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Development of an observational error model, and astrometric masses of 28 asteroids

Thesis submitted by
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Statement on the Contribution of Others

This dissertation produced three published papers:

- Chesley, S.R., Baer, J.J., Monet, D.G. Treatment of Star Catalog Biases in Asteroid Astrometric Observations, 2010, Icarus 210, 158. Sections 1-5 of this paper correspond to section 4 of the dissertation. Steve Chesley coordinated the community-wide effort to resolve the star catalog biases, and was therefore the lead author of this paper. I wrote sections 1, 2, 4.1, 5, 7.1, and 8 of this paper, while Steve wrote sections 3, 4.2, 6, and 7.2. For the purposes of this dissertation, I have rewritten all of the text that Steve contributed in my own words. Dave Monet contributed the catalog-specific bias look-up table described in that paper's section 4.2. With the exception of sections 6 and 7 (which are not included in this dissertation), I performed all of the calculations for this paper.
- Baer, J.J., Chesley, S.R., Milani, A. Development of an observational error model, 2011, Icarus 212, 438. The content from this paper corresponds to sections 3 and 5 of the dissertation. I wrote all of this paper, and performed all of the research associated with it.
- Baer, J.J., Chesley, S.R., Matson, R.D. Astrometric Masses of 26 Asteroids and Observations on Asteroid Porosity, 2011, Astronomical Journal, 141, 143. The content from this paper corresponds to sections 2, 6.0, 6.3, and 7.0 of the dissertation. I wrote all of this paper. Rob Matson contributed precovery observations of several asteroids; but I performed all of the calculations and analysis.

Intellectual support was provided by the following collaborators:

- Steve Chesley (Solar System Dynamics Group, Jet Propulsion Laboratory) acted as my Principal Supervisor. We discussed all aspects of this effort, including the design, construction, implementation, and validation of the observational error model, and the interpretation of the asteroid mass determinations. Steve coordinated the community-wide effort to resolve the star catalog biases, and was therefore the lead author of the first paper; however, for the purposes of this dissertation, I have rewritten all of the text that Steve contributed to that paper in my own words. Steve was also co-author on the second and third papers.
- Andrea Milani (Department of Mathematics, University of Pisa) helped conceive the idea of an observational error model, and provided guidance throughout its development. He was a co-author on the second paper.
- Rob Matson (Science Applications International Corporation) was a co-author on the third paper, contributing precovery images and reduced positions of several test asteroids.
- Dave Monet (U.S. Naval Observatory) was a co-author on the first paper, contributing the catalog-specific bias look-up table.

- Dan Britt (Department of Physics, University of Central Florida) shared his expertise on asteroid mineralogy, and discussed the appropriate grain densities for different asteroid classes.
- Alan Harris (Space Science Institute) helped locate a reliable occultation-based diameter for asteroid 8 Flora.

The full text of this dissertation was written by me; and all calculations (unless otherwise noted) were performed by me.

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Abstract

As a large asteroid encounters a smaller body, its gravitational attraction perturbs the trajectory of the smaller asteroid. The method of astrometric mass determination uses a least-square algorithm to simultaneously solve for both the orbit of the small asteroid, and the mass of the larger asteroid required to produce the observed perturbation. Since the perturbations are quite small, the observations of the smaller asteroid must be highly precise; and the perturbations of other asteroids must be accounted for.

Current practice, however, is to assume that all observations of a given era have the same uncertainty, and that the errors in these observations are uncorrelated. These assumptions are unrealistic; and they lead to sub-optimal masses and orbits. We therefore pursue development of an observational error model that provides realistic estimates of the uncertainties and correlations in asteroid observations.

In the course of our first attempt to construct the error model, we detected a significant bias in the observations of numbered asteroids, due to position-dependent errors in the star catalogs from which the observations were reduced. Before proceeding further, we developed a method to remove these biases, and undertook extensive calculations to validate its performance. Implementing this technique, we completed development of the error model, and demonstrated that it produces orbits that are both more accurate, and more precise.

We then used the new error model to iteratively refine an integrated ephemeris of 300 large asteroids, which allowed us to deduce the masses of 28 main-belt asteroids. These include the first published masses of 5 Astraea ($1.255 \pm 0.003 \times 10^{-12} M\odot$) and 39 Laetitia ($2.83 \pm 0.73 \times 10^{-12} M\odot$).

After combining our mass estimates with those of other authors, we studied the bulk porosities of over 50 main-belt asteroids; and after reviewing the collisional evolution of main-belt asteroids, we concluded that asteroids as large as 300 km in diameter may be loose gravitational aggregates. This finding will place a specific constraint on models of main-belt collisional evolution. Additionally, we found that C-type asteroids tend to have significantly higher macroporosity than S-type asteroids; and after reviewing thermal models of asteroid accretion, we concluded that distant C-type asteroids likely have a cometary-type structure and composition that results from a lack of global heating following their initial accretion.

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1 Introduction

A remarkable amount of information can be deduced about an asteroid, simply by tracking its path across the sky, and dissecting the light reflected by its unresolved disk. For instance, precise observations over a sufficiently long observational baseline allow us to calculate the asteroid's orbit, and thus predict its position at future (and past) dates. If these predicted positions are sufficiently precise, we can observe occultations of background stars, allowing us to directly measure the asteroid's diameter. Combined with systematic analyses of the asteroid's lightcurve, we can deduce its three dimensional shape, and thus its volume. Infrared spectroscopic observations can help us characterize its surface mineralogy; and by comparing these observations with the properties of recovered meteorites, we can identify suitable analogues, and thus estimate the grain density of the asteroid's surface minerals. Finally, by observing how the asteroid gravitationally perturbs the trajectories of its neighbors, we can deduce its mass. Combining the mass and volume allows us to deduce the asteroid's bulk density; and comparing this to the grain density of its constituent minerals, we can calculate its bulk porosity.

As impressive as this chain of reasoning might be, however, these measurements of diameter, relative dimensions, and mass all rely upon an accurate understanding of the asteroid's orbit.

While the force model governing an asteroid's motion is deterministic, uncertainties in the observations used to calculate the orbit lead to uncertainties in the resulting state vector; so the asteroid's position and velocity at any time are actually expressed as a six-dimensional ellipsoid whose size is governed by a probability density function. We assume that the observational uncertainties are normally distributed; but until recently, little effort has been devoted to confirming this assumption, or to determining the proper parameters of this distribution. Indeed, current convention is to assume that all observations from a given era are of equivalent precision, regardless of source; and that any errors in these observations are uncorrelated. While such simplifications may have been necessary when computational resources were more limited, they actually penalize the accuracy and precision of current work.

Since the observed perturbations in the orbit of a small asteroid caused by the gravitational attraction of a large asteroid are of roughly the same order of magnitude as the uncertainties in those observations, the accuracy and precision of the derived masses depend heavily upon accurate modeling of the observational errors. And the proper weighting of observations is especially vital, if we are to combine observations of different levels of precision. New surveys, such as PanSTARRS, promise to routinely provide observations with uncertainties on the order of 0.1 arc seconds (Jedicke and The Pan-Starrs Collaboration, 2004), thus permitting highly sensitive mass estimates. But many mass determination encounters are fixed in the past, or rely upon long observational baselines. So while new and highly precise observations may be helpful, we must also make the best possible use of less precise contemporaneous and historical observations.

Therefore, our primary objective will be to develop a realistic model of the errors in optical observations of asteroids, applicable to the full set of available observations. Once that error model is complete, we will validate it against conventional assumptions, demonstrate its superiority for both asteroid orbit and mass determination, and illustrate its performance for PanSTARRS-class surveys.

In assuming that the observational errors are normally distributed, however, we implicitly assume that these errors are not systematically biased. In the development of the error model, we will encounter just such a bias in the positions derived from star catalogs; and it will be necessary to model and eliminate the effects of this bias, and to validate the effectiveness of our debiasing technique, before proceeding further.

The validated error model will then be used to calculate the masses of 28 main belt asteroids. Combined with the efforts of other researchers, this provides us with a significant sampling of the properties of asteroids; and we will discover that about half of the asteroids with diameters less than 300 km have a significant level of porosity. Explaining this high porosity will send us in several directions.

First, we will review current theories as to the collisional evolution of asteroids following their accretion in the solar nebula. We will find that, over the lifetime of the solar system, collisions between asteroids are inevitable. The material properties of the asteroids determine how they will respond to these collisions; and we will find that some collisions are so violent that they disrupt the target asteroid, leaving the fragments to recombine under their own gravity as a "rubble pile". Gaps between the fragments give these asteroids a high level of porosity; and we will conclude that such collisional evolution likely accounts for the observed high porosities of most asteroids.

Upon comparison with S-type asteroids, however, we will find that C-type asteroids with semi-major axes greater than 3.0 AUs have anomalously high porosities that cannot be explained simply as a result of collisional evolution. Instead, we will find that, lying so far from the Sun, these asteroids took much longer to accrete from the solar nebula. This delay meant that most of their short-lived radioactive isotopes decayed prior to accretion; as a result, these asteroids were never warmed by the internal heat of radioactive decay. Since that heating was vital in the lithification process, these distant C-type asteroids were left essentially unmodified by metamorphosis or aqueous alteration, remaining highly porous gravitational aggregates of accreted dust grains and water ice that might best be described as "cometary".

Finally, we will look forward to future developments of the error model, and to refinements in our mass determination techniques.

We begin with a short summary of current practice, and a discussion of our previous work.

1.1 Asteroid Mass Determinations

There are several methods of measuring the mass of an asteroid, all of which depend, in some way, upon an analysis of its gravitational effects. In the 209 years since the discovery of Ceres, approximately 473,000 asteroids have been catalogued (Williams, 2007); but we have measured the masses of less than 60 (see Table 14). This is testament to the difficulty of isolating the small gravitational perturbations of individual asteroids from the "background noise" of the chaotic main belt.

Most successful orbit determinations have utilized the "astrometric" method, involving the study of close approaches between two asteroids. If accurate observations exist for the period before, during, and after an encounter between a large ”subject” asteroid and a smaller ”test” asteroid, one can deduce the mass of the subject asteroid by studying the resulting perturbations in the trajectory of the test asteroid. This method was first utilized by Hertz (1966) to yield a mass for 4 Vesta.

Since the IAU Minor Planet Center (MPC) currently offers a database of over 56 million asteroid observations, it is often possible to select cases where observations exist before, during, and after an encounter; therefore, this method should theoretically be quite successful. Until recently, however, the precision of optical observations has been relatively poor; and the cumulative effect of unmodeled perturbations from other main-belt asteroids often swamps the weak signal of the individual perturbation one is attempting to measure. Thus, only the largest asteroids have produced detectable perturbations.

By comparison, the precision of spacecraft range and Doppler tracking data is quite good; such data is therefore extremely useful in detecting asteroid perturbations. Analysis of tracking data from Mars probes such as Viking, Mars Pathfinder, and Mars Global Surveyor has permitted measurement of the masses of the three largest asteroids, Ceres, Pallas, and Vesta, to within a few tenths of a percent (Standish, 2001) (Pitjeva, 2001). And tracking data from close fly-bys by spacecraft such as NEAR Shoemaker have enabled us to measure the masses of smaller asteroids, such as 253 Mathilde (Yeomans et al., 1997) and 433 Eros (Yeomans et al., 2000). But building, launching, and operating spacecraft is quite expensive; and unless the asteroids are very large, only close-range encounters can yield useful masses.

Finally, many asteroids have been observed to possess satellites of their own. The first such discovery was made by the Galileo spacecraft, when it encountered 243 Ida while passing through the main belt on the way to Jupiter. From imagery that provided estimates of the satellite asteroid's orbital period, Kepler's Third Law was used to estimate the mass of the parent asteroid (Belton et al., 1995). Since then, the use of ground-based adaptive optics and radar have led to the discovery of additional satellites, and resulted in several especially precise mass determinations, including 22 Kalliope (Margot and Brown, 2001) (Descamps et al., 2008) (Marchis et al., 2008a), 45 Eugenia (Merline et al., 1999) (Marchis et al., 2008a), 87 Sylvia (Margot and Brown, 2001) (Marchis et al., 2005a), 90 Antiope (Merline et al., 2002) (Descamps et al., 2007), 107 Camilla (Marchis et al., 2008a), 617 Patroclus (Marchis et al., 2006), 762 Pulcova (Merline et al., 2002) (Marchis et al., 2008a), 3749 Balam (Marchis et al., 2008b), 1999 KW4 (Ostro et al., 2006), and 2000 DP107 (Margot et al., 2002).

Since we do not have access to such specialized instruments or spacecraft, we have elected to utilize the astrometric method of mass determination. However, by conducting a thorough search for candidate encounters, employing an extremely accurate force model, and applying a statistical error model to properly weight the observations, we hope to discover several additional masses, and significantly refine those already obtained.

1.2 Asteroid Volume Determinations

Assuming that a reliable estimate of the volume of an asteroid is already available, determining the mass of that asteroid immediately yields its bulk density; and by comparing the bulk density to the grain density of the corresponding meteoritic analogue, we can estimate its bulk porosity.

Unfortunately, as explained by Hilton (Hilton, 2002), obtaining a reliable estimate of an asteroid's volume has also proven difficult. Initially, optical astronomers used micrometers to estimate the diameters of asteroids; but even in the cases of 1 Ceres, 2 Pallas, and 4 Vesta, the apparent disks were simply too small, and these measurements eventually proved inaccurate.

Radiometric measurements, in which the amount of reflected visible radiation is compared with the amount of emitted infrared radiation (Allen, 1971), initially yielded observational uncertainties of approximately 100 km. However, the Infrared Astronomical Satellite (IRAS), launched in 1983, refined this technique to provide the diameters of 2228 asteroids with uncertainties of approximately 10% (Tedesco et al., 2002); to this day, the Supplemental IRAS Minor Planet Survey remains the primary source of asteroid diameters. Nevertheless, most asteroids are aspherical; and the volumes derived from radiometric diameters cannot account for such shape factors.

Another method of measuring asteroid size involves stellar occultations. Given the times of eclipse and reappearance, each observer essentially determines the length of a chord of the asteroid's projection onto the image plane; if enough observers stationed across the predicted track participate, the size and shape of this projection can be precisely determined. But unless repeated occultations allow a sampling of the shape at different rotational phase angles, the three-dimensional shape and volume of the asteroid cannot be determined. A somewhat complementary method involves deducing a triaxial shape model of an asteroid from its rotational light-curve. As the asteroid tumbles through space, different faces are presented to observers, resulting in subtle changes in apparent brightness; if enough observations can be obtained, the ratio of the sizes of the three axes can be derived (Ostro et al., 1984). Combining the relative dimensions from the light-curve with the absolute size from occultations, an accurate volume can be obtained.

Direct imaging by spacecraft such as Galileo and NEAR Shoemaker have yielded shape models and volumes for 243 Ida (Belton et al., 1996), 951 Gaspra (Belton, 1994), 253 Mathilde (Yeomans et al., 1997), and 433 Eros (Yeomans et al., 2000). Imaging by the Hubble Space Telescope has provided precise dimensions of the largest asteroids, including 4 Vesta (Thomas et al., 1997); and the use of adaptive optics on large ground-based telescopes has provided data of comparable precision (Drummond et al., 1998). Another particularly intriguing technique involves analysis of reflected radar delay and Doppler data, using the Arecibo radar telescope to illuminate the target. While this technique has yielded extremely precise shapes and volumes for 4769 Castalia (Hudson and Ostro, 1994) and 216 Kleopatra (Ostro et al., 2000), it is limited by the r^{-4} falloff in signal intensity.

With the exception of long-term orbital imaging, however, each of these these methods only provides a cross-sectional profile of the asteroid; the presence of significant concavities could lead us to overestimate the asteroid's volume. Moreover, in reducing a cross-section to an "equivalent sphere", and using that sphere to estimate the asteroid's volume, we are likely to overestimate the volume, and hence underestimate the density.

1.3 Asteroid Density and Porosity

While there are many different taxonomic schemes seeking to precisely classify asteroids based on spectral data, asteroids can be divided into three broad categories: C (Carbonaceous), S (Silicate), and M (Metal). In many dynamical simulations, including the development of planetary ephemerides, it is assumed that all asteroids of a given taxonomic class have the same bulk density. When combined with IRAS diameters (and assuming spherical shapes), the perturbations due to hundreds of asteroids can be modeled.

By comparing the bulk density (that is, total mass divided by total volume) of an asteroid with the grain density (that is, the density of a solid mineral) of its constituent minerals (usually estimated using meteoritic analogues), we can estimate its bulk porosity (that is, the percentage of an asteroid's volume that is empty). The very largest asteroids have low bulk porosities, ranging from 0-10%; such asteroids are described as being ”coherent” or ”monolithic”. Many smaller asteroids have bulk porosities ranging from 10-30%, and are described as being ”fractured”, presumably by collisions with other asteroids. Some have even greater bulk porosities, and are described as being ”rubble piles”. These asteroids were likely thoroughly disrupted by a catastrophic impact; the fragments later recombined under their weak mutual gravitational attraction, leaving voids between them.

We would emphasize, however, that inferring grain density from meteoritic analogues can be problematic. First, taxonomic classifications can be ambiguous, especially if they are based solely on the differences in apparent magnitude at selected wavelengths. Second, we can only observe surface composition; it is possible that an asteroid's interior composition may differ, or that significant internal voids may be present. Finally, the association of specific meteorite types with specific taxonomic classes is subject to error. Therefore, due caution should be exercised.

Also, unusual or highly irregular shapes, or concavities (especially from large craters), may cause us to overestimate the volume, and hence underestimate the bulk density, and overestimate the bulk porositiy. On the other hand, it is much harder to underestimate the volume; so unexpectedly large bulk densities (and thus negative porosities) indicate that either the mass or the assumed grain density is suspect.

As a practical matter, the degree of porosity significantly affects an asteroid's impact dynamics. Indeed, the energy of an impact shock wave is largely dissipated in collapsing the voids, making highly-porous asteroids surprisingly difficult to disrupt (Britt et al., 2002).

2 Previous Work

Before attempting to develop a statistical error model for asteroid observations, we employed conventional astrometric methods in measuring the masses of 21 main-belt asteroids (Baer and Chesley, 2008). Since many of the principles and techniques are still employed in our most recent work, we will discuss them in detail.

Astrometric mass determination is a modification of conventional least-squares orbit determination, in which the mass of the perturbing body is added as a seventh solve-for parameter. Ideally, the process is applied to relatively close encounters between a large *subject* asteroid and a small *test* asteroid, where precise observations of the test asteroid exist before, during, and after the encounter.

Since the mass determination calculations are lengthy, it is first necessary to conduct a survey for encounters likely to result in significant deflection of the test asteroid. Furthermore, since the mass determination process is based upon perturbations in the trajectory of a test asteroid, it is absolutely essential to employ an accurate force model that accounts for all other known perturbations upon that test asteroid. And since newly-calculated asteroid masses and orbits improve the accuracy of the force model, the processes of mass determination and force model refinement are intertwined.

We will therefore begin with the selection of candidate encounters; later, we will describe the iterative scheme that yielded our previous asteroid masses and ephemerides.

2.1 Selection of candidate encounters

As described by Michalak (Michalak, 2000), perhaps the most direct method of selecting suitable mass determination encounters involves integrating the orbit of a small test asteroid through the period of available observations, both with and without the influence of the large subject asteroid; cases in which the perturbed and unperturbed trajectories result in significant differences in predicted right ascension and declination are obvious candidates for detailed analysis.

However, with over 120,000 numbered asteroids catalogued at the time of our analysis, we felt that the integration required to test all of the possible encounters for even a limited number of large asteroids would be prohibitive. We therefore sought a computationally-efficient alternative.

As described by Hilton (Hilton et al., 1996), a two-body approximation of the deflection angle θ in the trajectory of a small test asteroid due to the gravitational perturbation of an encounter with a large subject asteroid is given by

$$\tan\frac{\theta}{2} = \frac{G(m+M)}{v^2 b}$$

where m and M represent the masses of the test and subject asteroids, v is the relative velocity, and b is the distance of closest approach.

However, there are limits to relying solely upon the deflection angle as the survey criterion. First, it is unclear whether the direction of deflection will result in an easily-observable change in trajectory; a deflection that largely impacts the inclination of the test asteroid's orbit, for instance, would not be as easily noted as a deflection that significantly alters its semi-major axis. Second, even a relatively small change in the test asteroid's semi-major axis may provide useful data if several decades of observations exist both before and after the encounter.

In hopes of optimizing our selection of candidate encounters, we therefore applied Opik's two-body analysis of planetary encounters, as developed in Carusi et al. (1990), and in Valsecchi et al. (2003). This two-body analysis allowed us to estimate the change in the inclination and semi-major axis of a test asteroid's orbit due to an encounter with a larger subject asteroid. Thus, for each large subject asteroid, we tested every other possible numbered test asteroid in the Minor Planet Center orbital database (MPCORB) with a relative Minimum Orbital Intersection Distance (MOID) of 0.1 AU or less, conservatively selecting those encounters within the period of observation of the test asteroid resulting in a predicted deflection angle, predicted change in inclination, or predicted change in sky position, exceeding 0.002 arc seconds. In total, over 2500 candidate events were identified.

2.2 The force model

The main asteroid belt is a chaotic system in which each asteroid is gravitationally perturbing every other asteroid; to make an analogy with radio, successful mass determination therefore requires isolating a very weak signal from a very noisy background environment. Clearly, we needed to account for every other significant perturbation on a test asteroid, so that the perturbations due to the subject asteroid could be isolated by the least-squares algorithm.

The software used for the mass determinations was a modified version of the CODES application (Baer, 2004), whose integration force model accounts for gravitational perturbations (including first-order relativistic terms), the oblateness of the Sun, Earth, and Jupiter, and solar radiation pressure. In calculating gravitational perturbations due to the Sun, planets, and Earth's Moon, CODES uses the JPL DE-405 ephemeris, which provides precise positions of these bodies for the period 1800-2200.

Standish explains that, in accounting for perturbations due to the 300 most important perturbing asteroids, the DE-403 ephemeris calculated positions of these asteroids using their mean orbital elements (Standish et al., 1995). The masses of these perturbing asteroids were modeled using diameters from the Infrared Astronomical Satellite (IRAS) catalog, assuming a uniform density for asteroids of each taxonomic class (the mean densities were adjusted as part of the least-squares solution). In refining this process for DE-405, the orbits of Ceres, Pallas, and Vesta were integrated accounting for perturbations from the Sun, planets, and Moon, while the orbits of the other 297 asteroids were integrated accounting for perturbations from the Sun, planets, Moon, Ceres, Pallas, and Vesta (Standish, 1998).

The baseline CODES application used an approach similar to DE-403, accounting for gravitational perturbations from the 300 asteroids based on positions from mean orbital elements. Clearly, such an approximation would not suffice here.

To enhance the CODES force model for mass determination, we therefore resolved to create a fully-integrated ephemeris of the 300 asteroids, in which the orbit of each asteroid would account for perturbations from the Sun, planets, Earth's Moon, and the other 299 asteroids. Since this ephemeris would be derived from (and fully consistent with) DE-405, we termed it the BC-405 asteroid ephemeris.

2.3 The iterative process

Clearly, the masses of the 300 asteroids would be required to model their perturbations; but since the entire purpose of the BC-405 ephemeris was to facilitate the determination of those very same masses, we decided to pursue an interative approach.

First, we applied the mass determination algorithm to the 2500+ candidate encounters, using a simplified asteroid ephemeris that accounted only for perturbations from Ceres, Pallas, and Vesta (abbreviated as "CPV"), with the CPV masses taken from DE-405 and the CPV orbits based on mean elements. The mass determination algorithm provided the statistical uncertainty in the measured mass; masses were considered valid if the *significance* (defined as the ratio of the measured mass to its uncertainty) exceeded two. Only those 102 candidate events resulting in valid masses, or in mass uncertainties less than one-half of the a priori' mass (estimated using a density of 2 g/cm^3 and the known IRAS diameter), were retained for further study.

An initial *draft zero* version of the BC-405 ephemeris was then created, using MPCORB state vectors (Marsden, 2005) of the 300 asteroids at epoch, the best available published masses (see Table 14) for some of the largest asteroids, and estimates based on DE-403 taxonomic class densities (Standish et al., 1995) and IRAS diameters (Tedesco et al., 2002) for the masses of all other asteroids. This draft zero ephemeris was used by the mass determination algorithm to analyze the remaining 102 candidate events, using all available observations of the test asteroids in the AstDyS database (Milani and Chesley, 1999). The draft zero ephemeris was also used in a conventional orbit determination algorithm to refine the epoch state vectors of the 300 asteroids in the ephemeris, using all available observations of each ephemeris asteroid in the AstDyS database.

Then, the newly-calculated masses and refined state vectors were used to create the next version of the ephemeris. The entire process was repeated four times, until the calculated masses and orbits in successive versions of the ephemeris agreed to within their 1σ uncertainties.

The final result was an internally-consistent set of measured masses and ephemeris state vectors.

2.4 The mass determination algorithm

As noted above, the mass determination algorithm consists of calculating a precise orbit of the test asteroid, and solving for the perturbing mass of the subject asteroid. To provide context for what follows, we will briefly review the orbit determination process.

The conventional least-squares orbit determination algorithm relies upon finding the minimum of the cost function

$$Q(x) = b^T \Lambda^{-1} b \tag{1}$$

In this equation, x is the state vector, $b = b(x)$ is a vector containing the "observed - computed" residuals for each observation, and Λ is the observational covariance matrix, with

$$\Lambda_{ij} = r_{ij} \sigma_i \sigma_j \tag{2}$$

where σ_i is the square root of the covariance (i.e., the uncertainty) of the ith observation, and r_{ij} is the correlation between the ith and jth observations. We would find the minimum by seeking stationary points of $Q(x)$:

$$0 = \frac{dQ}{dx} = 2b^T \Lambda^{-1} \frac{db}{dx}$$

If we define $A = \frac{\delta b}{\delta x}$, then the equation to be solved reduces to

$$0 = A^T \Lambda^{-1} b$$

If we assume a total of N data points, where N = 2(number of optical observations) + (number of radar delay observations) + (number of radar doppler observations), then b is an $N \times 1$ vector, A is an $N \times 6$ matrix, and Λ is a $2N \times 2N$ matrix.

The solution of this equation is

$$dx = -(A^T \Lambda^{-1} A)^{-1} A^T \Lambda^{-1} b$$

To populate A, we create six variant trajectories by adding small increments Δx_j to the nominal state vector; noting the resulting change Δb_i in the predicted RA and Dec compared to the nominal trajectory, we use the numerical approximation $A_{ij} \approx \frac{\Delta b_i}{\Delta x_j}$.

Conventionally, it is assumed that σ_i is 3 arc seconds for optical observations prior to 1890, 2 arc seconds for observations from 1890-1950, and 1 arc second thereafter. The additional assumption that observations are uncorrelated, i.e.,

$$r_{ij} = \begin{cases} 1 & \text{when } i = j, \\ 0 & \text{when } i \neq j. \end{cases}$$

leads to Λ being a diagonal matrix, thus greatly simplifying solution. The validity and consequences of these assumptions will be addressed at length in subsequent sections.

In the initial stages of the least-squares algorithm, all available optical and radar observations of the test asteroid are used, until successive state vector solutions converge. Then we begin evaluating the χ value of each observation

$$\chi = \sqrt{\left(\frac{(\alpha_o - \alpha_c) \times \cos\delta}{\sigma_\alpha}\right)^2 + \left(\frac{(\delta_o - \delta_c)}{\sigma_\delta}\right)^2}$$

where α represents right ascension, δ represents declination, the subscripts "o" and "c" refer to "observed" and "calculated" (or predicted) values, and σ is the square root of the covariance (i.e., the uncertainty) in each observation. Observations with χ values exceeding a user-defined threshold are excluded (referred to as *outlier rejection*), and a new solution is calculated, with the process being repeated until successive state vector solutions again converge; in each successive solution, every observation is considered for inclusion, even if it had been excluded in the prior solution.

In modifying this algorithm for astrometric mass determination, the mass of the perturbing body was added as a seventh solve-for parameter in the state vector x; otherwise, the principles were identical.

Since no manual editing of observations would be used, we decided to attempt to duplicate the effect of such editing through control of the χ threshold. First, the masses were calculated using a threshold of $\chi \leq 5$. The resulting subject asteroid mass and test asteroid state vector were then used to initialize a second mass determination using a threshold of $\chi \leq 3$. Finally, the resulting subject asteroid mass and test asteroid state vector were used to initialize a third mass determination using a threshold of $\chi \leq 1.5$. A weighted average of these three masses was used as the final value.

In addition to the 300 asteroids in the BC-405 ephemeris, the mass determination force model also accounted for perturbations from any other asteroids that our survey predicted might deflect the test asteroid. The trajectories of these *additional perturbers* were integrated using CPV propogation, beginning with the MPCORB epoch state vector; and since published masses for these additional perturbers were not available, their masses were estimated using taxonomic class-based densities and IRAS diameters.

2.5 Results

In all, 56 of the candidate events yielded valid masses for 21 separate subject asteroids. Any measured masses differing from the weighted average for that asteroid by more than 6σ (where σ is the square root of the weighted mass covariance, i.e., the weighted uncertainty) were discarded. In the cases of asteroids 1 Ceres, 4 Vesta, and 10 Hygiea, literally dozens of valid masses were obtained; but to optimize the quality of the results, only those events where the significance exceeded a given threshold (50 for Ceres and Vesta, 30 for Hygiea) were used.

For asteroids 10 Hygiea, 15 Eunomia, 16 Psyche, 52 Europa, 87 Sylvia, 511 Davida, and 704 Interamnia, parallel mass determinations were made by an independent algorithm used in Chesley et al. (2005); agreement between the two algorithms was excellent, and the results with the largest significance were used.

Our results from this previous work are listed in Table 14 alongside other recently published values. Of the 21 asteroids for which valid masses were measured, 5 masses appeared to be new, 14 agreed to within 1σ with previously published values, and the other 2 masses were within 2σ of previously published values.

3 The Observational Error Model

In the common circumstance where more than three observations of a given asteroid exist, the random noise in observations will ensure that the best-fit orbit passes through none of the observations; we seek a statistical solution that minimizes the sum of the squares of the right ascension and declination residuals.

But the least-squares method assumes that the noise in the right ascension and declination observations is unbiased, and has a normal distribution. Moreover, the assumption that observational errors are uncorrelated may well have been necessary in an era before multi-GHz microprocessors, in order to simplify the mechanics of solution; but common sense suggests that closely-spaced observations made by the same observatory of the same asteroid will likely have common systematic errors due to star catalog biases, timing errors, differential refraction, etc. Finally, the assumption that all observatories within a given era have uniform uncertainty is highly dubious, as factors such as aperture size, detector technology, astrometric reduction methodology, and observer experience are clearly relevant in determining the level of observational precision and accuracy. Indeed, as we will discover, even the choice of star catalog can prove pivotal.

Combining the astrometric products of diverse instruments also becomes problematic. For instance, Pan-STARRS is expected to yield observational uncertainties of 0.1 arc seconds (Jedicke and The Pan-Starrs Collaboration, 2004), almost an order of magnitude more precise than current surveys; but if all observations are weighted with a uniform uncertainty of 1 arc second, the least-squares algorithm will produce a solution whose errors are equally distributed. It is therefore highly likely that the *apparent* residuals in Pan-STARRS observations will greatly exceed the design specifications, casting doubt on the system's performance.

In short, even as applications such as collision analysis and mass determination push orbit determination to the limits of observational precision, assumptions are made that essentially guarantee the incorrect weighting of observations, and a suboptimal solution.

3.1 The Work of Carpino et al. (2003)

Carpino et al. (2003) sought to definitively test whether observational errors had a Gaussian distribution; and if so, to determine whether the parameters of that distribution could be determined.

They began by calculating the best-fit orbits of the 17,349 numbered asteroids then catalogued. Statistical analysis focused on the observatories contributing the largest number of observations. It was found, for instance, that the residuals of the LINEAR survey did indeed have a near-Gaussian distribution, assuming an outlier rejection scheme was utilized.

However, after separating the observations into bins based upon the observatory making the observation, the date of the observation, the detector technology used, and the number of digits with which the time and RA/Dec were reported, it was also found that the RMS errors for some observatories were significantly smaller than those for other observatories. For instance, the declination RMS error for the US Naval Observatory in Flagstaff (MPC code 689) was typically about 0.14 arcseconds, while that for Palomar Mountain (MPC code 675) often exceeded 1 arc second. Moreover, the residuals for a given observatory varied with time. For example, the declination RMS error for Palomar Mountain increased from 0.69 arc seconds in the years 1959-1962 to 1.34 arc seconds in the years 1972-1974.

Additionally, a non-trivial bias in declination residuals was observed. This bias would unexpectedly reappear in our own work (see section 4.1).

Finally, it was demonstrated that the residuals in observations of the same asteroid made by the same observatory are often signficantly correlated; the correlations are highest for closely-spaced observations separated by less than an hour, and decay rapidly with time. For instance, declination residuals for the LINEAR survey (MPC code 704) had correlations for closely-spaced observations as high as 0.32; but for observations separated by more than 24 hours, the correlations dropped to less than 0.15. The authors showed that these correlations could be adequately modeled by functions of the form

$$Ae^{-Bt} + Ce^{-Dt} + E(1 - Ft^2)e^{-Gt} \tag{3}$$

where t is the time separating observations (see section 3.2).

Based upon these results, the authors proposed the development of an observational error model that would determine the parameters (RMS errors, biases, and correlations) of the RA and Dec residual distributions for each observatory contributing observations to the Minor Planet Center. When calculating the orbit of an asteroid, these observatory-specific parameters could be used to properly weight each observation; and the least-squares algorithm would then yield an optimal best-fit orbit.

Our intent was to create such a model, validate its performance against conventional methods, and apply it to derive the most accurate possible asteroid masses.

3.2 Definition of the Observational Error Model

The observational error model is essentially a statistical analysis of the demonstrated performance of each contributing observatory over a specific time interval. Per Carpino et al. (2003), it is explicitly assumed that ”observed - computed” residuals are unbiased and (after outlier removal) normally distributed.

We began by calculating the ”observed - computed” residuals for all available observations. To ensure that the orbits were sufficiently well-established as to ensure that these residuals could be computed accurately, consideration was restricted to the 42 million optical observations of numbered asteroids in the Minor Planet Center's database as of January 22, 2008. These observations were then separated into statistically homogeneous ”bins”, designed to isolate any factors that might reasonably be expected to impact astrometric accuracy or precision; thus, all observations assigned to a particular bin must share the following characteristics:

- they must be from the same observatory;
- they must occur within the same 30-day period;
- they must have a measured or predicted apparent magnitude falling within a one-magnitude range;
- they must either lie within 10 degrees of the galactic equator, lie above galactic latitude +10 degrees, or lie below galactic latitude -10 degrees;
- the same detector technology (e.g., CCD vs. photographic plate) must be used to collect the observations.

To satisfy the Law of Large Numbers, we required a minimum bin size of 1000 observations:

- If a bin was smaller than the minimum size, it was combined with the nearest bin (in the sense of time) that shared all other characteristics;
- If a bin was still smaller than the minimum size, it was combined with the nearest bin (in the sense of apparent magnitude) that shared all other characteristics;
- If a bin was still smaller than the minimum size, it was combined with the nearest bin (in the sense of galactic latitude) that shared all other characteristics;

- If a bin was still smaller than the minimum size, it was combined with a bin that matched in all characteristics except detector technology.
- If any bins smaller than 1000 observations remained, those observations were placed into a ”MIX” bin.

Within each bin (and assuming that the residuals are, in fact, normally distributed),

- the sum of the ”observed - computed” RA residuals yielded the mean RA bias;
- the sum of the ”observed - computed” Dec residuals yielded the mean Dec bias;
- the standard deviation of the ”observed - computed” RA residuals yielded the observational uncertainty in RA;
- the standard deviation of the ”observed - computed” Dec residuals yielded the observational uncertainty in Dec.

Modeling the error correlations was more challenging.

As noted previously, Carpino et al. (2003) demonstrated that closely-spaced observations *of the same asteroid* made by the same observatory had significant non-zero error correlations; errors from observations *of different asteroids* made by the same observatory were only very weakly correlated. Moreover, our intent was to model error correlation values for use in calculating the orbit of a *single* asteroid. Therefore, we restricted our attention to closely-spaced observations *of the same asteroid* made by the same observatory.

Carpino et al. (2003) further noted that such error correlations decayed quickly during the first day, then decayed more slowly to near zero over a period of weeks. We therefore required that observations be separated by less than 50 days.

Subject to these requirements, a single bin could not hope to contain enough such pairs of observations as to provide a statistically significant correlation sampling. Therefore, all observations associated with a given observatory were used to create a single correlation model for that observatory.

To accurately model each observatory’s performance, observation-pairs were placed in ”baskets”, depending on their separation in time; baskets were spaced at one hour intervals for the first day, and at daily intervals thereafter. The empirical error correlations within each basket B were calculated as

$$Corr = \frac{1}{N_B} \sum_{i,j \in B} b_i \sigma_i b_j \sigma_j$$

where N_B is the number of observation pairs in basket B, b_i is the ”observed - computed” residual in the i’th observation, and σ_i is the uncertainty in the i’th observation.

As a purely practical matter, however, the resulting 148 empirical data points for each observatory were too unwieldy to be used in an observational error model; it would be necessary to find a set of mathematical functions, each with a small number of coefficients and scaling factors, that best approximated (in a least-squares sense) the empirical data curves for each observatory. Moreover, the fact that these mathematical functions would be used to populate the covariance matrix imposed additional constraints. To guarantee that the covariance matrix can be inverted in the least-squares algorithm, it must be positive definite; and, as explained in Carpino et al. (2003), the individual correlations r_{ij} must decay to zero in order to guarantee that the covariance matrix will be positive definite. Therefore, we are limited to using exponential decay functions, or the products of quadratic functions times exponential decay functions, to model the error correlations.

In practice, we used functions of the form

$$r_{ij} = Ae^{-Bt} + Ce^{-Dt} + E(1 - Ft^2)e^{-Gt} \tag{4}$$

where t is the time separating observations i and j. The first exponential term was used to represent the rapid decay of error correlations during the first day, while the second exponential term was used to represent the slower subsequent decay through t = 50 days; the quadratic-exponential product term was used in a handful of cases where the correlation curves showed additional, non-exponential features. The constants A, B, C, D, E, F, and G were determined in a two-stage process. First, a systematic survey over the range of possible values of these constants revealed a combination that minimized the RMS difference between the observed and modeled correlations; and second, a least-squares algorithm was used to refine the solution.

Each bin inherited the RA and Dec correlation models of its observatory; so the error model for each bin consisted of the seven correlation model constants in both RA and Dec, combined with the mean biases and RMS errors in RA and Dec. Therefore, one need only determine in which bin an individual observation lay in order to determine the corresponding error model RA and Dec biases, uncertainties, and correlations. The entries of the covariance matrix corresponding to observation pairs made by the same observatory (separated by less than 50 days) were populated using Equations 2 and 4; all other entries were assumed zero.

3.3 Numerical Considerations

In our orbit and mass determinations, we do not directly solve the least squares normal equation

$$A\Delta x = \Delta b \tag{5}$$

Instead, we utilize the computationally efficient Square Root Information Filtering (SRIF) algorithm (Bierman, 1974). However, the SRIF algorithm assumes that the covariance matrix is the identity; and since the observational error model assumes that the errors between closely-spaced observations made by the same observatory have non-zero correlations, the covariance matrix will no longer be diagonal (much less the identity). Therefore, some preparatory work is necessary before the SRIF algorithm can be applied.

If the observational noise is represented by ν, then we have

$$A\Delta x + \nu = \Delta b \tag{6}$$

where

$$E(\nu\nu^T) = \Lambda \tag{7}$$

and Λ, the covariance matrix, is positive definite.

We use the outer product Choleski Square Root algorithm (Golub and Van Loan, 1989a) to find a matrix G such that $\Lambda^{-1} = G^T G$. Then, if we pre-multiply Eq. 6 by G, we have

$$GA\Delta x + G\nu = G\Delta b \tag{8}$$

If we define $\bar{A} = GA$, $\bar{\nu} = G\nu$, and $\bar{\Delta b} = G\Delta b$, our equation becomes

$$\bar{A}\Delta x + \bar{\nu} = \bar{\Delta b} \tag{9}$$

and we have

$$E(\bar{\nu}\bar{\nu}^T) = I \tag{10}$$

as desired.

Next, applying the SRIF algorithm, we use a sequence of Givens rotations (Golub and Van Loan, 1989b) to construct an orthogonal transformation T such that $T\bar{A}$ is upper triangular. We define the matrix R to be the upper 6x6 portion of $T\bar{A}$ (Note: If we're also solving for the mass of a perturbing subject asteroid, then R is the upper 7x7 portion of $T\bar{A}$). Then if z is a column vector consisting of the first six elements of $T\bar{\Delta b}$ (first 7 elements for mass determination), we have the solution

$$\Delta x = R^{-1} z \tag{11}$$

with covariance

$$P = R^{-1} R^{-T} \tag{12}$$

In some real-world cases, we have discovered that the Choleski algorithm fails. Since the Choleski algorithm is valid if the covariance matrix is positive definite, we can only conclude that the correlation model sometimes results in a covariance matrix that is not positive definite. In theory, this is not possible, since the correlation model is based on functions like Ae^{-Bt} and $E(1-Ft^2)e^{-Gt}$ that decay to zero for large t. In practice, however, estimated pairwise correlations, also known as polychoric correlations, can indeed lead to non-positive definite covariance matrices, because the correlations are not obtained en masse, and therefore may not be statistically consistent.

A straightforward (if numerically brutal) solution is to multiply all of the off-diagonal elements of the covariance matrix by 0.9; this procedure can be repeated until the covariance matrix is positive definite, and the Choleski algorithm converges.

After introducing this simple treatment, the problem has never reappeared.

4 The Initial Error Model, and the Star Catalog Biases

Our initial observational error model was constructed precisely as described above. The thirty most prolific observatories in contributing asteroid observations to the Minor Planet Center were included in the model:

- 046 - Klet Observatory, Ceske Budejovice
- 049 - Uppsala-Kvistaberg

- 095 - Crimea-Nauchnij
- 106 - Crni Vrh
- 120 - Visnjan
- 291* - LPL/Spacewatch II
- 327 - Peking Observatory, Xinglong Station
- 333* - Desert Eagle Observatory
- 411 - Oizumi
- 413 - Siding Spring Observatory
- 557 - Ondrejov
- 566* - Haleakala-NEAT/GEODSS
- 599 - Campo Imperatore-CINEOS
- 608* - Haleakala-AMOS
- 644* - Palomar Mountain/NEAT
- 645 - Apache Point-Sloan Digital Sky Survey
- 675* - Palomar Mountain
- 683* - Goodricke-Pigott Observatory, Tucson
- 688 - Lowell Observatory, Anderson Mesa Station
- 689* - U.S. Naval Observatory, Flagstaff
- 691* - Steward Observatory, Kitt Peak-Spacewatch
- 699* - Lowell Observatory-LONEOS
- 703* - Catalina Sky Survey
- 704* - Lincoln Laboratory ETS, New Mexico
- 801 - Oak Ridge Observatory
- 809* - European Southern Observatory, La Silla
- 910 - Caussols-ODAS
- E12* - Siding Spring Survey
- G96* - Mt. Lemmon Survey
- H07 - 7300 Observatory, Cloudcroft

Note: Only those observatories marked with asterisks yielded sufficient data to construct reliable correlation models; the other observatories shared the correlation model constructed for the MIX bin.

With the bias, RMS error, and correlation models in hand, we reprocessed the ”raw” observations, subtracting out the biases and assigning new uncertainties. We then recalculated the orbits of the numbered asteroids, with the correlation models providing more realistic covariance matrices.

For what follows, it will be useful to recall that the error model assumes the ”observed - computed” residuals are normally distributed. Moreover, one would expect that, once the RA and Dec biases associated with each bin were removed, the residuals would be unbiased, and the error correlations would be relatively small and decay quickly to zero.

Upon analysis, we found that these expectations were being violated.

4.1 Detection of the Star Catalog Biases

The RA and Dec correlation models for the initial error model are depicted in Figures 1 through 8. In a few cases (e.g., 683, 699, 703, and 704), the error correlations are relatively small, and quickly decay to zero, precisely as anticipated. In several other cases, however, (e.g., 291, 566, 608, 644, 675, 691, and 809), the errors are highly correlated. And in some instances (e.g., 291, 644, 689, and G96), the error correlations decay rather slowly, over a period of weeks, rather than hours; by Day 50, these correlations are still significantly greater than zero. This last point is especially significant, since the error correlations *must* decay quickly to zero in order for the least square covariance matrix to be positive definite, and thus invertible.

In retrospect, this suggests that a significant, undiscovered error source exists. At the time these correlation models were created, however, we anticipated that the error model development would be interative, with the orbits resulting from the first version being used to calculate the residuals that would form the basis of the second version, etc. We therefore hoped (and expected) that the high correlations would disappear after sufficient iterations.

Figure 9 illustrates the kurtosis of the RA and Dec residuals for the initial error model. The CODES least squares algorithm uses a chi-square rejection threshold for outlying observations of 8; the corresponding kurtosis (approximately 4.8) is greater than the expected value of 3, indicating that the RA and Dec distributions are slightly peaked. (Note: The definition of kurtosis used in this paper results in a normal distribution having a kurtosis of 3.0.) Moreover, no reasonable value for the rejection threshold results in a kurtosis near 3. While an ideal kurtosis is likely unachievable, this result is consistent with the presence of a correlating error source.

Unmistakable evidence of a serious problem emerged in Figures 10 and 11. A histogram of the ”raw” declination residuals (that is, based on nominal observations to which the error model was not applied) for the numbered asteroids revealed a clear bias of approximately +0.19 arc seconds; this was confirmed by a plot of the raw mean residuals for various values of chi-square. Significantly, no such bias is evident in the right ascension residuals; this led us initially to believe that only the declination observations were affected.

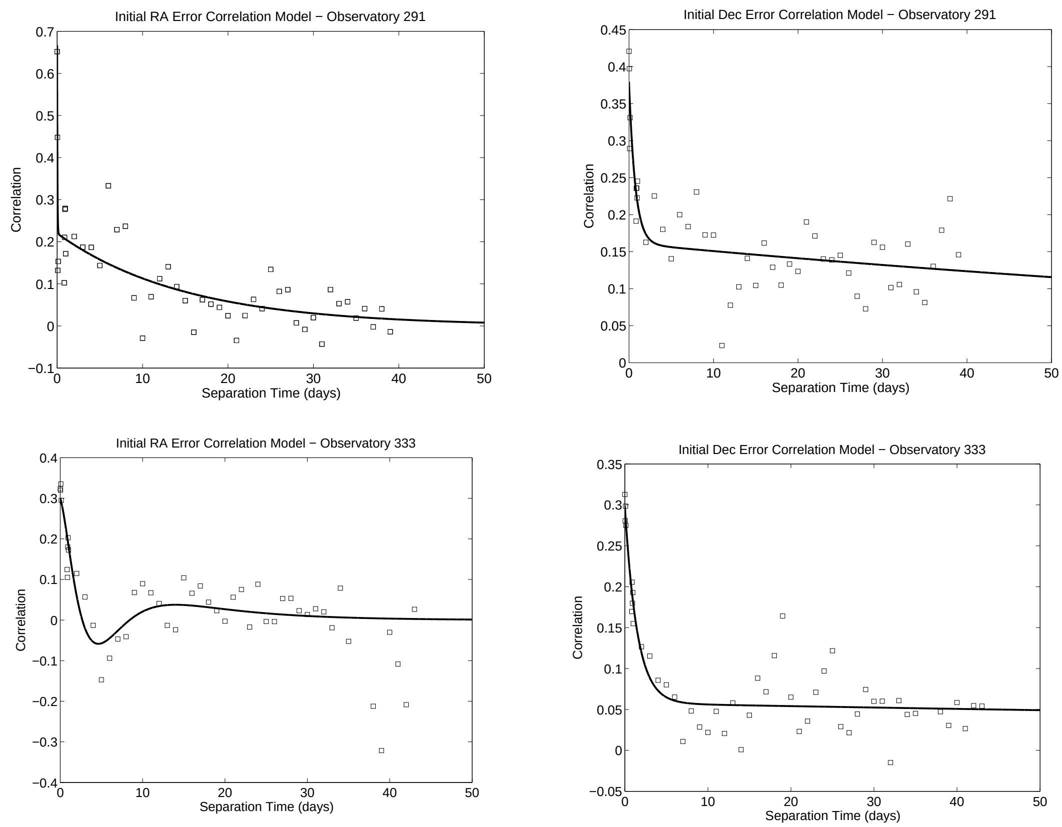


Figure 1: Initial RA and Dec correlation models for observatories 291 and 333.

Based on this data, we hypothesized that there were systematic declination biases in the star catalogs used to reduce the asteroid observations. And as we investigated further, we encountered evidence outside of our own work.

Fig. 12, dating to mid-2008, depicts histograms of the post-fit means of right ascension and declination residuals for the 1649 numbered asteroids under automated orbit maintenance at that time (S. Chesley, priv. comm.). While the right ascension histogram shows a symmetric distribution with a mean of 0.004 arc seconds and a standard deviation of 0.057 arc seconds, the declination histogram is decidedly non-gaussian and asymmetric, with a mean of 0.074 arc seconds and a standard deviation of 0.095 arc seconds.

Upon analysis of the Rosetta spacecraft's encounter with asteroid 2867 Steins, Trevor Morley (T. Morley, priv. comm.) independently deduced a bias of +0.212 arc seconds in the declination observations of that asteroid. However, to fully account for the observed encounter geometry, a right ascension bias of +0.092 arc seconds was also

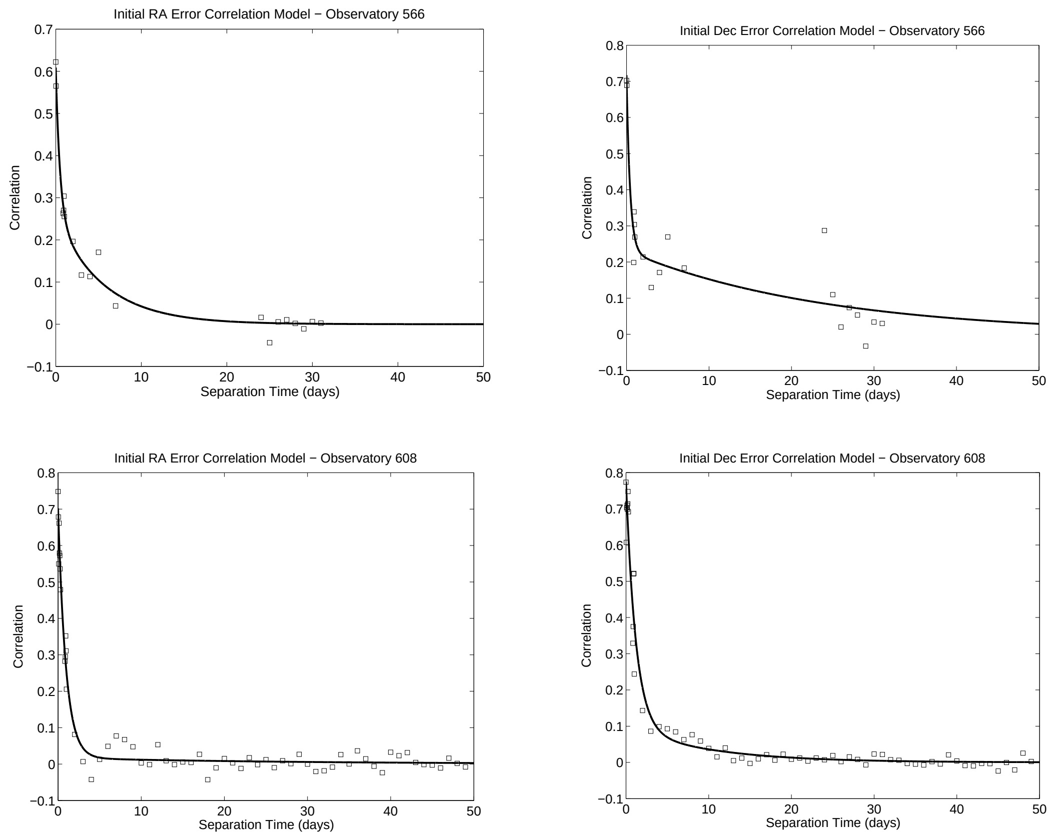


Figure 2: Initial RA and Dec correlation models for observatories 566 and 608.

necessary. This was the first indication that a bias was present in both coordinates. As Morley noted, a systematic bias in the right ascension observations of asteroids would not be immediately obvious, since a least-squares orbit determination algorithm would simply rotate the calculated orbit around the z-axis (celestial poles) to minimize the RMS error, thus eliminating the evidence of a net right ascension bias. Since none of the other orbital parameters could be manipulated so as to eliminate the declination bias, it appeared to be the only systematic error in the observations.

Mauna Kea Observatory (MPC observatory code 568) independently noted a persistent positive declination bias in observations of 99942 Apophis (D. Tholen, priv. comm.). In the discussions that followed, David Tholen referred us to da Silva Neto et al. (2005), who had observed a mean declination bias of approximately 0.11 arc seconds in the USNO B1.0 positions of the optical counterparts of 64 ICRF sources. Using the more accurate UCAC2 catalog as a reference, comparisons of the positions of stars appearing in both B1.0 and UCAC2 were used to derive local corrections to the

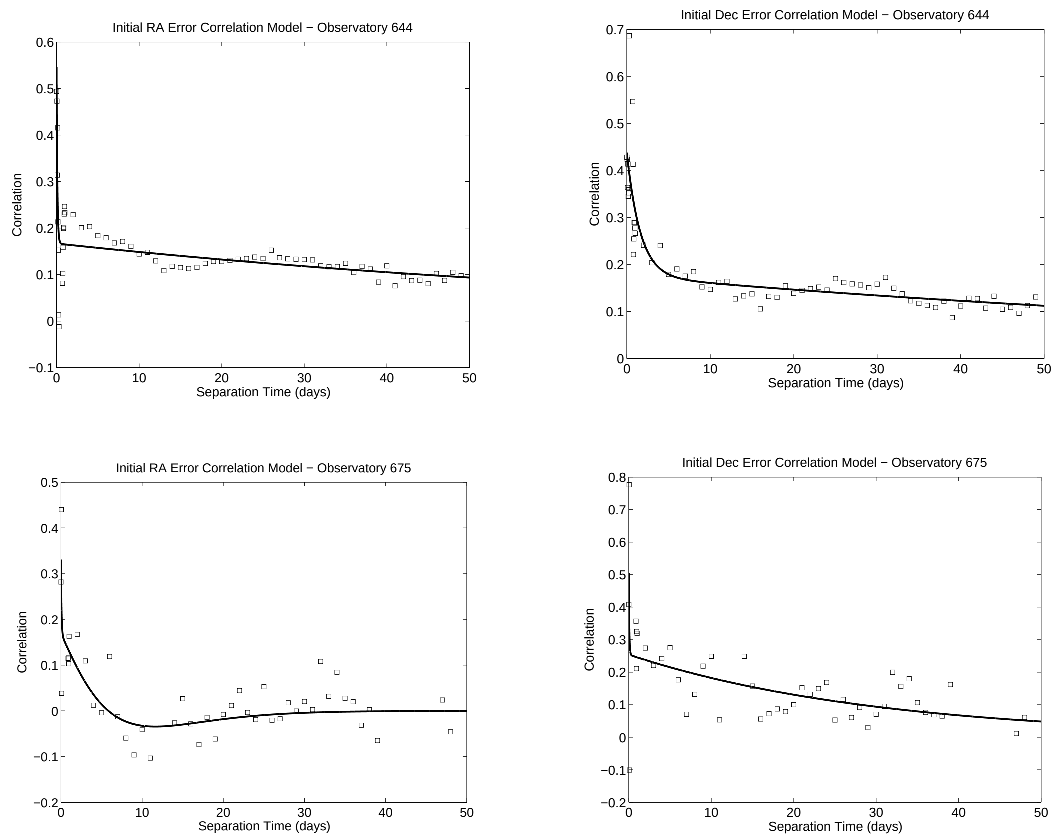


Figure 3: Initial RA and Dec correlation models for observatories 644 and 675.

B1.0 positions; implementing these local corrections, the B1.0 declination biases for the ICRF sources were reduced to approximately 0.03 arc seconds. In time, this idea proved most useful.

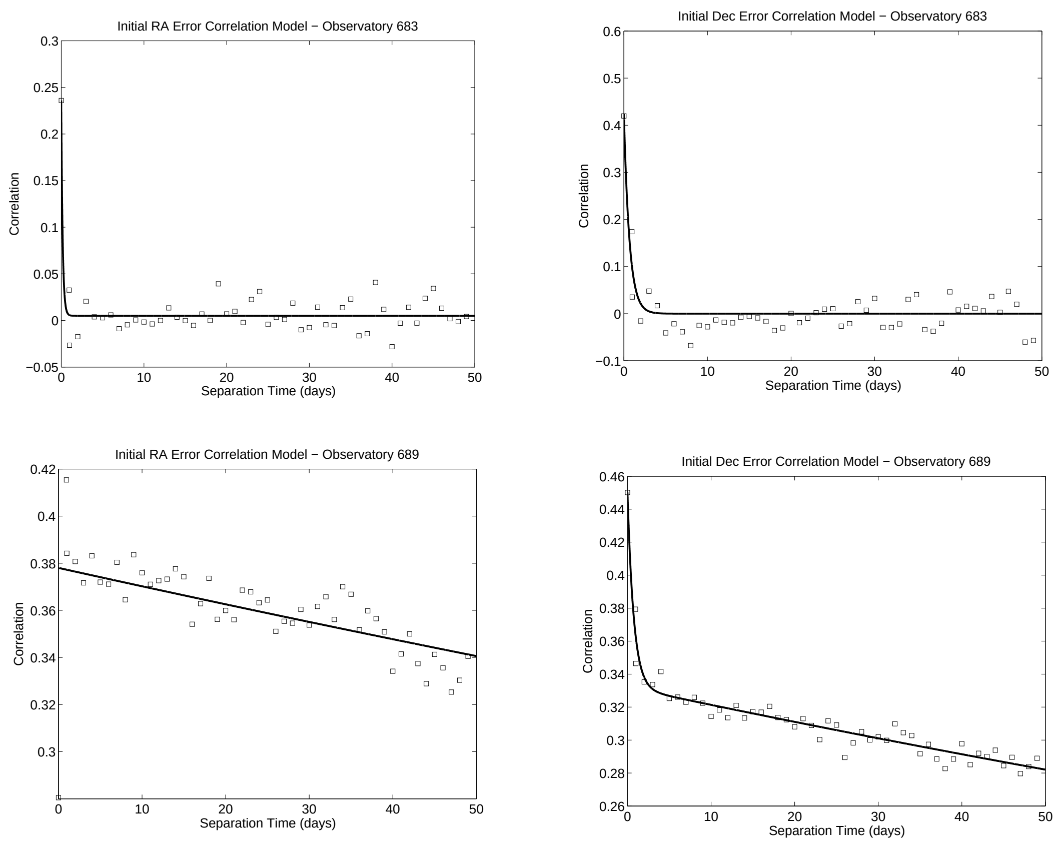


Figure 4: Initial RA and Dec correlation models for observatories 683 and 689.

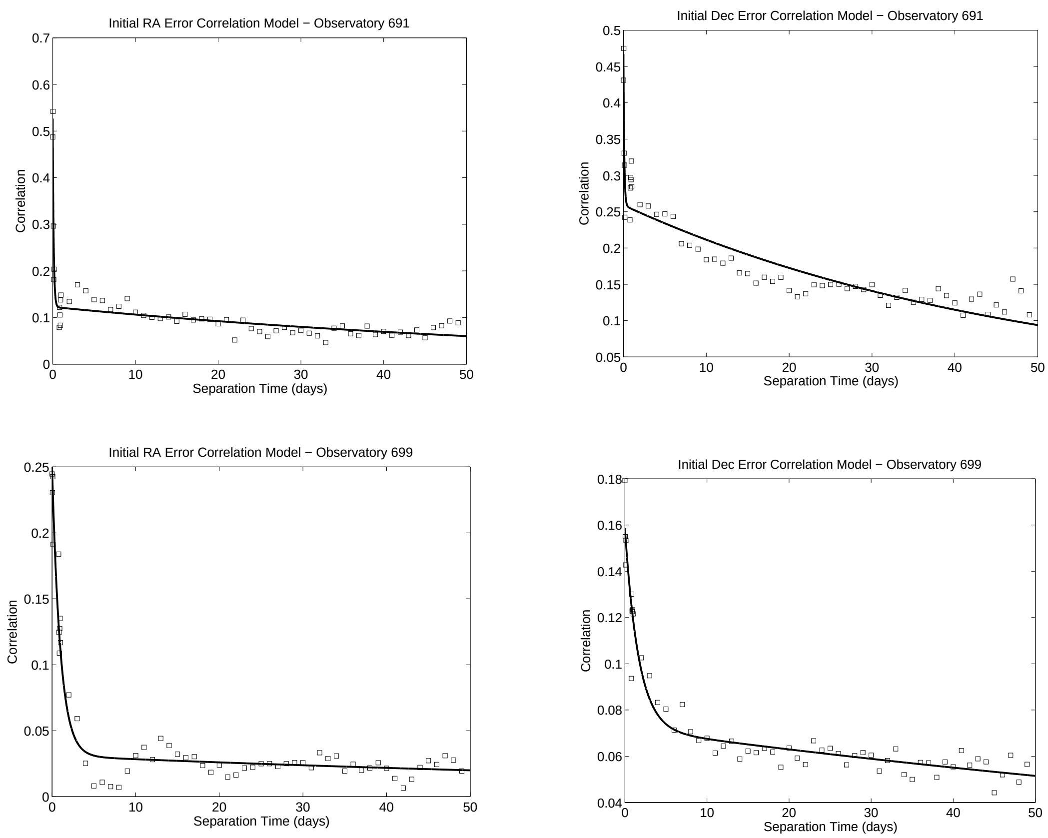


Figure 5: Initial RA and Dec correlation models for observatories 691 and 699.

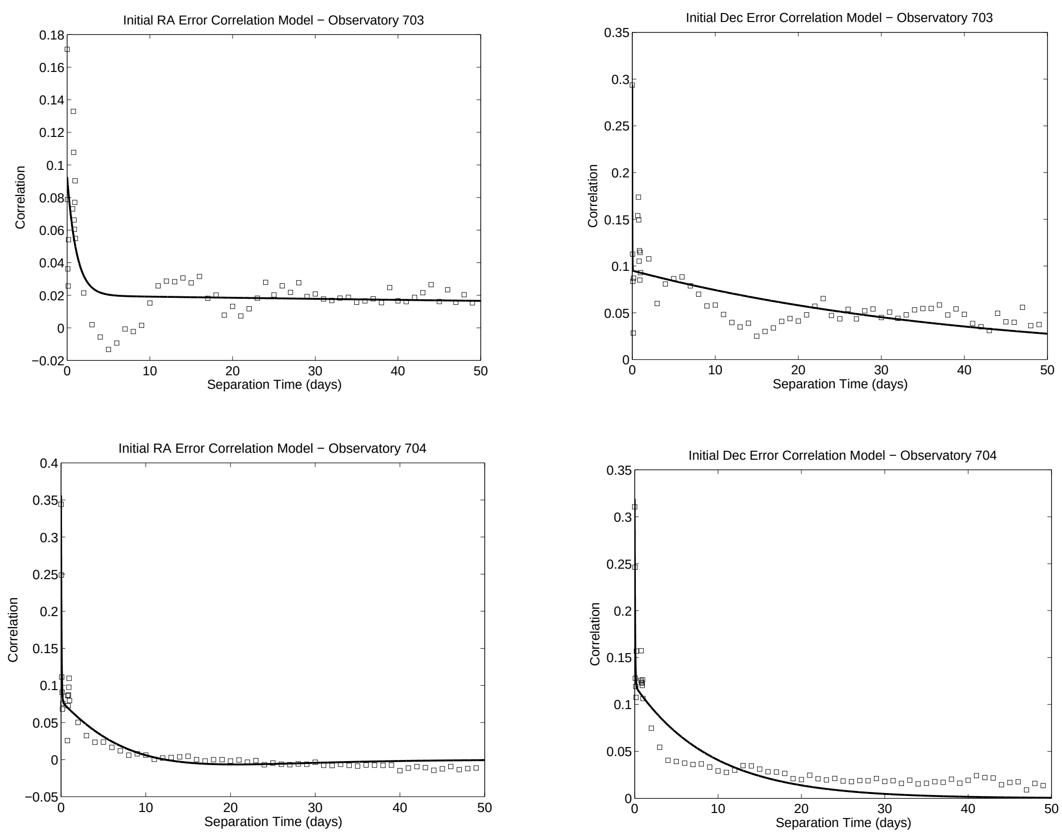


Figure 6: Initial RA and Dec correlation models for observatories 703 and 704.

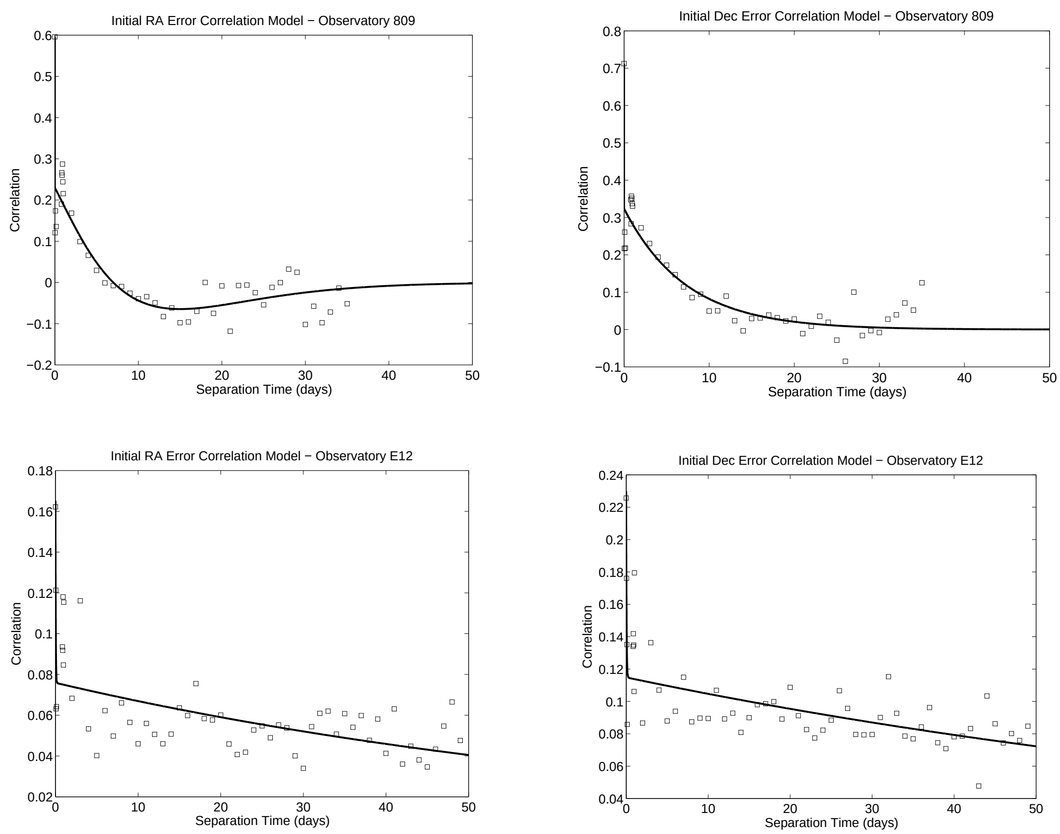


Figure 7: Initial RA and Dec correlation models for observatories 809 and E12.

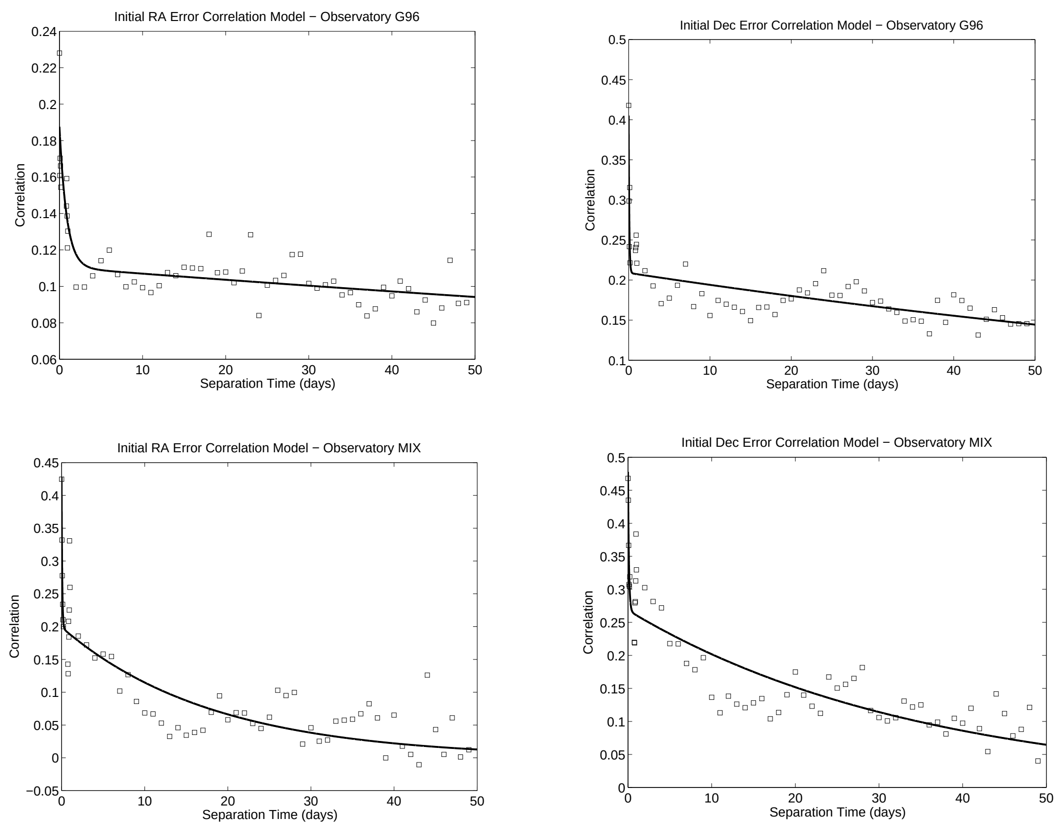


Figure 8: Initial RA and Dec correlation models for observatories G96 and MIX.

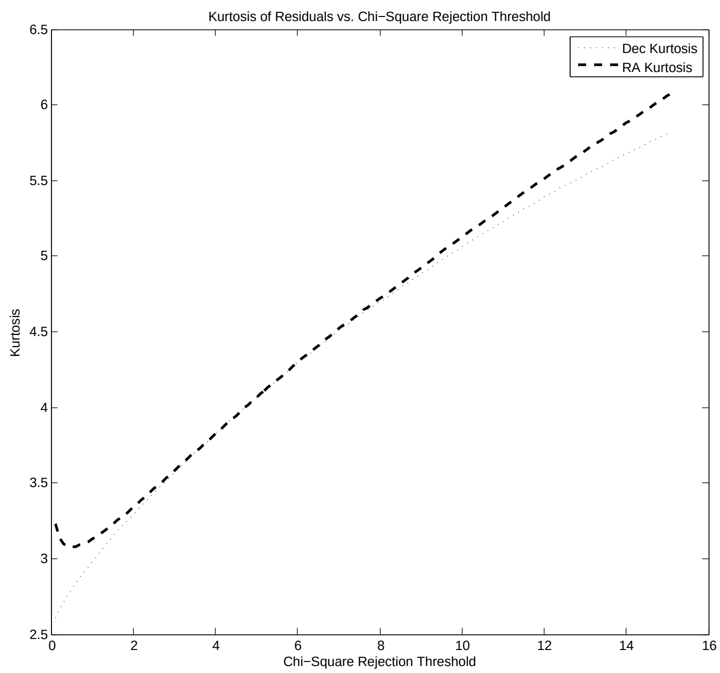


Figure 9: Kurtosis of RA and Dec residuals for initial error model.

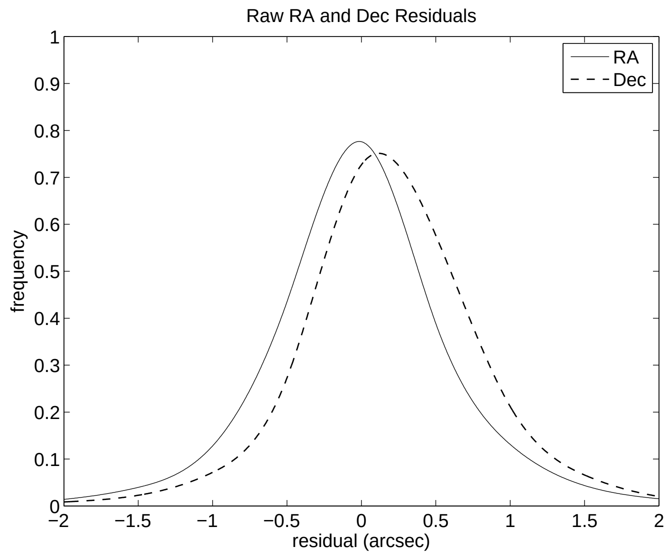
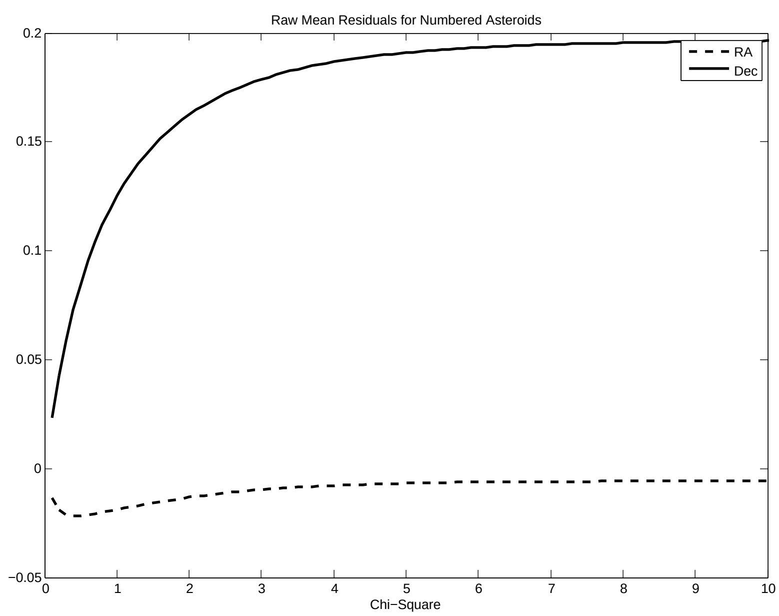


Figure 10: Nominal residuals of the numbered asteroids, illustrating Dec bias.



mean biases.pdf

Figure 11: Mean residuals of the numbered asteroids, illustrating Dec bias.

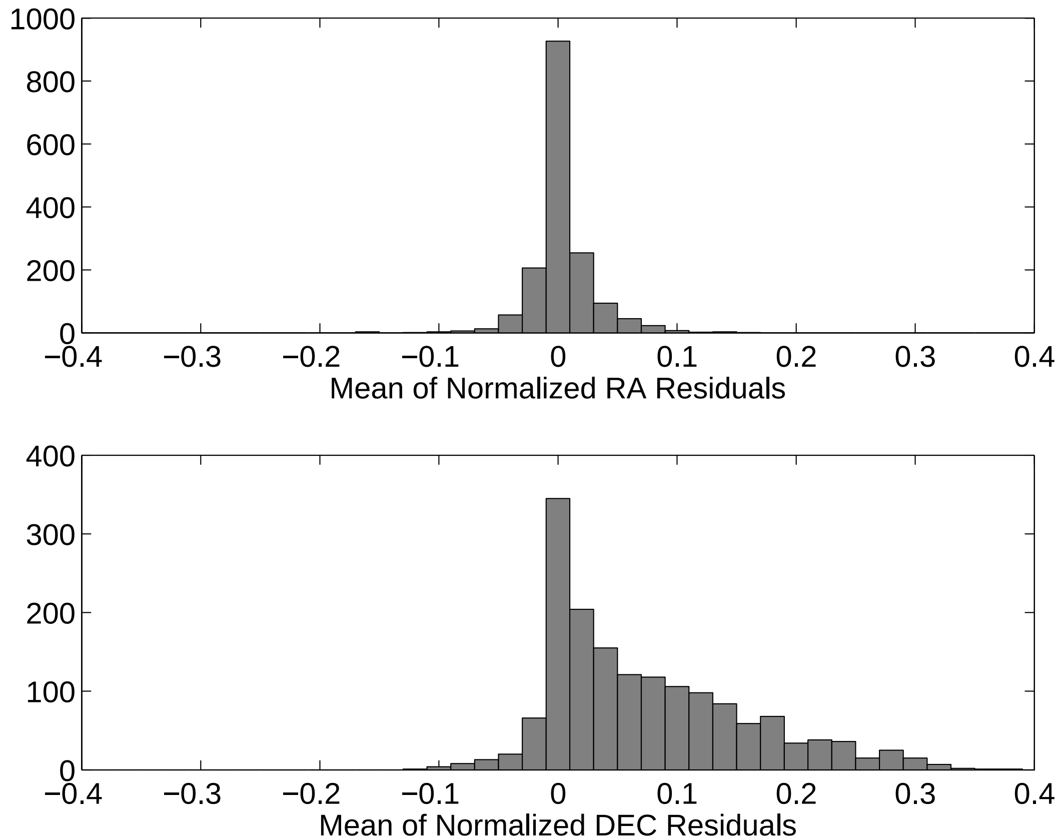


Figure 12: Mean of normalized post-fit residuals for the 1649 numbered asteroids (including all numbered NEAs and some space mission targets) under automated orbit maintenance as of mid-2008. Nearly all observations are weighted at 1 arcsec, so the abscissa is approximately in arc seconds.

4.2 The Star Catalog Flag

The astrometric reduction of asteroid observations relies heavily on accurate star catalogs; background stars in an image are identified, and used as references against which the positions of the head and tail of an asteroid trail may be determined. Ideally, star catalogs should be ”dense and deep”, containing a great many stars of varying brightness distributed throughout the entire sky, allowing high-precision astrometry regardless of asteroid size or location.

In that context, three all-sky U.S. Naval Observatory star catalogs are among the most useful. The USNO A1.0 catalog, introduced in 1996, contains 488,006,860 sources down to magnitude 20, with an estimated accuracy of 0.25 arseconds (Monet et al., 1998). The A2.0 catalog, introduced in 1998, is an update of A1.0 that moves the reference frame from the Guide Star Catalog to the ICRF; it contains 526,280,881 sources (Monet, 1998). The B1.0 catalog, introduced in 2003, contains 1,042,618,261 objects down to V magnitude 21, with an estimated accuracy of 0.20 arseconds (Monet et al., 2003).

Note that other catalogs, such as UCAC2 and 2MASS, have smaller estimated position errors; but unfortunately, these catalogs each have limitations relative to B1.0. The UCAC2 catalog, introduced in 2004, contains 48,330,571 stars with positions accurate to within 0.07 arc seconds at the limiting magnitude of 16; but it only covers the sky from declination -90 degrees to +40 degrees (Zacharias et al., 2004). (Note: The recently introduced UCAC3 catalog (Zacharias et al., 2010) covers the entire sky, thus resolving this limitation.) The all-sky 2MASS catalog, introduced in 2003, contains 470,992,970 objects, with positions accurate to within 0.07 arc seconds (Skrutskie et al., 2006); but it is limited to V magnitude 16.9, meaning that reference stars may be overexposed in images of small asteroids.

Our intent was to characterize the biases in each of these major star catalogs; armed with a look-up table, we could determine the biases in each optical observation, subtact those biases out, and recalculate the orbits of the numbered asteroids. Key to this effort, however, was knowing which star catalog was used to reduce each optical observation.

In discussing the bias issue with Gareth Williams of the Minor Planet Center, we learned that an undocumented flag existed in the MPC observation records for many modern optical observations (Gareth Williams, private communication). Specifically, starting in mid-2001, the MPC began using column 72 of the 80 column ground-based optical observation record to denote which star catalog was used to astrometrically reduce each optical asteroid observation (see Table 1). Relatively few observatories reported this information; but direct examination of the MPC astrometric data set for December 12, 2008 showed that those few observatories contributed approximately 82.6% of all optical observations.

Moreover, several of the most prolific observatories had retained their star catalog data internally, covering periods well before the MPC added that flag to their observation records; using the information they provided (see Table 2), we were able to recover the star catalog information for another 5,907,682 of the observations in the MPC data file.

Therefore, as illustrated in Table 3, we were able to determine which star catalogs were used to astrometrically reduce approximately 92.8% of the optical asteroid observations.

Note that many of the catalogs listed in Table 1 are either subsets of larger catalogs, or incremental versions of the same catalog. For purposes of clarity, these variations have been combined in Table 3; and we will refer to the catalogs using these generic labels in subsequent sections.

The group with which the author worked on the subsequent debiasing analysis included Steven Chesley of the NASA Jet Propulsion Laboratory, and David Monet of the U. S. Naval Observatory. To standardize our data source, we jointly agreed to adopt the MPC astrometric data set for December 12, 2008 for all further work.

Table 1: Star Catalog Flags for Optical Observations in MPC Data File.

Catalog	MPC flag	No. of Observations
USNO-A1.0	a	173,556
USNO-SA1.0	b	31,044
USNO-A2.0	c	26,071,594
USNO-SA2.0	d	1,327,783
UCAC-1	e	243,111
Tycho-1	f	0
Tycho-2	g	299,648
GSC-1.0	h	0
GSC-1.1	i	10,055
GSC-1.2	j	11,665
GSC-2.2	k	180
ACT	l	13,866
GSC-ACT	m	364,575
TRC	n	0
USNO-B1.0	o	6,799,942
PPM	p	0
UCAC-2-beta	q	0
UCAC-2	r	12,315,889
USNO-B2.0	s	445
UCAC-3-beta	t	0
UCAC-3	u	0
NOMAD	v	2,763
CMC	w	337,053
Hip-2	x	0
GSC (generic)	z	1,537
Unspecified	—	10,079,283
Total	—	58,083,989

Note: The flag ”L” has since been assigned to the 2MASS catalog.

Table 2: Observer-supplied Star Catalog Information

Obs. Code	Time Frame	Catalog Used
704	Before 2000-Jan-01	USNO A1.0
704	After 2000-Jan-01	USNO A2.0
691	1991-Aug-31 – 1999-Sep-28	GSC-1
691	1999-Sep-29 – 2000-Dec-21	USNO A1.0
691	2000-Dec-22 – 2006-Dec-26	USNO A2.0
703	Before 2005-Jan-01	USNO A2.0

Table 3: Total Observations Using Each Star Catalog.

Catalog	MPC Flags	No. of Observations	Percentage
USNO-A2.0	c,d	30,786,427	53.0%
UCAC	e,q,r,t,u	12,559,000	21.6%
USNO-B1.0	o,s	6,800,387	11.7%
Unknown	—	4,171,601	7.2%
USNO-A1.0	a,b	2,205,452	3.8%
GSC-1	h,i,j,z	543,037	0.9%
GSC-ACT	m	364,575	0.6%
CMC	w	337,053	0.6%
Tycho	f,g	299,648	0.5%
ACT	l	13,866	0.0%
NOMAD	v	2,763	0.0%
GSC-2	k	180	0.0%
Total	—	58,083,989	—

4.3 Debiasing: An Iterative Indirect Approach

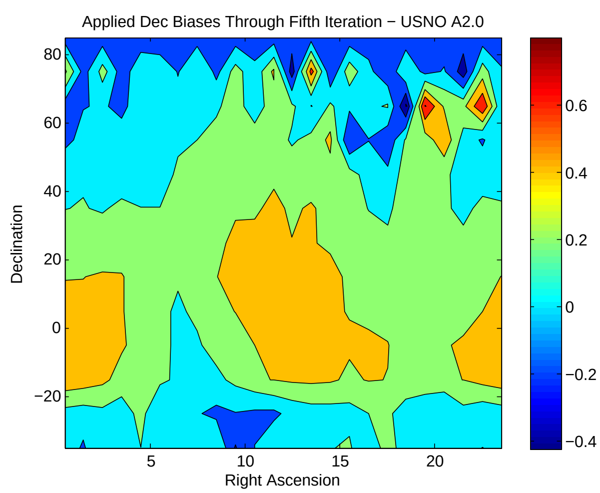
As shown in Figures 10 and 11, the observations of numbered asteroids demonstrated a clear observational bias in declination; but no such bias appeared in right ascension. We therefore began by debiasing only the declination coordinates. After compiling the observational biases, we divided the sky into 18 zones of declination, each 10 degrees wide; within each zone, we calculated the mean declination biases for USNO A1.0, A2.0, B1.0, UCAC-2, and observations of various eras whose reduction catalogs were unknown. We then created best-fit polynomials for each of these groups to model the declination biases in each zone, and used them to debias the observations for the next iteration.

Initially, the approach seemed promising; the biases resulting from the second iteration were reduced to one third of their previous values. However, in order to achieve these reductions, we had to apply significant corrections (on the order of 0.35 arc seconds) to the UCAC-2 declination observations. Given the stated accuracy of the UCAC-2 star positions, this was clearly unrealistic. We concluded that the biases in the other catalogs were likely resulting in best-fit orbits that made the UCAC-2 residuals appear much larger than their intrinsic errors. Therefore, we decided to repeat the second iteration, but with no corrections applied to the UCAC-2 derived positions.

The results from the revised second iteration showed significant improvement; for most of the observation sets, the biases had been reduced to below 0.06 arc seconds. And yet the biases in the UCAC-2 derived observations remained above 0.2 arc seconds. A third iteration yielded little further reduction.

By this point, additional analysis had demonstrated that the asteroid residuals did indeed contain a right ascension bias; and we suspected that our failure to account for this was responsible for the slow convergence in eliminating the observed bias in the UCAC-2 residuals. We therefore implemented a two-dimensional bias model for all future iterations, with a grid spacing of 1 hour in right ascension and 10 degrees in declination. As before, the mean observed bias in each grid square was used to debias the observations in the next iteration. But unfortunately, two further iterations yielded little further improvement; the biases in the UCAC-2 derived observations remained near 0.2 arc seconds.

Despite these difficulties, the bias corrections that we derived through this indirect approach (e.g., Figure 13) do share many of the gross properties seen in the corresponding (and much more detailed) sky maps derived from the direct approach seen in the next section. In retrospect, we believe that, had we started with a two-dimensional bias model in the first place, perhaps with smaller bins on the sky, this iterative technique might have yielded adequate results; but we do not believe that it can be as effective as the direct approach that we have developed, which we describe now.



DEC biases A2.pdf

Figure 13: Applied USNO A2.0 Dec debias (in arc sec) - Fifth Iteration.

4.4 Debiasing: A Direct Star Catalog Approach

Just as we concluded that the indirect debiasing technique was unlikely to succeed, we read the paper described earlier in section 4.1 by da Silva Neto et al. (2005), and realized that their technique appeared most promising.

The intent was to divide the sky into pixels of equal area. Within each pixel, several reference objects would be selected whose positions were independently known to high precision, and which also appeared in the star catalogs whose biases were being analyzed; to minimize false identifications while still allowing for systematic differences, positions in the various catalogs had to agree within 2.0 arc seconds. The differences between the reference positions of those objects and their catalogued positions (each projected onto the plane tangent to the center of each pixel) would be added together to yield the mean astrometric offset (plus standard deviation) for that pixel. (Note: Since the epochs of the catalogs were all close to J2000.0, no corrections were made for proper motion.)

As Table 3 indicates, the vast majority of the ”tagged” observations (that is, those observations for which the reducing star catalog was known) used either the USNO A1.0, A2.0, B1.0, UCAC, or Tycho catalogs. We therefore restricted the subsequent analysis to these catalogs.

As a reference, we selected the 2MASS catalog (Skrutskie et al., 2006). Covering the entire sky down to V magnitude 16.9, with systematic position errors of 0.080 arc seconds with respect to the ICRS, we believed the 2MASS catalog would provide ample and accurate reference sources in every pixel. Additionally, since the 2MASS epoch was very near J2000.0 (the epoch used by the other catalogs), reference star positions could be directly compared without considering the effects of proper motion.

To divide the sky into pixels of equal area, we used the JPL HEALPix[1] tessellation (Górski et al., 2005). To achieve high spatial resolution (a lesson learned from the indirect method), the greatest possible number of pixels was needed. As a practical matter, however, it would be necessary to select a pixel size large enough to ensure sufficient reference stars lay within each and every pixel in the sky. We therefore used SIDE=64 to generate the tessellation, producing 49,152 pixels on the sky, each with an area slightly less than one square degree.

Obtaining the star catalogs proved difficult, due to the sizes of the files. The catalog comparisons were therefore performed by Dave Monet, who had direct access to the files at the USNO. The resulting look-up table consisted of 49,152 lines, each giving the position of the center of that pixel, and the mean and standard deviation of the astrometric offset within that pixel for the USNO A1.0, A2.0, B1.0, UCAC, and Tycho catalogs (since the UCAC catalog does not cover the entire sky, many of its entries were left blank).

Figure 14 depicts probability densities of the mean differences between the subject catalogs and 2MASS; Table 4 lists the mean and standard deviation of the same distributions. From these, we observe that the precision and accuracy of the Tycho and UCAC catalogs are comparable, and vastly superior to the other catalogs. Indeed, their differences with respect to 2MASS are essentially within the expected 2MASS position

[1] `http://healpix.jpl.nasa.gov`

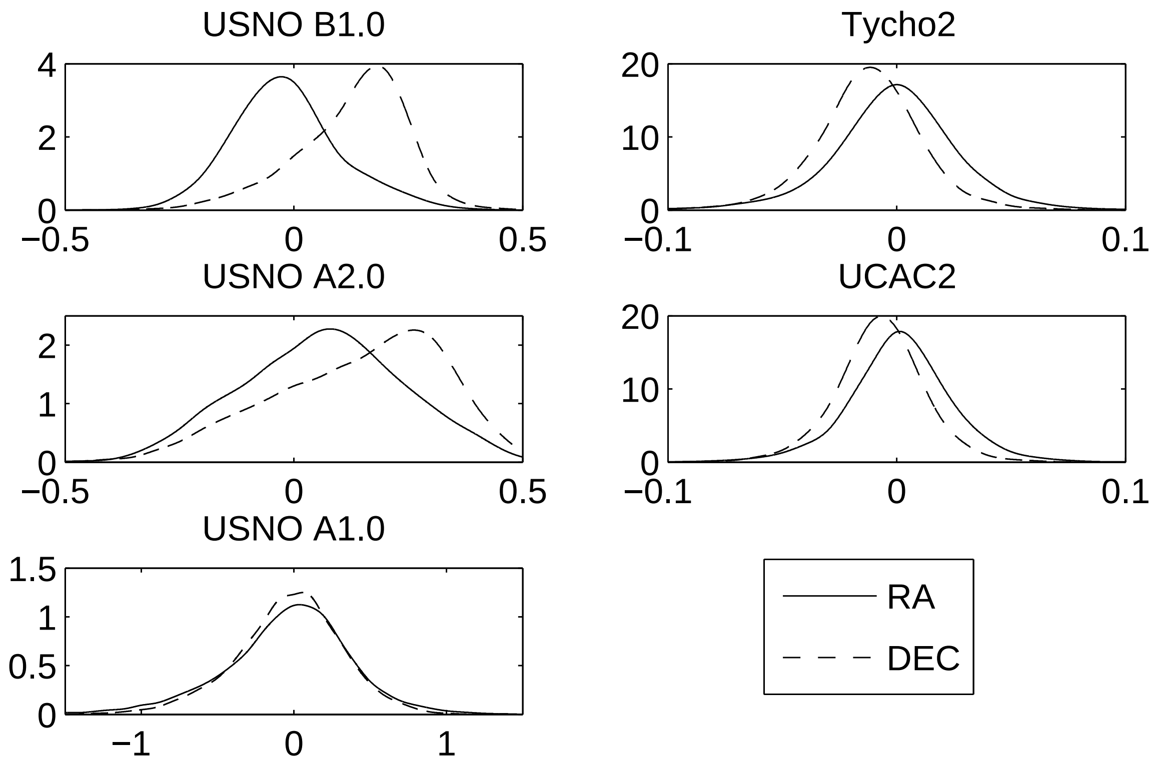


Figure 14: Probability densities of inter-catalog systematic errors, as compared to the 2MASS catalog. For each plot, the abscissa is the difference in arcsec between the given catalog and 2MASS, and the ordinate is the associated probability density in arcsec^{-1}. Note that the plots are not all on the same scale.

error; it is therefore difficult to determine whether these differences represent systematic errors in the Tycho 2 and UCAC catalogs, or simply uncertainties in the 2MASS reference. Consequently, we decided not to debias observations reduced using Tycho 2 or UCAC.

By contrast, the USNO A2.0 and B1.0 catalogs reveal significant biases - especially in declination, with mean offsets of 0.142 arc sec and 0.126 arc sec respectively. While the USNO A1.0 has a relatively large dispersion (on the order of 0.4 arc sec), it exhibits a relatively modest bias.

Figure 15 depicts sky maps of the RA and Dec biases with respect to 2MASS for the five catalogs under consideration. Note that the color scale is different for each catalog, in order to display as much of the structure in that catalog's bias as possible. In these plots, regions with relatively small biases are colored green; while positives biases are red, and negative biases are blue. The USNO A1.0 map shows some structure, despite the catalog's relatively modest mean bias in Table 4; but there is little differ-

Table 4: Inter-catalog Systematic Errors, with respect to 2MASS.

	Mean $\pm$ Std. Dev.	
Catalog	RA (mas)	DEC (mas)
Tycho 2	-1 ± 28	-12 ± 24
UCAC 2	2 ± 23	-7 ± 20
USNO B1.0	-16 ± 123	126 ± 123
USNO A2.0	63 ± 180	142 ± 189
USNO A1.0	-41 ± 419	-34 ± 352

ence in the biases in the northern and southern skies. The Dec maps for the USNO A2.0 and B1.0 catalogs (which together account for approximately 70% of all asteroid astrometry) are significantly "hotter" overall, in agreement with Fig. 14. Moreover, the corresponding RA maps indicate that the RA bias is hemispheric-dependent, with large cold regions (negative bias) centered around 45° RA (extending from pole to pole), and even stronger hot regions (positive bias) opposite. By contrast, the UCAC and Tycho sky maps show very limited structure, more consistent with random fluctuations.

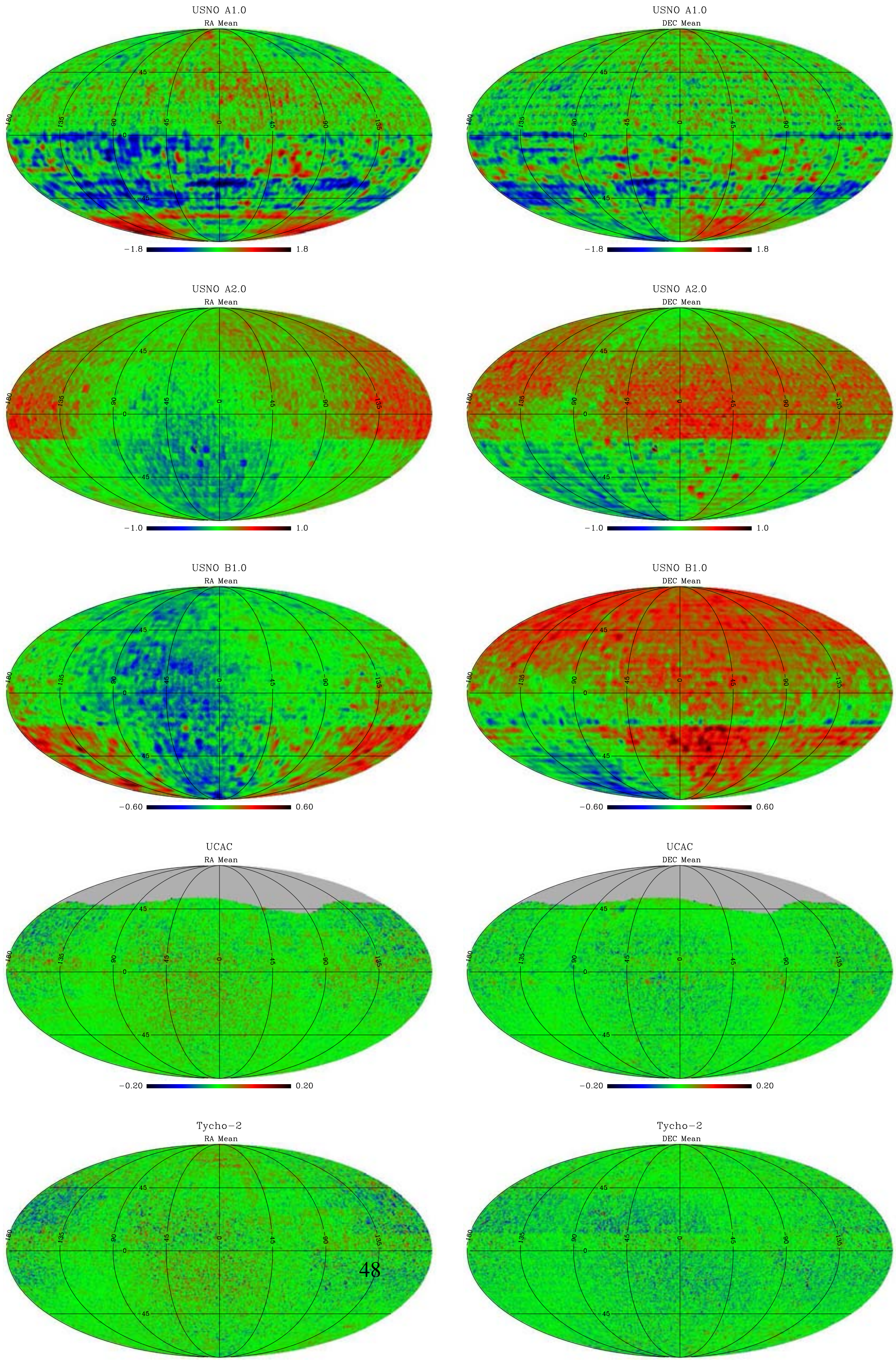


Figure 15: HEALPix maps of the RA and Dec biases with respect to 2MASS for USNO A1.0, A2.0, B1.0, UCAC, and Tycho.

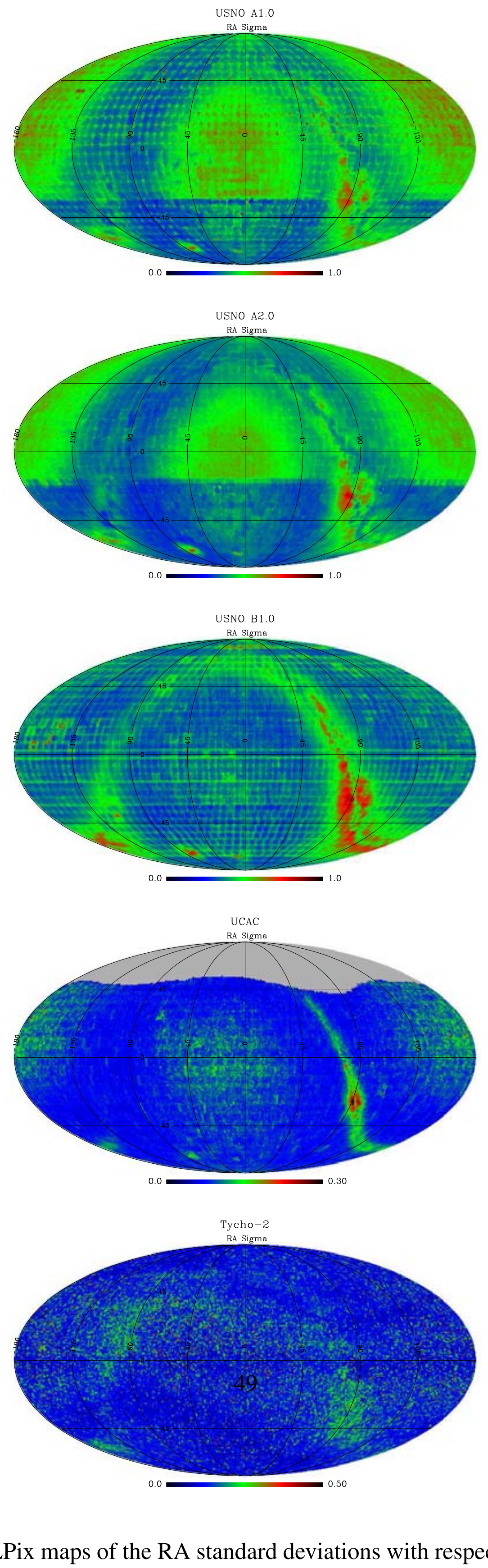


Figure 16: HEALPix maps of the RA standard deviations with respect to 2MASS. The Dec dispersions are not significantly different.

With the biases in each catalog now understood, the way forward appeared clear. Knowing in which pixel a given asteroid observation lay, and which catalog was used to reduce that observation, the Monet look-up table would allow us to subtract out the corresponding astrometric offsets. The resulting debiased observations could then be used to recalculate the orbits of the minor planets, and proceed with development of the error model.

Before proceeding with the error model development, however, it was first necessary to validate our debiasing technique.

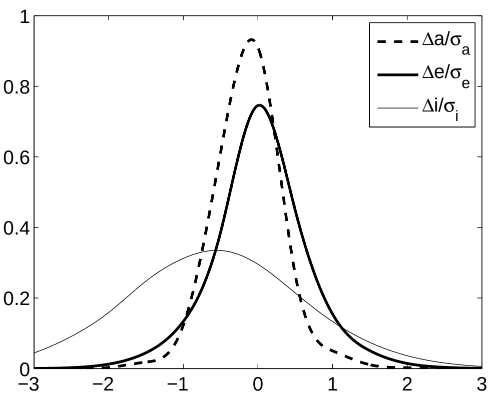


Figure 17: Distribution of orbital element variation between raw and debiased fits to all numbered asteroids.

4.5 Debiasing Validation: A Test on All Numbered Asteroids

To evaluate the effectiveness of the "direct debiasing" technique, we calculated the orbits of the numbered asteroids, both without and with debiasing corrections, to obtain "raw" and "debiased" fits respectively. We limited the objects considered to the numbered asteroids, since their orbits can be determined to sufficient precision as to distinguish the effects of debiasing. Also, because the objective here is not necessarily to obtain the best possible orbits, but rather to evaluate the efficacy of debiasing, we have used only data that comes within the scope of the debiasing technique, namely astrometry known to be reduced with respect to one of the five catalogs discussed in the previous section. This amounts to 48,621,261 observations of 201,804 asteroids over the interval 1949-11-19 to 2008-12-12 (Note: The 1949-era observations are likely precovery attempts reduced using one of the five catalogs).

Outlier rejection was used in the orbit calculation, according to the technique described by Carpino et al. (2003), with separate fits for the raw and debiased cases.

The distribution of the change in orbital elements between the raw and debiased fits is depicted in Fig. 17. The debiased orbital inclinations generally declined, relative to their raw orbit counterparts, which is consistent with the fact that the majority of the astrometry falls in the northern sky, and has a positive declination bias, which will tend to erroneously increase the estimated inclination.

The changes in the semi-major axis and eccentricity are generally smaller; but there are still a significant number of cases with $> 1\sigma$ deviations.

4.6 Correlation of Postfit Residuals with Sky Position

Figure 18 depicts the postfit residuals for the raw fits, where the sky map reflects the mean postfit residual in each HEALPix cell. As is the case with the asteroids themselves, the majority of numbered asteroid detections are found along the ecliptic. Only cells with at least ten residual measurements are plotted. For the USNO A1.0, A2.0 and B1.0 catalogs, the raw astrometric residuals are remarkably similar in structure and magnitude to the corresponding catalog biases (Fig. 15). This suggests that, where the observation density is sufficient, the indirect approach to debiasing (by reference to postfit residuals) may have utility in cases where the catalog bias is poorly constrained.

Figure 18 implies a significant bias in the postfit residuals of astrometry reduced with the Tycho and UCAC catalogs, despite the low systematic errors seen with these catalogs. In retrospect, this is not particularly surprising, given that the vast majority of observations were reduced using the significantly biased A2.0 and B1.0 catalogs; these biased catalogs skewed the orbit estimates for the raw fits, leading to higher residuals in the unbiased Tycho and UCAC astrometry.

The postfit residuals for the debiased orbital fits are depicted in Fig. 19, where the signatures seen in Fig. 18 are now substantially reduced, indicating that the biases have been largely eliminated (note however the evident striping in the UCAC plots, which we will discuss further in Sec. 4.9). The histograms depicted in Fig. 20 indicate that the debiasing technique does indeed improve the residual distribution; in each case, the curves representing debiased residuals have higher peaks, and are more nearly centered on zero, indicating that the mean residuals and variances have been reduced.

Table 5 quantifies the reduction in mean residuals for each catalog, and also indicates the scatter in the astrometric residuals, before and after debiasing. The table lists the number of observations, separated by catalog and observatory, and the associated RA and Dec residual mean ($\bar{\alpha}$, $\bar{\delta}$) and standard deviation ($\langle\alpha\rangle$, $\langle\delta\rangle$). The ratios between the debiased and raw data are also given.

Overall, the star catalog-based debiasing was quite effective, with the mean residuals reduced by as much as 70%; but there are a few curious entries in Table 5 that are worth noting. Of particular interest are the cases that still show a moderate residual bias in the debiased fits. For example, observatory code 703 (Catalina Sky Survey, Mt. Bigelow Schmidt Camera) shows significant RA bias in both the USNO A2.0 and UCAC astrometry; the UCAC Dec bias is rather large, as well. Similarly, E12 (Siding Spring Survey), shows significant Dec bias; and a few other observatories appear to have some signature as well. Also, while the star catalog-based debiasing clearly reduced the mean residuals for observations reduced using USNO B1.0, the mean RA residuals for observatories 699 and 691 are still significant; in effect, their large but opposite biases cancel each other out. We propose a likely explanation for these behaviors below.

Table 5: Residual Statistics for Numbered Asteroids by Catalog and Observatory.

				Debiased (arcsec)				Raw (arcsec)				Ratio Debiased/Raw			
Code	Used	Percent	Deleted	$\bar{\alpha}$	$\langle\alpha\rangle$	$\bar{\delta}$	$\langle\delta\rangle$	$\bar{\alpha}$	$\langle\alpha\rangle$	$\bar{\delta}$	$\langle\delta\rangle$	$\bar{\alpha}$	$\langle\alpha\rangle$	$\bar{\delta}$	$\langle\delta\rangle$
USNO A2.0															
ALL	26,215,118	53.93%	211,513	0.03	0.61	0.08	0.58	0.06	0.64	0.29	0.60	0.44	0.96	0.27	0.96
704	20,358,631	77.68%	169,849	0.05	0.63	0.10	0.60	0.08	0.66	0.30	0.63	0.59	0.96	0.32	0.96
699	1,158,767	4.406%	5,577	0.00	0.62	0.11	0.53	0.02	0.65	0.35	0.55	0.08	0.96	0.32	0.95
691	1,796,063	6.812%	4,076	-0.03	0.30	-0.01	0.30	0.04	0.33	0.23	0.35	-0.73	0.91	-0.05	0.84
608	576,376	2.210%	7,582	0.06	0.61	-0.11	0.75	0.10	0.65	0.13	0.76	0.60	0.95	-0.86	0.98
703	861,322	3.317%	15,267	-0.20	0.69	-0.02	0.63	-0.15	0.70	0.20	0.65	1.37	0.98	-0.09	0.97
644	707,790	2.679%	203	0.00	0.29	0.09	0.30	0.03	0.34	0.29	0.34	-0.10	0.86	0.29	0.87
291	222,085	0.842%	359	-0.10	0.46	0.04	0.32	-0.03	0.46	0.28	0.36	2.83	0.98	0.14	0.88
599	74,867	0.285%	469	-0.01	0.39	0.01	0.34	0.01	0.41	0.26	0.38	-1.23	0.97	0.05	0.88
333	13,509	0.051%	76	0.04	0.55	-0.24	0.53	0.05	0.55	-0.05	0.54	0.88	0.99	4.63	0.98
D35	29,074	0.110%	16	0.11	0.39	0.02	0.38	0.20	0.41	0.21	0.40	0.53	0.95	0.09	0.94
OTH	416,634	1.607%	8039	-0.03	0.63	-0.04	0.51	0.01	0.62	0.16	0.53	-1.97	1.00	-0.25	0.96
UCAC 1&2															
ALL	9,109,348	18.74%	48,420	-0.10	0.53	0.05	0.49	-0.13	0.54	0.03	0.52	0.74	0.98	1.91	0.95
703	4,186,043	46.04%	30,218	-0.20	0.63	0.12	0.59	-0.23	0.64	0.07	0.61	0.84	0.98	1.65	0.98
G96	3,283,638	35.89%	2,974	-0.01	0.32	-0.05	0.27	-0.04	0.33	-0.09	0.31	0.27	0.95	0.61	0.87
E12	1,001,493	10.98%	3,779	-0.02	0.50	0.17	0.45	-0.05	0.50	0.28	0.47	0.46	0.98	0.63	0.96
683	200,152	2.253%	6,218	0.04	0.79	0.07	0.90	0.01	0.80	0.02	0.91	3.32	0.99	4.52	0.99
J75	117,112	1.280%	147	0.03	0.41	-0.06	0.37	0.04	0.42	-0.10	0.39	0.80	0.98	0.55	0.93
106	92,049	1.006%	44	0.02	0.40	-0.05	0.39	-0.02	0.42	-0.14	0.41	-1.01	0.97	0.33	0.95
143	1,443	0.016%	26	0.09	0.57	-0.04	0.47	0.07	0.57	-0.12	0.48	1.26	1.00	0.31	0.97
OTH	227,418	2.538%	5014	0.01	0.51	-0.00	0.42	-0.03	0.51	-0.04	0.45	-0.26	0.99	0.02	0.94
USNO B1.0															
ALL	5,085,749	10.46%	15,652	0.03	0.48	0.09	0.42	-0.06	0.49	0.18	0.44	-0.40	0.99	0.51	0.95
699	2,408,525	47.44%	11,719	0.11	0.61	0.15	0.54	0.02	0.61	0.23	0.56	6.50	0.99	0.63	0.97
644	1,275,002	25.00%	182	0.04	0.24	0.07	0.20	-0.05	0.26	0.18	0.26	-0.68	0.92	0.41	0.77
691	1,166,659	22.92%	2,366	-0.16	0.30	0.00	0.28	-0.23	0.32	0.08	0.32	0.70	0.93	0.06	0.89
291	63,199	1.239%	12	-0.22	0.39	0.07	0.26	-0.29	0.40	0.15	0.29	0.76	0.96	0.49	0.89
OTH	172,364	3.406%	1373	0.05	0.48	0.03	0.39	-0.04	0.46	0.14	0.41	-1.15	1.02	0.24	0.94
USNO A1.0															
ALL	1,940,649	3.992%	67,389	-0.01	0.72	0.03	0.69	-0.06	0.76	-0.03	0.76	0.12	0.95	-0.93	0.92
704	1,597,775	82.83%	65,408	0.00	0.76	0.03	0.73	-0.05	0.81	-0.03	0.80	-0.01	0.95	-1.06	0.91
691	319,034	15.97%	1594	-0.06	0.49	0.01	0.46	-0.12	0.51	-0.06	0.48	0.47	0.96	-0.22	0.97
OTH	23,840	1.206%	387	0.08	0.65	0.21	0.62	-0.01	0.63	0.19	0.61	-5.63	1.04	1.12	1.03
Tycho 2															
ALL	220,629	0.46%	564	0.03	0.24	0.01	0.25	-0.01	0.26	0.00	0.28	-3.85	0.91	-5.38	0.89
689	133,287	60.26%	11	0.00	0.20	-0.03	0.21	-0.06	0.22	-0.04	0.24	-0.06	0.91	0.83	0.87
OTH	87,342	39.74%	553	0.06	0.29	0.07	0.30	0.07	0.30	0.05	0.34	0.89	0.95	1.29	0.91
Unknown															
ALL	5,336,727	N/A	359,619	0.02	0.73	0.16	0.68	-0.07	0.73	0.13	0.70	-0.31	1.00	1.23	0.98
699	1,180,015	20.84%	7,153	0.11	0.68	0.31	0.57	0.03	0.67	0.27	0.60	3.65	1.02	1.14	0.96
644	1,119,458	19.85%	11,277	0.04	0.51	0.43	0.51	-0.04	0.49	0.40	0.52	-1.06	1.04	1.08	0.97
608	581,208	10.43%	13,175	0.00	0.78	0.12	0.80	-0.09	0.77	0.11	0.80	-0.02	1.02	1.07	0.99
D29	147,281	2.591%	325	0.08	0.44	-0.10	0.41	0.03	0.44	-0.16	0.44	2.85	0.98	0.60	0.94
689	124,658	2.194%	330	-0.02	0.28	-0.01	0.26	-0.09	0.30	0.00	0.29	0.26	0.93	1.72	0.89
106	28,499	0.503%	172	0.03	0.54	0.26	0.47	-0.06	0.52	0.20	0.50	-0.55	1.02	1.29	0.94
300	24,032	0.430%	443	-0.07	0.63	0.34	0.71	-0.13	0.63	0.26	0.72	0.55	1.00	1.31	0.98
OTH	2,131,576	43.16%	326,744	-0.03	0.85	-0.03	0.74	-0.14	0.86	-0.06	0.76	0.19	0.99	0.52	0.98

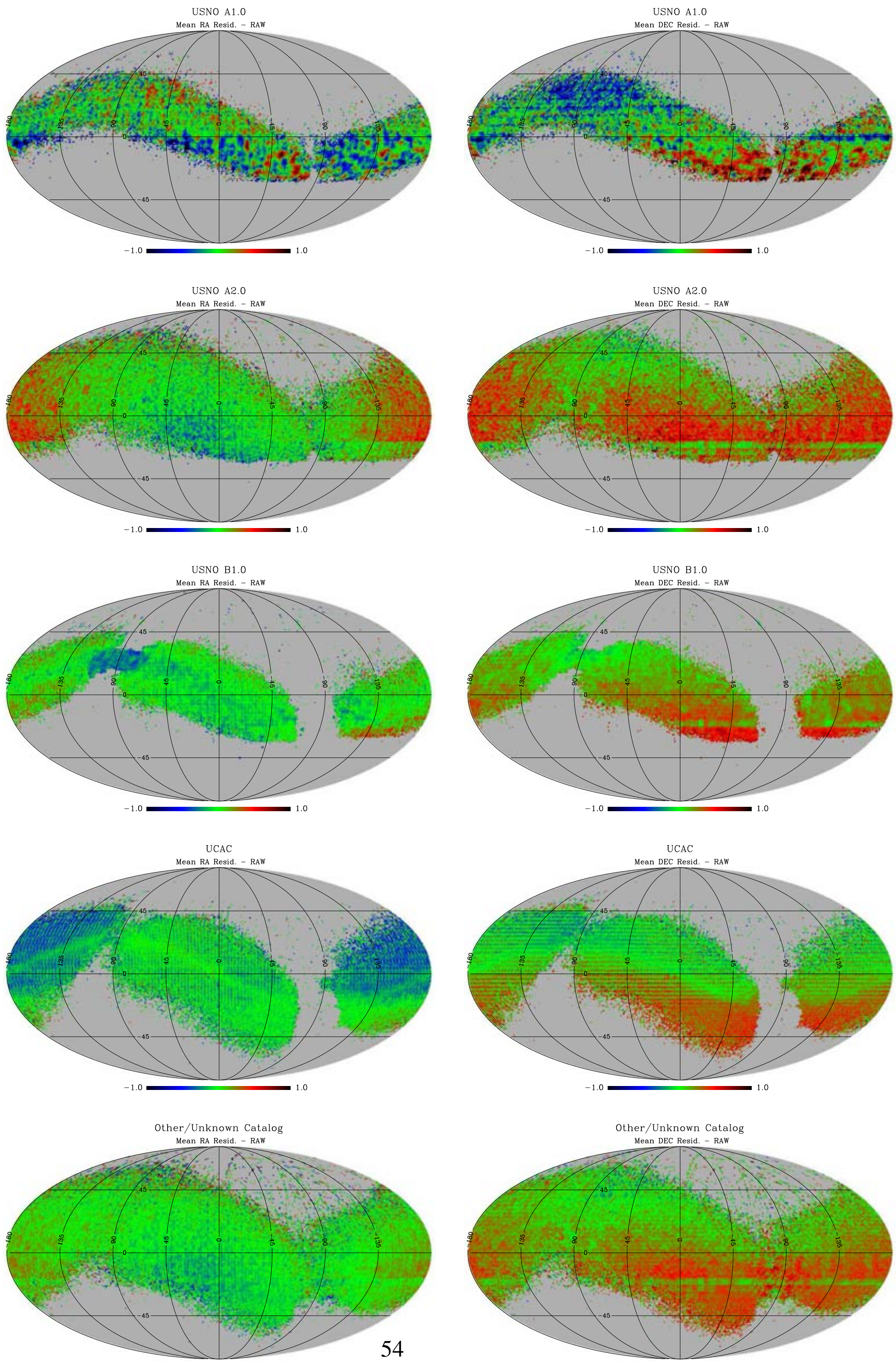


Figure 18: Mean residuals for fits of raw astrometry to numbered asteroids. The plots depict 49152 equal area cells using the HEALPIX algorithm (Górski et al., 2005). Cells with ten or fewer observations are not plotted.

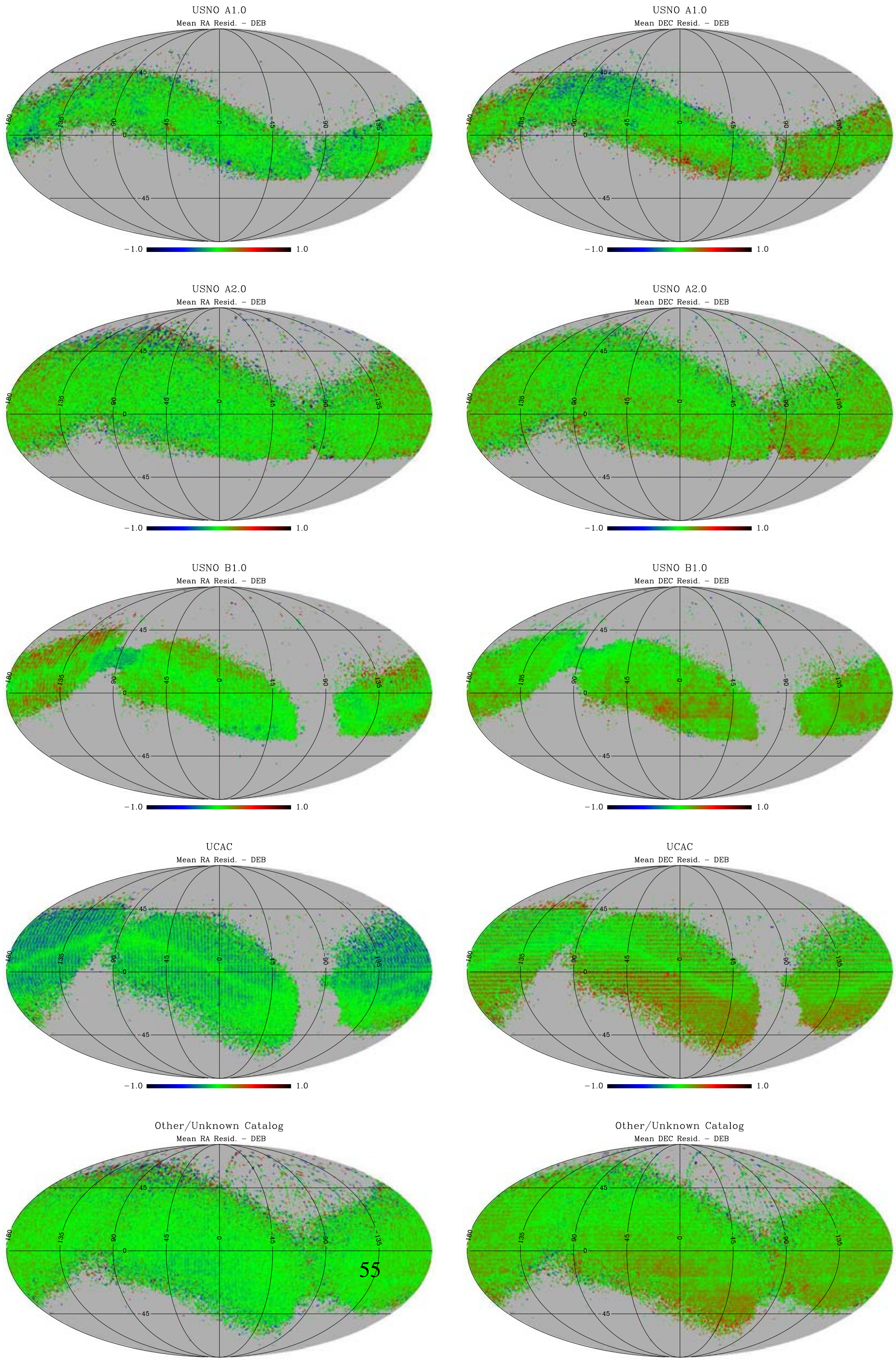


Figure 19: Mean residuals for fits of debiased astrometry to numbered asteroids. The debiasing has substantially removed the catalog bias signal seen in Fig. 18.

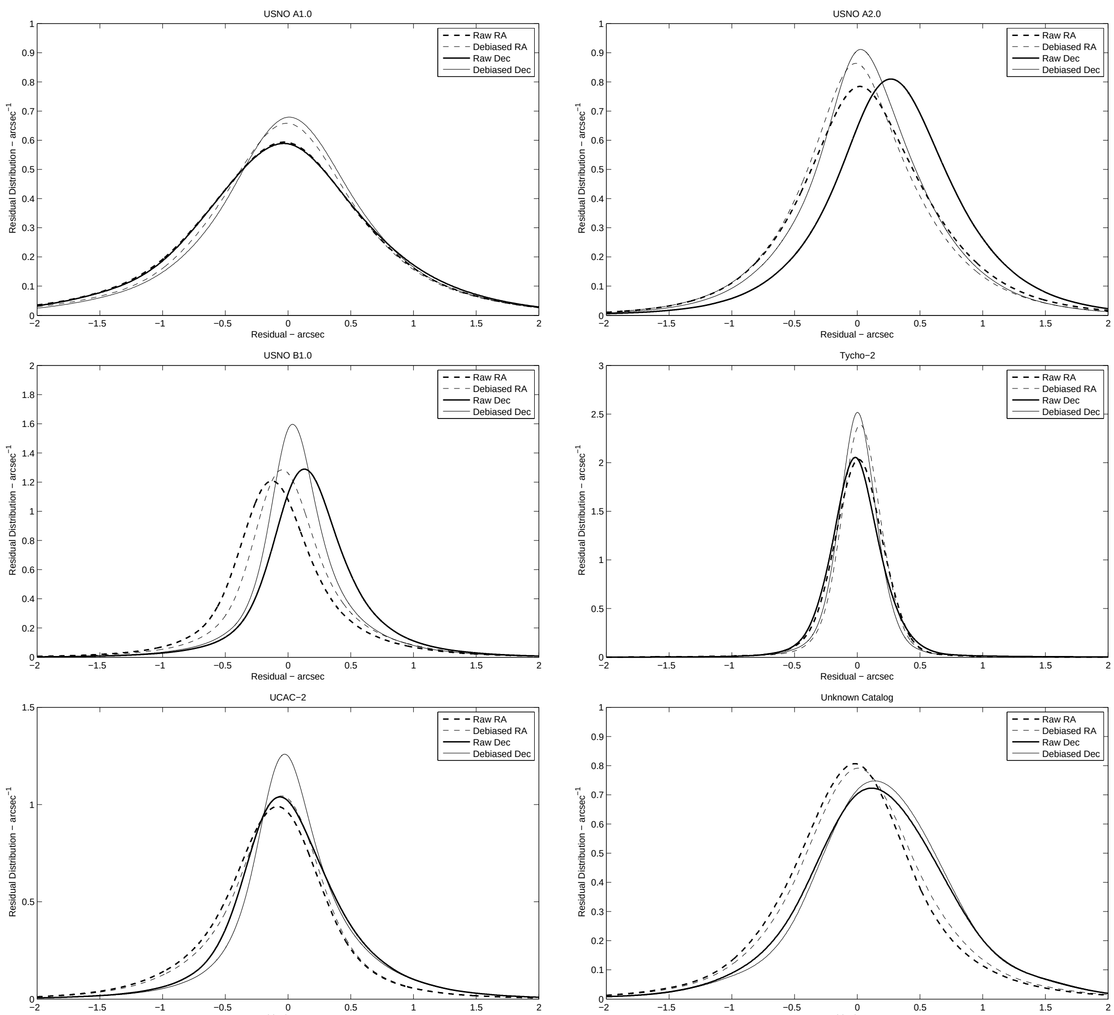


Figure 20: Distribution of postfit residuals for raw and debiased orbital fits for all numbered asteroids.

Table 6: Attribution of unknown 699 and 644 observations.

Catalog	Code	mean RA (arcsec)	sd RA (arcsec)	mean DEC (arcsec)	sd DEC (arcsec)
USNO A2.0	ALL	0.0636	0.6367	0.2895	0.6040
	699	0.0243	0.6464	0.3470	0.5528
	644	0.0292	0.3387	0.2947	0.3428
UCAC 2	ALL	-0.128	0.5378	0.0279	0.5178
USNO B1.0	ALL	-0.062	0.4869	0.1799	0.4434
	699	0.0176	0.6120	0.2318	0.5565
	644	-0.052	0.2579	0.1839	0.2562
USNO A1.0	ALL	-0.063	0.7644	-0.028	0.7577
Tycho 2	ALL	-0.006	0.2647	-0.001	0.2840
Unknown	ALL	-0.070	0.7263	0.1296	0.6961
	699	0.0290	0.6704	0.2718	0.5995
	644	-0.035	0.4898	0.3967	0.5215
	608	-0.085	0.7662	0.1077	0.8028
	106	-0.060	0.5221	0.2005	0.5025
	689	-0.093	0.3019	-0.003	0.2915

4.7 Untagged Astrometry

Table 5 also details the statistics of the (prefit) residuals associated with observations reduced using unknown catalogs, which appear dominated by observatories 699 (LONEOS) and 644 (NEAT-Haleakala). An examination of the residuals allows us to to infer which catalog was used in each case.

Table 6 contains a subset of Table 5, showing the mean residuals and standard deviations for the five catalogs, as well as the prefit residuals for the unknown observations from 699, 644, 608, 106, and 689. The unknown 699 residuals and standard deviations are an excellent match for those of the A2.0 catalog; we feel it is therefore extremely likely that these observations were reduced using A2.0. Similarly, the unknown 644, 608, and 106 statistics are most consistent with A2.0.

As Table 5 indicates, most astrometry reported by 689 is based on the Tycho-2 star catalog; Table 6 shows that the ”unknown” 689 astrometry is perfectly consistent with that catalog, making it likely these observations were also reduced using Tycho-2.

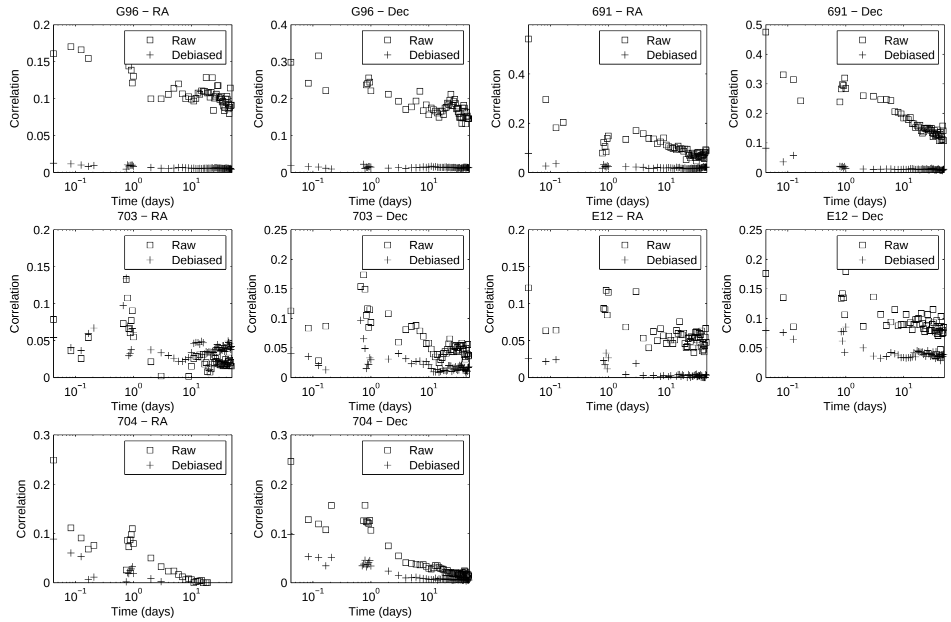


Figure 21: Correlations between closely-spaced observations of the same asteroid for several large observatories, illustrating the reduction in correlation due to debiasing.

4.8 Correlation of Residuals with Time

As noted in Sec. 3.2, the statistical error model proposed by Carpino et al. (2003) requires that the residuals of observations of the same asteroid made by the same observatory have only small correlations that rapidly decay to zero. As Figure 21 demonstrates, the correlations of the raw residuals were not only significant, but also persisted for several days. In most cases (e.g., observatories G96, 691, and 704), by contrast, the correlations of the debiased residuals were consistently smaller, and decayed to insignificance within a day.

However, the debiased correlations for observatories 703 and E12 were not entirely satisfactory; although the debiased correlations were indeed smaller, they did not decay exponentially to zero. And as mentioned above, Table 5 shows the debiased RA and Dec mean residuals for 703 were still significant, as were the debiased Dec mean residuals for E12. This led us to believe another error source existed, unique to these observatories, which might also account for the persistent correlations.

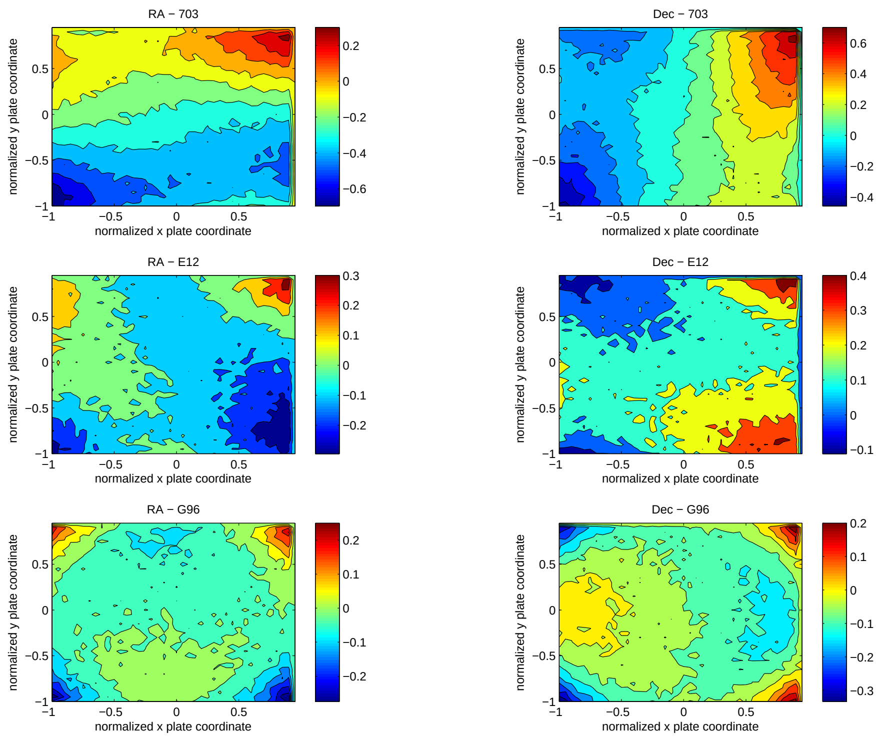


Figure 22: Mean residuals for the image planes of observatories 703, E12, and G96, illustrating the effects of high order distortions in the image reduction process.

4.9 Correlation of Residuals with Focal Plane Position

Observatories 703 and E12 both use the UCAC catalog to reduce observations; indeed, the UCAC astrometry set is dominated by these two observatories. Referring to Fig. 19, the debiased UCAC Dec residuals show horizontal striping, while the debiased UCAC RA residuals show vertical striping. We therefore suspected that there were significant errors at the edges of the image field, possibly caused by the failure to account for high-order field distortions in the image reduction process.

To confirm this, we used sky coverage data provided by observatories 703 and E12 to deduce where each asteroid observation lay in the image plane. We then divided the image plane into a 40x40 grid; and for each individual pixel, we determined the mean debiased RA and Dec residual for all observations lying at that point in the image frame.

As evident in Figure 22, the debiased residuals for 703 and E12 are generally small near the plate center; but they increase rapidly near the plate boundaries. Similar effects were also observed for observatory G96, which also uses the UCAC catalog.

Further analysis indicated that the field distortion errors for observatory 703 became pronounced between 1998 and 2003; this is consistent with the introduction of new optics in 1999. Since 2003, the plate residuals have been largely stable.

In Table 5, we note the significant negative value of $\bar{\alpha}$ for code 703 (Mt. Bigelow) with the UCAC catalog, and the similar positive value of $\bar{\delta}$ for E12 (Siding Spring). This may be related to the fact that the two intallations use a similar setup, except that the camera is rotated by 90° at E12 compared to the orientation used at 703 (R. McNaught, priv. comm.). Again, the UCAC astrometry set is dominated by these two observatories; and this persistent effect is evident in the numbered asteroid residual plots for UCAC (Fig. 19), where we can see that a negative residual trend persists in the northern hemisphere RA map, and a positive signal is present in the southern hemisphere Dec map.

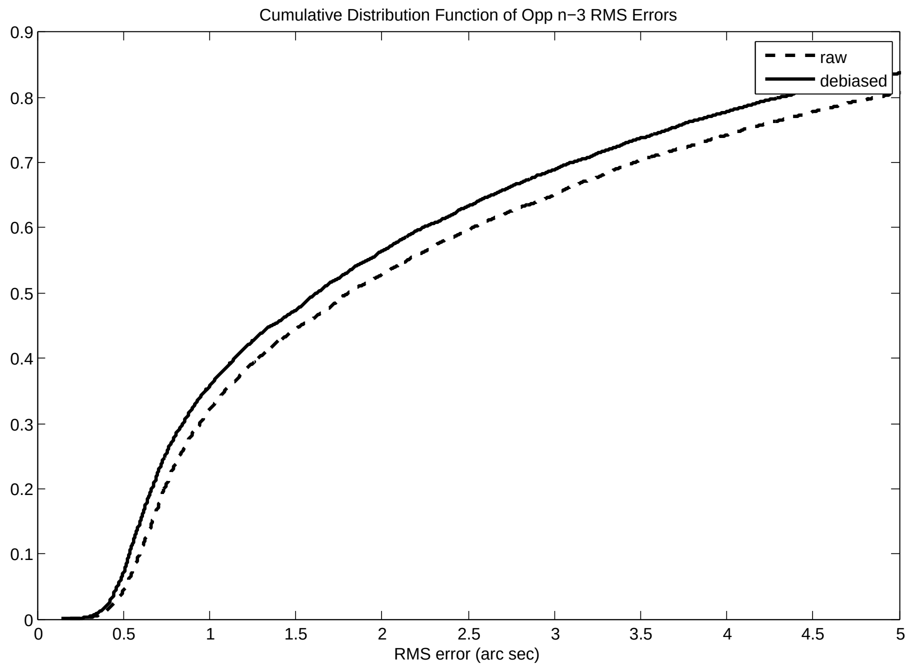


Figure 23: Cumulative distribution function of raw and debiased "observed - predicted" RMS errors for opposition n-3, demonstrating that the debiased orbits better predict observations.

4.10 Validation Through Prediction

In recalculating the orbits of the numbered asteroids, we compared the RMS errors obtained in using debiased observations, compared to those obtained using raw observations. In 96.66% of cases, the debiased RMS errors were lower, with a mean improvement of 0.039 arc seconds.

But as we saw in section 4.1, sub-optimal orbits can be manipulated to reduce the RMS error. In order to prove that the orbits calculated using debiased observations are superior, we must demonstrate that they predict better.

Assuming that an asteroid was observed at n oppositions, we selected 4313 numbered asteroids for which more than 50 observations were available, spanning at least 50 days, in both oppositions n-2 and n-1. We then calculated both the raw and debiased orbits of these asteroids using only observations from oppositions n-2 and n-1; and we used those orbits to predict the observations for opposition n-3. As Figure 23 demonstrates, the debiased orbits resulted in lower "observed - predicted" RMS errors, with a mean improvement of 0.067 arc seconds.

4.11 Application: Asteroid Mass Estimation

Aside from events associated with 1 Ceres or 4 Vesta, most asteroid mass determination events thus far discovered involve cumulative deflections on the order of a few arc seconds (or less). Since the debiasing corrections are non-trivial on this scale, we expected some improvement in mass determination relative to the use of raw observations.

Having said that, successful mass determination encounters usually involve changes in an asteroid's semi-major axis (and thus its mean motion), resulting in cumulative along-track shifts in sky position versus the pre-encounter trajectory. As we saw in Fig. 17, however, while debiasing does indeed improve determination of the semi-major axis, the improvement is somewhat less pronounced than for the eccentricity or inclination. Therefore, it seemed likely that the improvement in mass determination would be relatively modest.

Table 7 illustrates the results of eleven such comparative trials, representing all known mass determination events (aside from 1 Ceres or 4 Vesta) with encounters after 1997, and with a significance (defined as the ratio of mass to mass uncertainty) greater than 2.5. Observations prior to 1995 were eliminated, since they precede the availability of the USNO catalogs. As a result, knowledge of the pre-encounter trajectories was necessarily limited, often resulting in relatively poor quality masses. However, our intent here is not to obtain the best possible mass estimates, but rather to determine if debiasing results in superior values.

Table 7: Mass/Porosity Determinations Using Raw and Debiased Observations.

Method	Subject Ast.	Radius (km)	Test Ast.	Arc	N_{obs}	Enc. Yr.	Mass ($M_{\odot}$)	Rel. Diff.[a]	Bulk Density (g/cm^3)	Bulk Porosity[b]
Raw	1 Ceres	476.2±3.6[2]	13801	1997.8-2008.9	451	1998.1	$4.42 \pm 1.16 \times 10^{-10}$		1.94±0.51	0.43±0.15
Debiased				1997.8-2008.9	451	1998.1	$4.76 \pm 1.16 \times 10^{-10}$	0.29	2.09±0.51	0.38±0.15
Best[1]							$4.753 \pm 0.007 \times 10^{-10}$		2.09±0.05	0.39±0.01
Raw	3 Juno	129±3[3,4]	17715	1997.9-2008.9	497	2000.8	$2.71 \pm 1.99 \times 10^{-11}$		6.02±4.44	-0.77 ± 1.31
Debiased				1997.9-2008.9	497	2000.8	$1.46 \pm 1.98 \times 10^{-11}$	-0.63	3.25±4.40	0.05±1.30
Best[1]							$1.51 \pm 0.03 \times 10^{-11}$		3.36±0.24	0.01±0.07
Raw	6 Hebe	93±1.45[6,7]	4497	1997.1-2008.5	654	1997.5	$22.30 \pm 25.30 \times 10^{-12}$		13.17±14.95	-2.87 ± 4.40
Debiased				1997.1-2008.5	654	1997.5	$7.20 \pm 25.20 \times 10^{-12}$	-0.60	4.25±14.88	-0.25 ± 4.38
Best[5]							$6.46 \pm 0.32 \times 10^{-12}$		3.81±0.26	-0.12 ± 0.08
Raw	7 Iris	106±5[4,6]	52443	1998.8-2008.6	396	2001.2	$12.1 \pm 5.96 \times 10^{-12}$		4.80±2.46	-0.43 ± 0.73
Debiased				1998.8-2008.6	396	2001.2	$8.42 \pm 5.90 \times 10^{-12}$	-0.63	3.33±2.38	0.00±0.71
Best[5]							$6.86 \pm 0.50 \times 10^{-12}$		2.72±0.43	0.19±0.13
Raw	9 Metis	87±6[6,8]	29818	1996.5-2008.9	468	2005.2	$13.1 \pm 6.33 \times 10^{-12}$		9.47±4.98	-1.83 ± 1.49
Debiased				1996.5-2008.9	468	2005.2	$4.54 \pm 0.86 \times 10^{-12}$	-10.0	3.28±0.92	0.02±0.27
Best[5]							$5.70 \pm 1.40 \times 10^{-12}$		4.12±1.33	-0.23 ± 0.40
Raw	10 Hygiea	215.3±3.4[4,6]	3946	1996.8-2008.9	1093	1998.2	$7.15 \pm 5.80 \times 10^{-11}$		3.40±2.77	-0.15 ± 0.94
Debiased				1996.8-2008.9	1093	1998.2	$6.51 \pm 5.80 \times 10^{-11}$	-0.11	3.10±2.77	-0.05 ± 0.94
Best[5]							$4.45 \pm 0.07 \times 10^{-11}$		2.12±0.11	0.28±0.04
Raw	10 Hygiea	215.3±3.4[4,6]	24433	1995.1-2008.9	504	2004.5	$4.11 \pm 0.85 \times 10^{-11}$		1.96±0.42	0.34±0.14
Debiased				1995.1-2008.9	504	2004.5	$4.08 \pm 0.83 \times 10^{-11}$	-0.04	1.94±0.41	0.34±0.14
Best[5]							$4.45 \pm 0.07 \times 10^{-11}$		2.12±0.11	0.28±0.04
Raw	10 Hygiea	215.3±3.4[4,6]	57493	1996.4-2007.5	314	2000.6	$2.41 \pm 5.90 \times 10^{-11}$		1.15±2.81	0.61±0.95
Debiased				1996.4-2007.5	314	2000.6	$3.80 \pm 7.13 \times 10^{-11}$	0.19	1.81±3.40	0.39±1.15
Best[5]							$4.45 \pm 0.07 \times 10^{-11}$		2.12±0.11	0.28±0.04
Raw	10 Hygiea	215.3±3.4[4,6]	75794	2000.0-2008.2	208	2005.7	$5.87 \pm 4.28 \times 10^{-11}$		2.80±2.04	0.05±0.69
Debiased				2000.0-2008.2	208	2005.7	$4.06 \pm 3.96 \times 10^{-11}$	-0.46	1.94±1.89	0.34±0.64
Best[5]							$4.45 \pm 0.07 \times 10^{-11}$		2.12±0.11	0.28±0.04
Raw	15 Eunomia	134.1±7.5[4,6]	50278	1998.9-2008.2	220	2002.2	$1.65 \pm 0.13 \times 10^{-11}$		3.24±0.60	0.03±0.18
Debiased				1998.9-2008.2	220	2002.2	$1.59 \pm 0.13 \times 10^{-11}$	-0.41	3.14±0.59	0.06±0.17
Best[5]							$1.57 \pm 0.02 \times 10^{-11}$		3.09±0.52	0.08±0.16
Raw	189 Phthia	19±2[6]	6224	1995.0-2008.9	547	1999.1	$7.93 \pm 2.04 \times 10^{-14}$		5.49±2.24	-0.64 ± 0.67
Debiased				1995.0-2008.9	547	1999.1	$7.06 \pm 2.20 \times 10^{-14}$	-0.40	4.89±2.17	-0.46 ± 0.65
Best[5]							$1.93 \pm 0.41 \times 10^{-14}$		1.34±0.51	0.60±0.15

[a]The relative difference is the difference between the raw and debiased mass estimates, normalized by the stated debiased (formal) uncertainty.

[b]We assume grain densities of 2.4 g/cm^3 for S types (i.e., asteroids 3, 6, 7, 9, 15 and 189) and G types (i.e., 1 Ceres), and 3.0 g/cm^3 for C types (i.e., 10 Hygiea).

References:

[1]Pitjeva (2005)

[2]Thomas et al. (2005)

[3]Millis et al. (1981)

[4]Kaasalainen et al. (2002)

[5]Baer et al. (2008)

[6]Tedesco et al. (2002)

[7]Torppa et al. (2003)

[8]Thomas et al. (1996)

We frankly believe that the formal uncertainties in asteroid mass determination likely understate the actual effects of unmodeled perturbations and unknown error sources; so while we have listed the best currently available mass for each asteroid (with no debiasing applied), these values may not be sufficiently well determined to act as absolute references for comparison. We have therefore also provided estimates of bulk density and porosity; clearly unrealistic values should act as an additional check in these comparisons.

In ten of the eleven cases, the debiased mass is closer to the best currently available value than the mass derived from raw observations; the exception is the case of 10/24433, where the raw and debiased results are virtually identical. This advantage is most dramatically apparent in the case of 9/29818, where the difference between the debiased and raw masses is on the order of ten times the formal uncertainty (i.e., 10σ). The apparent advantage of using debiased observations is still evident, although not as starkly, in the results for 1/13801, 7/52443, 10/3946, 15/50278, and 189/6224. In each case, not only is the debiased mass closer to the best available value, but the resulting bulk porosity is equally (if not more) reasonable. In the cases of 3/17715, 6/4497 and 10/57493, the formal uncertainty in the calculated mass is larger than the mass itself; nevertheless, we believe it is significant that the calculated masses are consistently closer to the best available values, and the resulting bulk porosities are more reasonable than those resulting from raw observations.

5 Error Model: Second Iteration

We have demonstrated that the debiasing procedure successfully eliminated the biases from the observations of the numbered asteroids. As a result, the residuals are normally distributed, with error correlations that are relatively small, and that decay quickly to zero.

We therefore proceed to development and implementation of the error model's second iteration.

5.1 Refinements in the Second Iteration

As before, we used the MPC astrometric data set for December 12, 2008. After debiasing the observations of the numbered asteroids and recalculating their orbits, the second iteration of the observational error model was derived in almost exactly the same manner as described in Section 3.2, with two small refinements.

First, as noted above, if bins contain fewer than 1000 observations, these observations are combined into a MIX bin. Experience with the initial error model demonstrated that, since the overwhelming number of MIX observations are modern, the RA and Dec uncertainties reflected the precision of CCD technology. But since few early 19th century observatories contributed more than 1000 observations, nearly all of their sightings were sent to the MIX bin; and its highly precise, CCD-level uncertainties were clearly unrealistic for visual (and early photographic) observations.

Therefore, for the second iteration, we elected to create four MIX bins:

- MIX1 consists of observations from 1800 to 1890 (the visual era)
- MIX2 consists of observations from 1890 to 1950 (the early photographic era)
- MIX3 consists of observations from 1950 to 1995 (the late photographic era)
- MIX4 consists of observations from 1995 to the present (the CCD era)

Since the first three MIX bins are too sparse to allow the derivation of correlation models, the four MIX bins were combined for this purpose, resulting in a single MIX error correlation model. However, separate biases and RMS errors were calculated for each MIX bin.

The other refinement is that all MPC-listed observatories (and thus all observations in the MPC database) were included in the second iteration. In order to be operationally useful, this step is a clear prerequisite. And with the use of four MIX bins to represent the prevalent technology of each era, we felt the error models would be realistic, even for the smallest observatories.

We attempted to create correlation models for as many observatories as possible. As described in Section 3.2, however, very large data sets are required to find enough observation pairs to populate the 148 correlation baskets. In the end, correlation models were created for the following observatories:

- 106 - Crni Vrh
- 291 - LPL/Spacewatch II

- 568 - Mauna Kea
- 608 - Haleakala-AMOS
- 644 - Palomar Mountain/NEAT
- 673 - Table Mountain Observatory, Wrightwood
- 683 - Goodricke-Pigott Observatory, Tucson
- 689 - U.S. Naval Observatory, Flagstaff
- 691 - Steward Observatory, Kitt Peak-Spacewatch
- 699 - Lowell Observatory-LONEOS
- 703 - Catalina Sky Survey
- 704 - Lincoln Laboratory ETS, New Mexico
- E12 - Siding Spring Survey
- G96 - Mt. Lemmon Survey
- J75 - OAM Observatory, La Sagra

These correlation models are illustrated in Figures 24 through 31. Notice that the error correlations are much smaller than in the first iteration, and quickly decay to zero. This is precisely as expected. And since the correlations were significant only for approximately the first five days, particular care was taken in fitting the correlation models to the data in this period.

Excerpts from the resulting second iteration error model are given in Tables 16 and 17.

As Table 5 demonstrates, more than 60% of observations in the MPC database were collected by the modern survey observatories 704, 703, G96, and 699. Perusal of the corresponding entries in Table 17 reveal several significant features.

First, the RA and Dec RMS errors for these modern surveys are significantly less than 1 arc second, typically ranging from 0.2 to 0.8 arc seconds. Absent this statistical treatment, observations from these observatories would have been assigned unrealistically high uncertainties, thus deweighting these observations in the least squares solutions. Not only would the resulting uncertainty ellipsoids have been too large, but the solutions themselves would have been suboptimal, favoring less precise observations.

Second, as illustrated by Figures 32 and 33, the RA and Dec RMS errors for observations of apparent magnitude 18-19 made by observatory 704 decrease significantly with time. This is not unexpected; a survey's initial test observations are likely to be less precise, as both equipment and software are calibrated and refined for operational use. Moreover, these figures also demonstrate that observations more than 10 degrees outside the galactic plane have significantly higher RMS errors than those within the plane, likely due to the relative absence of background stars from which the asteroid's position is deduced. Absent this statistical treatment, however, these observations

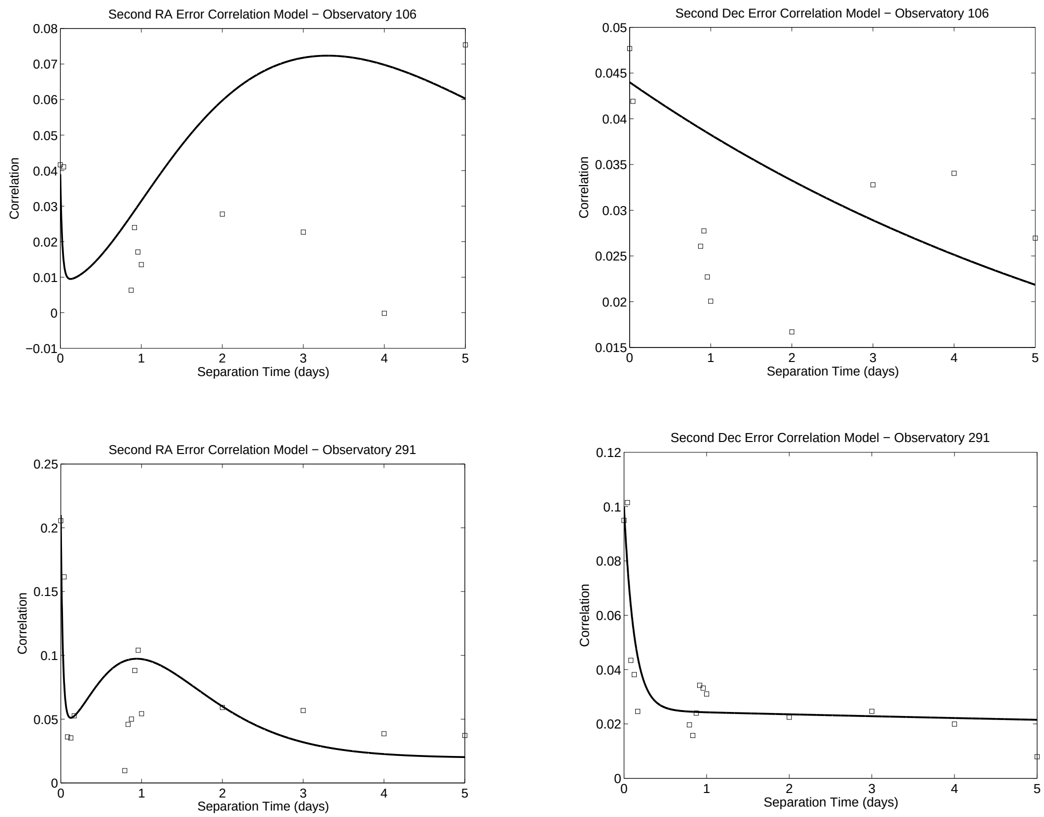


Figure 24: Second Iteration RA and Dec correlation models for observatories 106 and 291.

would have been assigned a uniform uncertainty, likely overweighting the less-precise test observations (and those outside the galactic plane), and likely underweighting the more-precise operational observations (and those near the galactic plane).

Third, as illustrated by Figures 34 and 35, the RA and Dec RMS errors for observatory 704 increase as the threshold magnitude of the bin increases. Again, this is not unexpected; as an asteroid becomes fainter, the signal-to-noise ratio drops, making it more difficult to precisely locate the image centroid. However, these plots clearly illustrate that failing to account for this effect again results in improper observational weighting, suboptimal orbits, and inaccurate uncertainty ellipsoids.

Fourth, Figure 36 illustrates the relative differences for asteroids 1-200,000 between error model epoch state vector components, and those resulting from the conventional default historical uncertainties with only catalog debiasing applied. While the majority of differences are less than 1σ, there is a non-trivial proportion of cases where the differences are significantly greater.

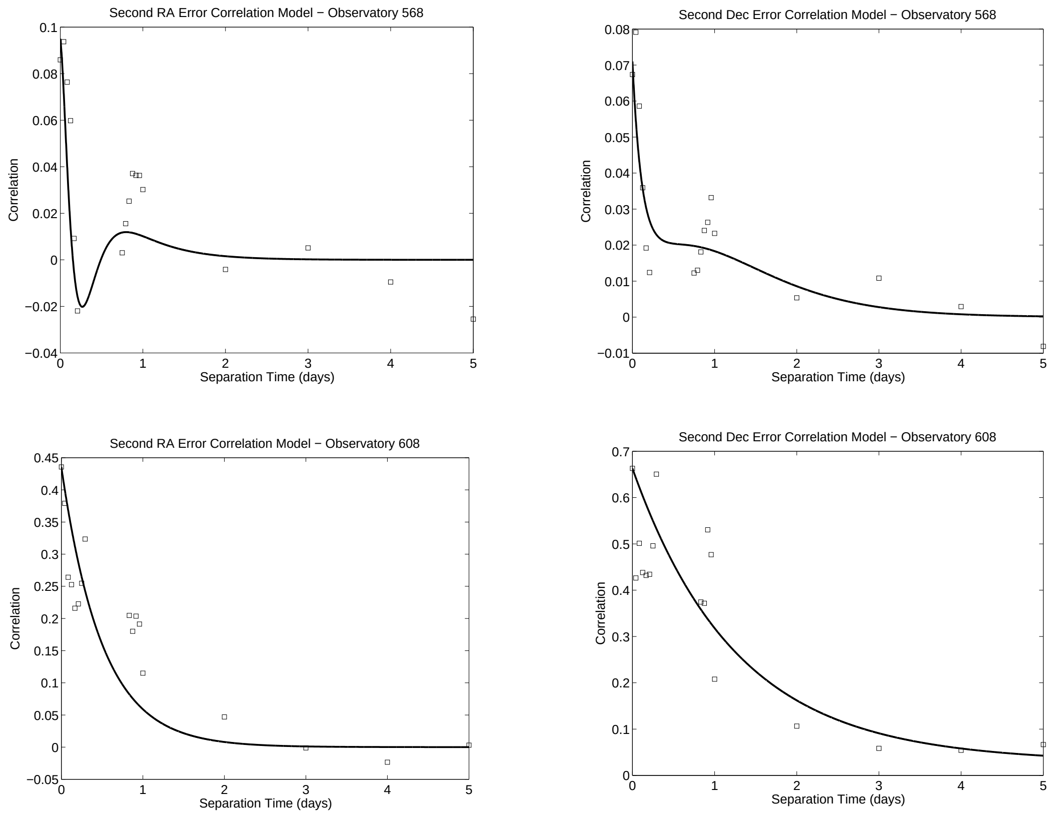


Figure 25: Second Iteration RA and Dec correlation models for observatories 568 and 608.

Fifth, the RA and Dec kurtoses for these observatories are consistently near 3 (especially for the most recent bins). Additionally, the RA and Dec biases for the MIX4 bin are insignificant compared to the RMS errors. This again demonstrates the effectiveness of the debiasing process.

Finally, as Table 8 illustrates, the RA and Dec RMS errors for the MIX1, MIX2, and MIX3 bins closely match the corresponding default historical values. While not endorsing the default assumptions, we find this result reassuring. Indeed, the default historical values were not arbitrary, but rather based upon extensive experience in orbit determination; any error model that yielded terribly different mean values for these eras would have been suspect. Moreover, this result further illustrates the advantages of our bin design, as new technology leads to smaller residuals over time.

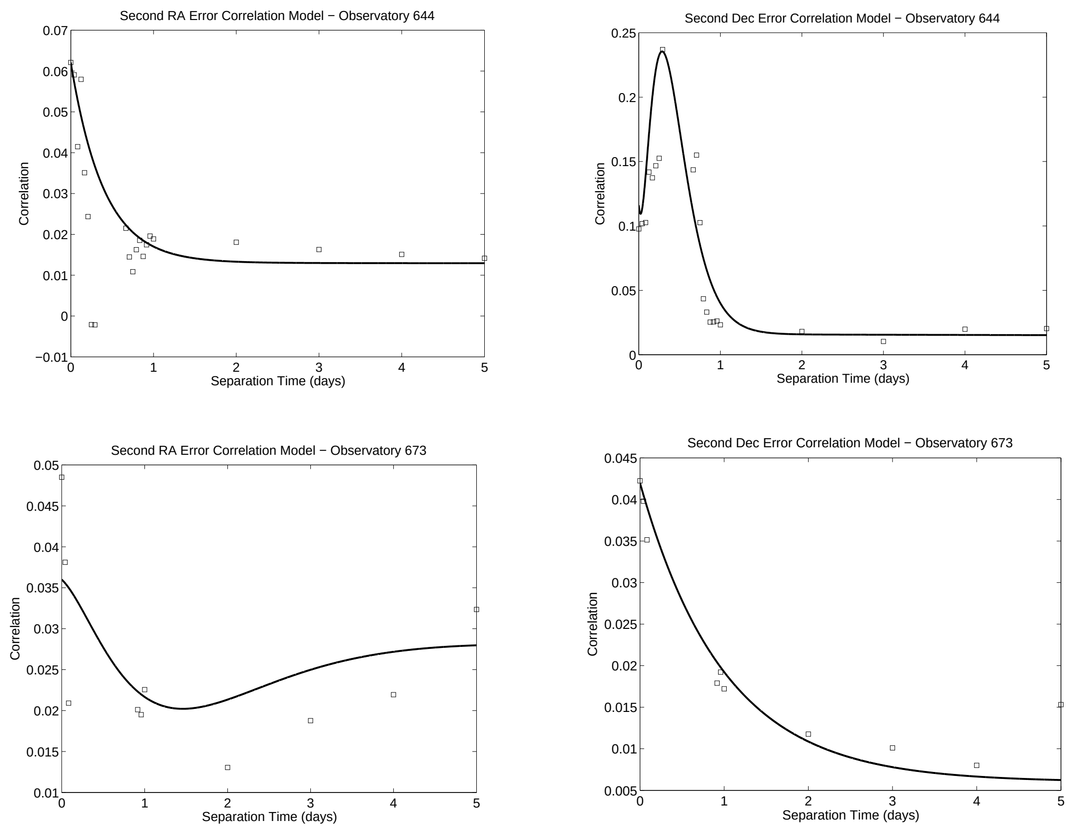


Figure 26: Second Iteration RA and Dec correlation models for observatories 644 and 673.

Table 8: Characteristics of the MIX bins.

Bin	RA RMS (arcsec)	Dec RMS (arcsec)	RA Bias (arcsec)	DEC Bias (arcsec)
MIX1	2.976	2.440	0.436	0.037
MIX2	1.837	1.605	0.120	-0.018
MIX3	0.941	0.919	-0.054	-0.041
MIX4	0.545	0.534	-0.001	0.029

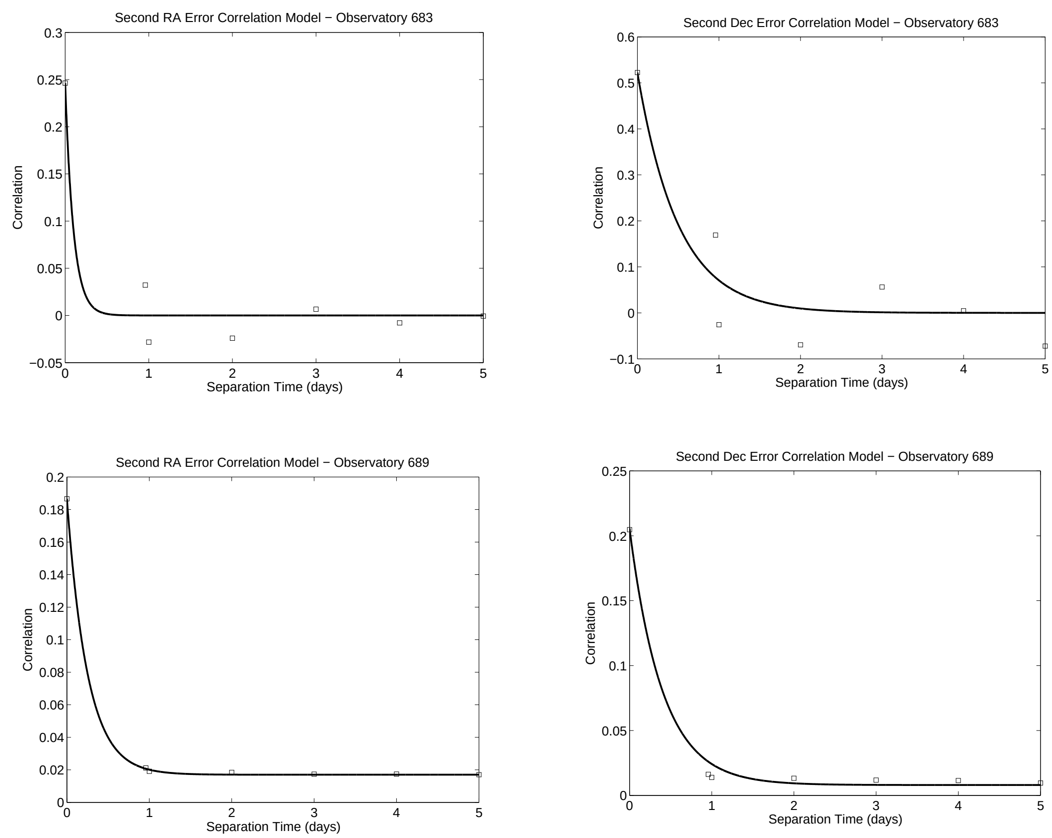


Figure 27: Second Iteration RA and Dec correlation models for observatories 683 and 689.

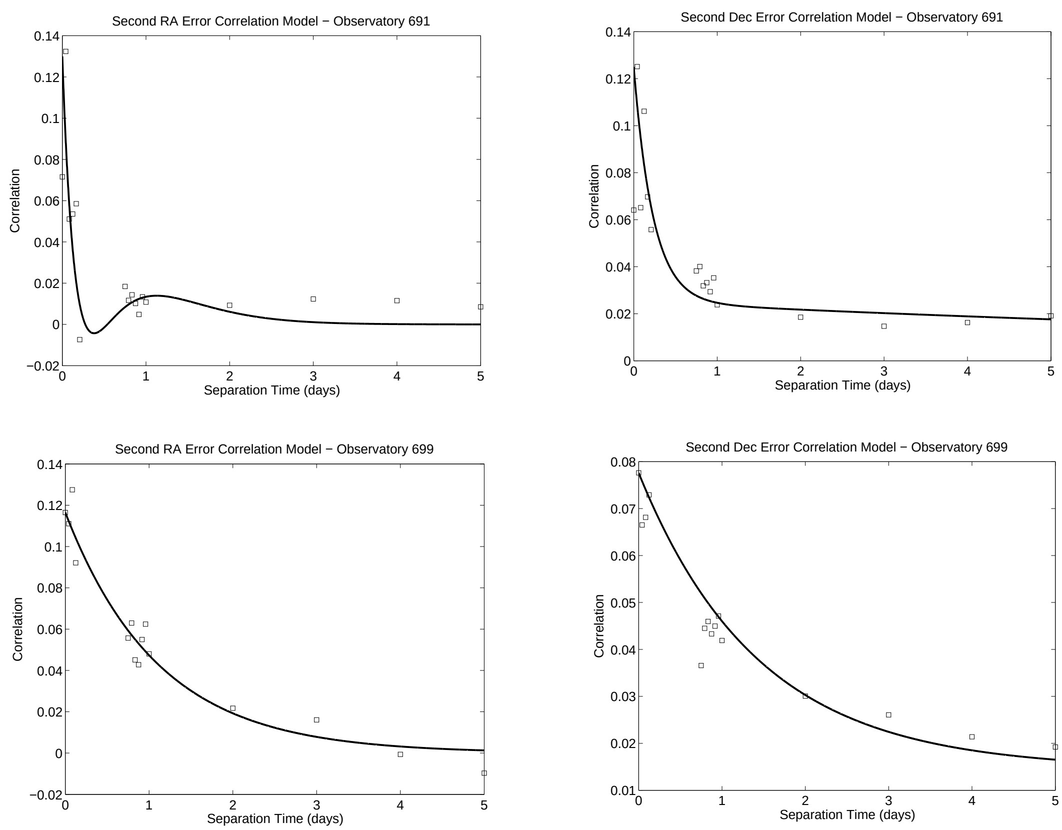


Figure 28: Second Iteration RA and Dec correlation models for observatories 691 and 699.

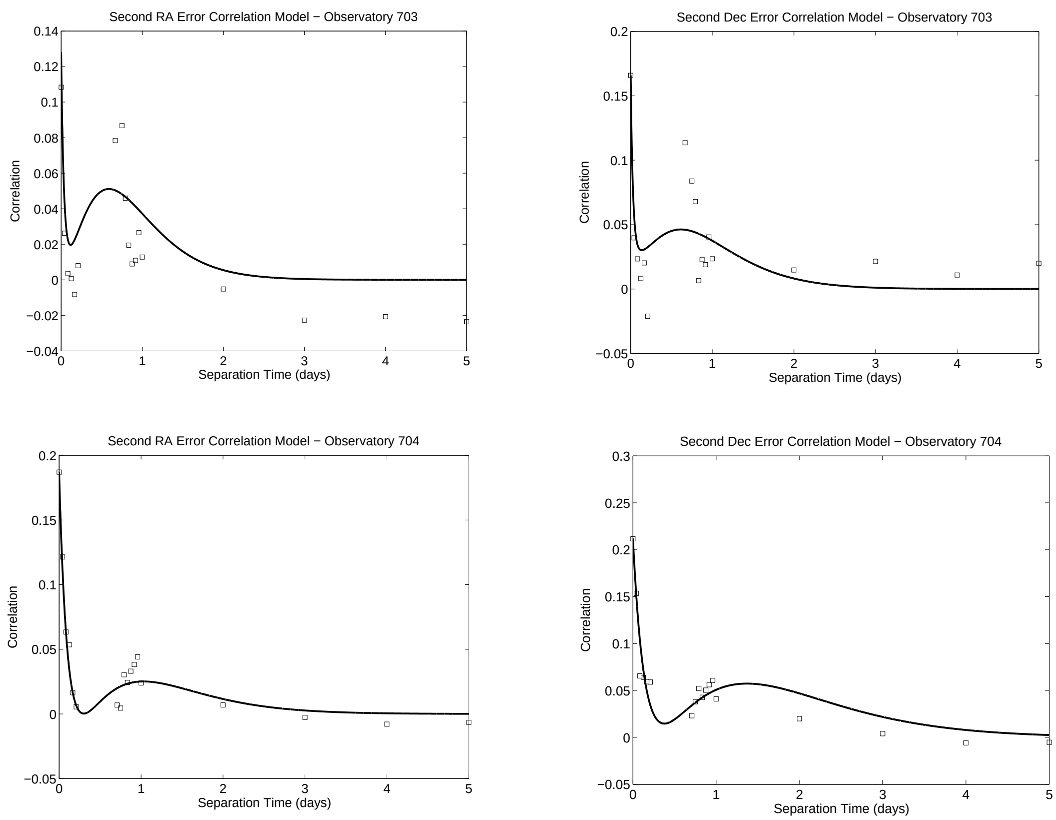


Figure 29: Second Iteration RA and Dec correlation models for observatories 703 and 704.

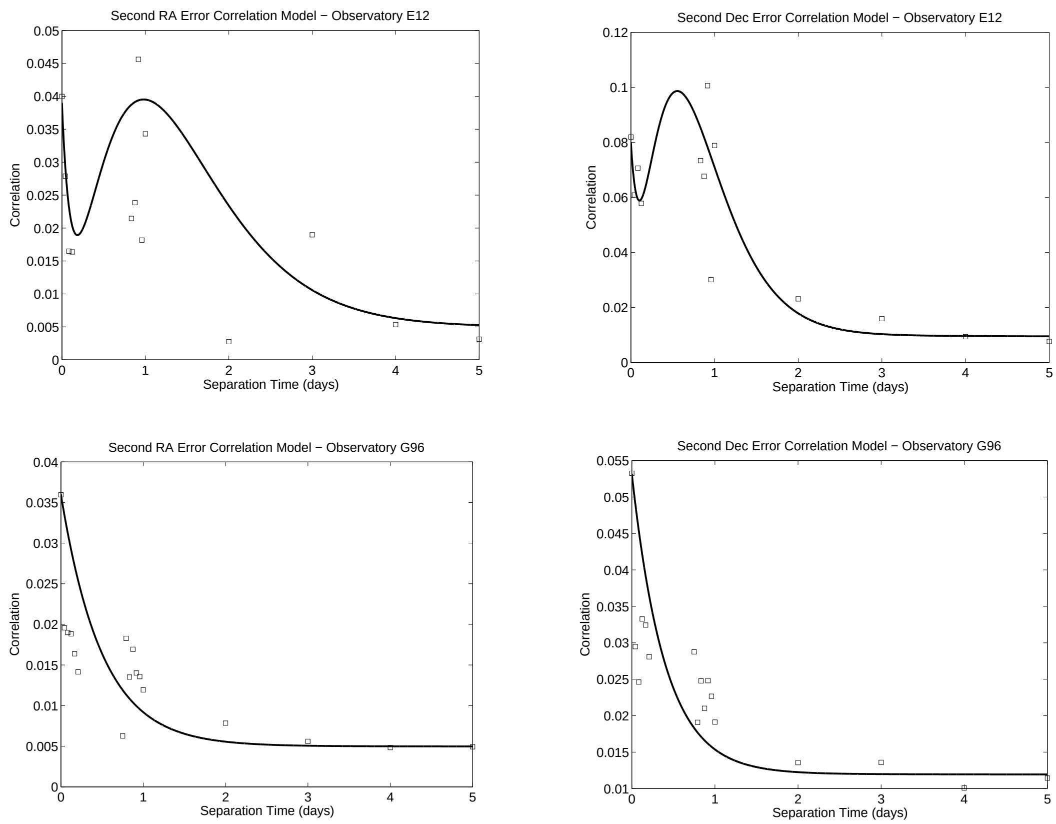


Figure 30: Second Iteration RA and Dec correlation models for observatories E12 and G96.

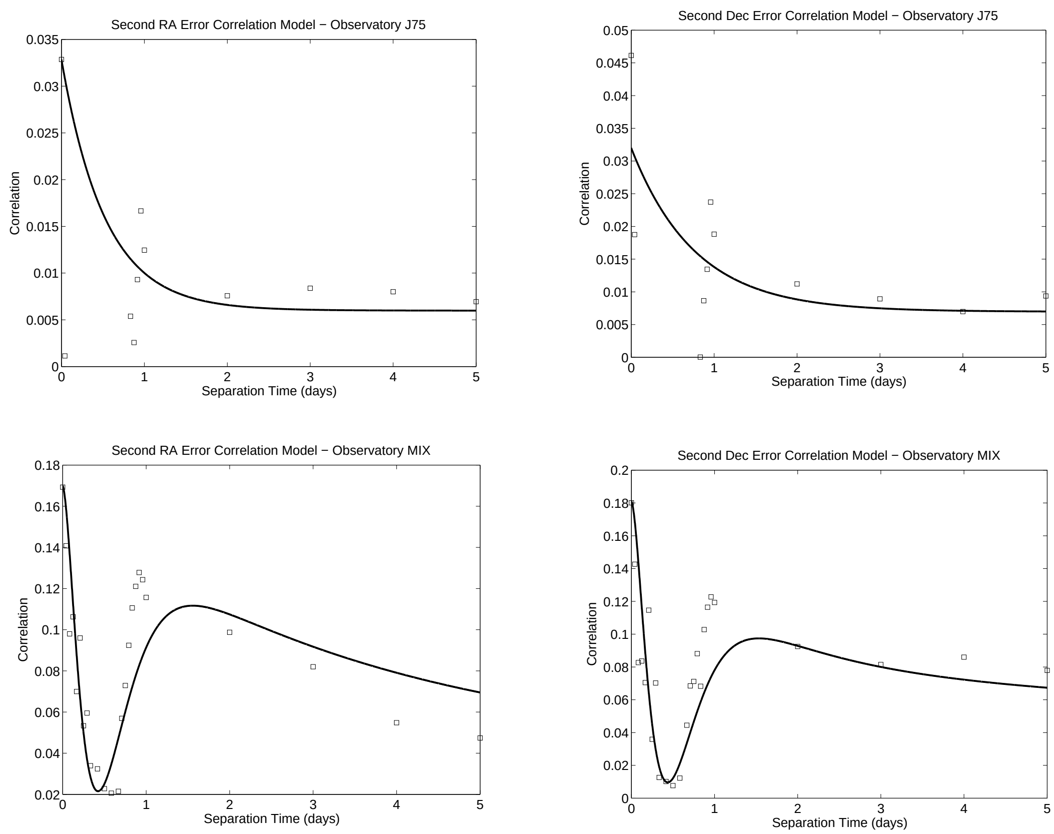


Figure 31: Second Iteration RA and Dec correlation models for observatories J75 and MIX.

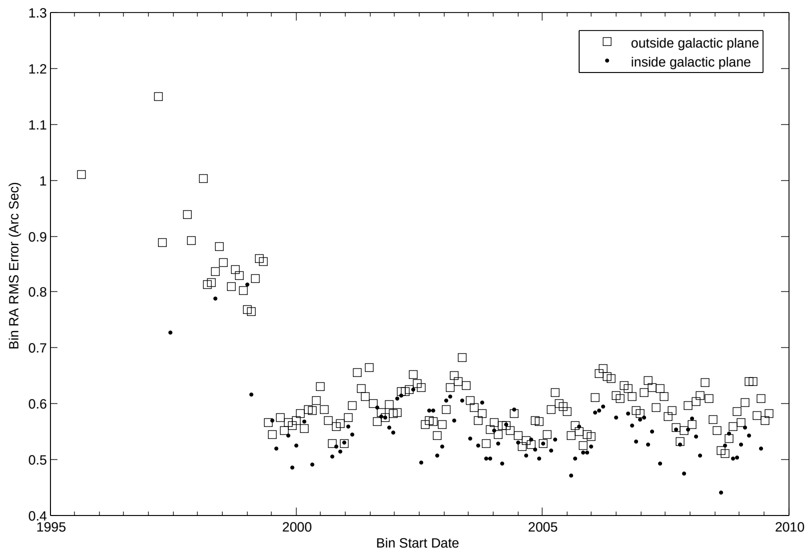


Figure 32: RA RMS errors for observations of magnitude 18-19 made by observatory 704 as a function of time.

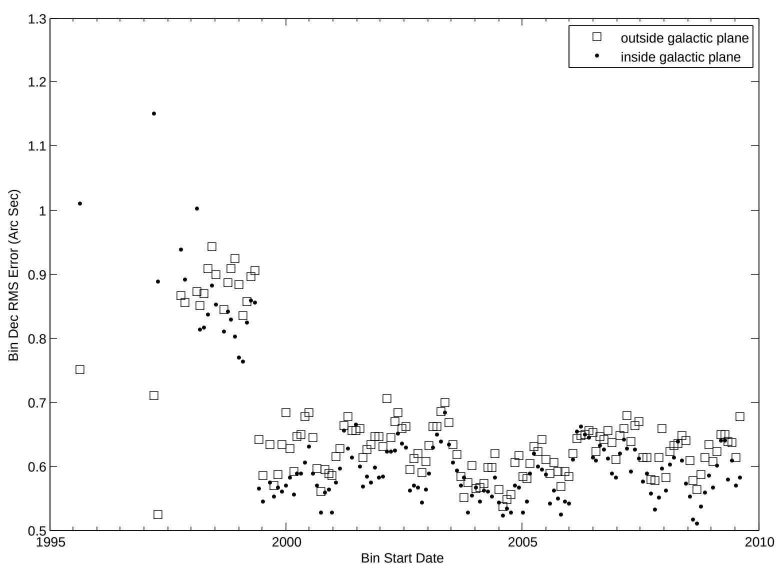


Figure 33: Dec RMS errors for observations of magnitude 18-19 made by observatory 704 as a function of time.

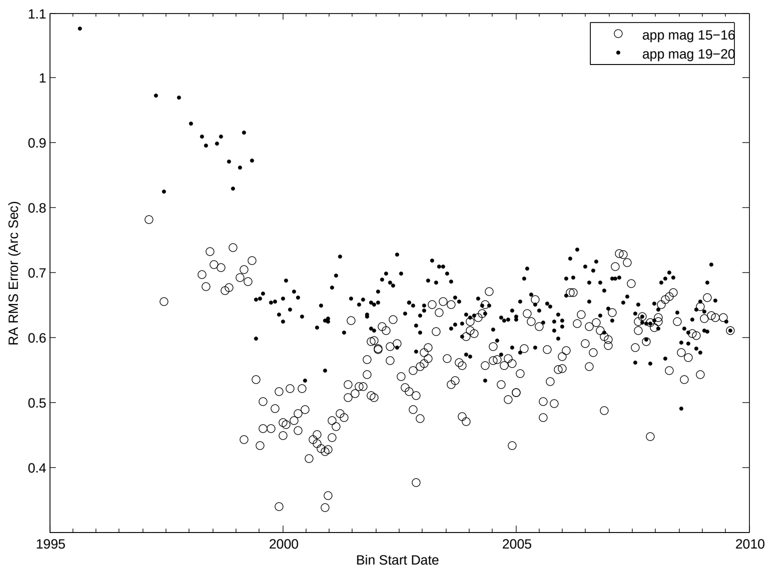


Figure 34: RA RMS errors for observatory 704 as a function of bin threshold magnitude.

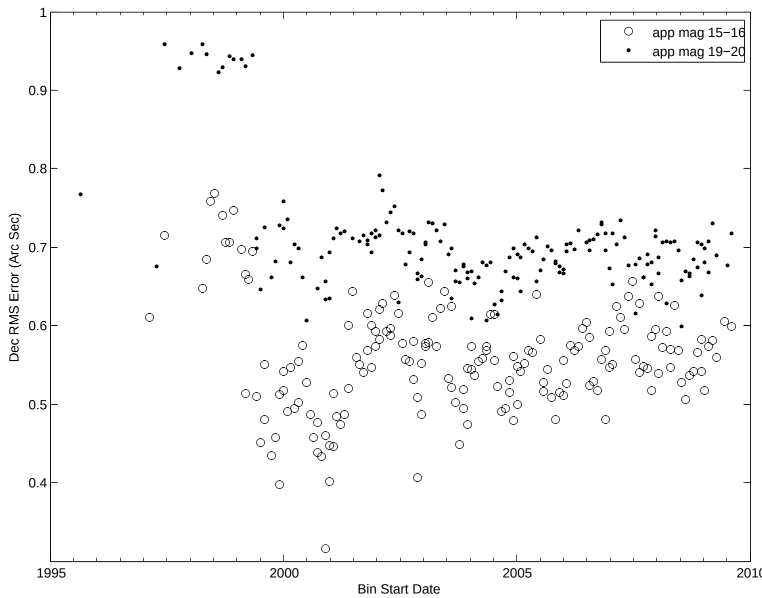


Figure 35: Dec RMS errors for observatory 704 as a function of bin threshold magnitude.

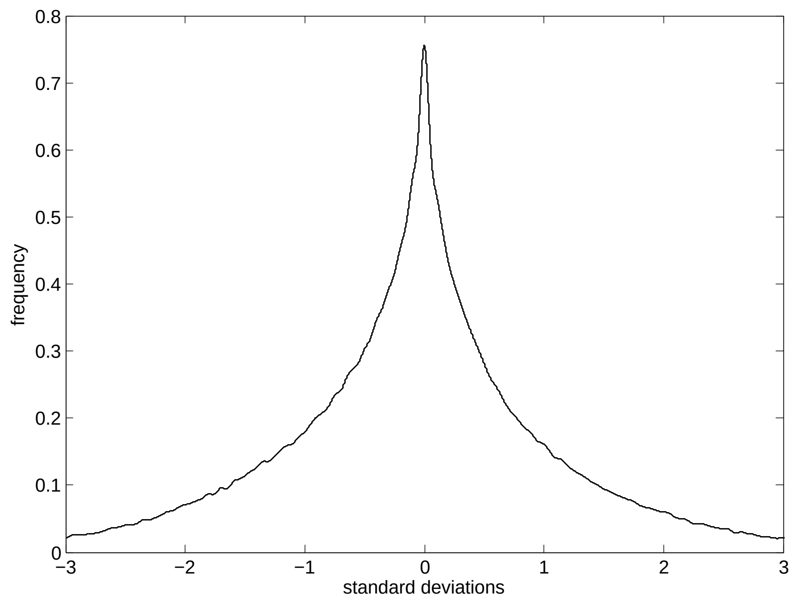


Figure 36: Relative differences in error model and debiased epoch state vectors for asteroids 1-200,000.

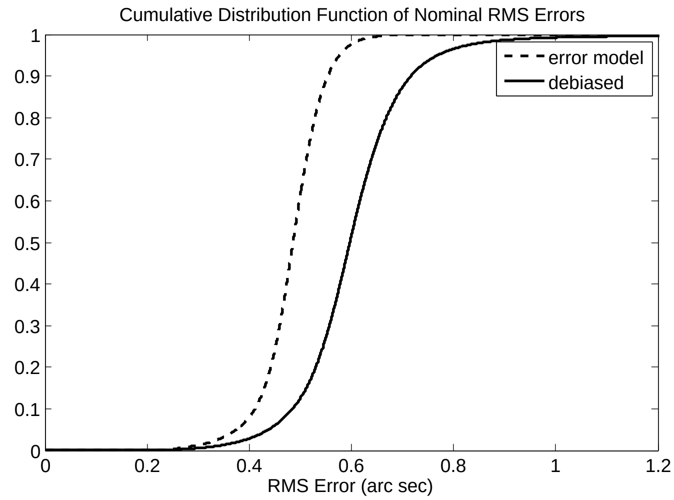


Figure 37: Cumulative Distribution Function: RMS errors for the error model and the conventional model with debiased observations.

5.2 Error Model Validation

To validate performance, the orbits of the numbered asteroids were calculated using the second iteration error model, and using only debiased observations and default historical uncertainties. The residuals and RMS errors from these two sets of orbits were compared. In 99.1% of cases, the error model RMS errors were smaller, with a mean improvement of 0.118 arc seconds. Additionally, the normalized error model RMS errors (compiled by dividing observational residuals by their corresponding assumed uncertainties) were closer to 1 in 98.2% of cases.

These results are illustrated in Figures 37 and 38. Obviously, these are very desirable characteristics, as they imply that the error model orbits agree with observations significantly better, and that the uncertainty ellipsoids are more realistic.

Nevertheless, these results are insufficient to validate the second iteration error model. As we saw in section 4.1, it is possible for the least squares algorithm to converge to a minimum residual solution that is nonetheless physically inaccurate. Indeed, one can even selectively delete observations so as to make one method appear superior. The only way to definitively validate the error model is to follow the prediction-based approach used in section 4.10, and demonstrate that the error model better predicts an asteroid's position at times outside of the observational baseline. We implemented this strategy in two separate tests:

- We selected 4530 numbered asteroids that had fifty or more observations spread over at least fifty days in both oppositions n-1 and n-2. We calculated the error model and debiased orbits based on observations from those two oppositions, and used these orbits to calculate the "observed - predicted" residuals for the observations of opposition n-3. The results are illustrated in Figure 39, which shows that the error model orbits predict the n-3 observations better, with a mean improvement of 0.091 arc sec.

- We selected 7250 numbered asteroids that had thirty or more observations spread over at least thirty days in each of oppositions n-1, n-2, and n-3. We calculated the error model and debiased orbits based on observations from those three oppositions, and used these orbits to calculate the ”observed - predicted” residuals for the observations of opposition n-4. The results are illustrated in Figure 40, which shows that the error model orbits predict the n-4 observations better, with a mean improvement of 0.080 arc sec.

We therefore conclude that the second draft error model is statistically valid, in that it more accurately models the physical trajectory of asteroids, and their corresponding region of uncertainty.

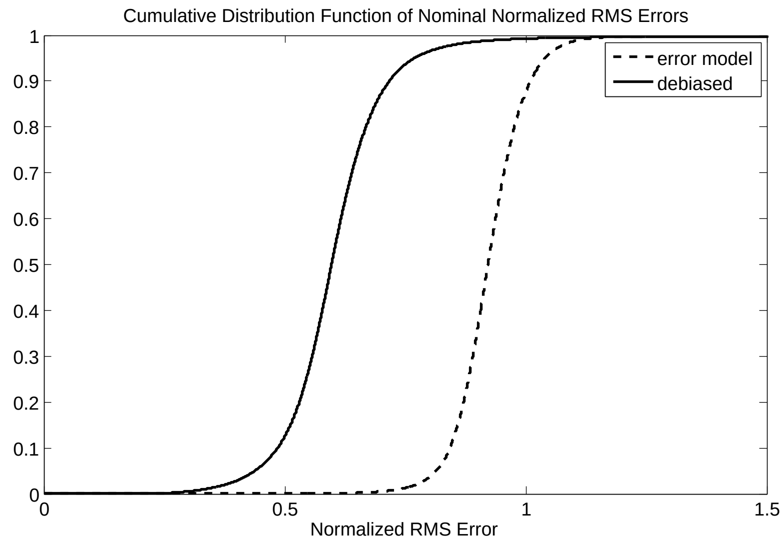


Figure 38: Cumulative Distribution Function: Normalized RMS errors for the error model and the conventional model with debiased observations.

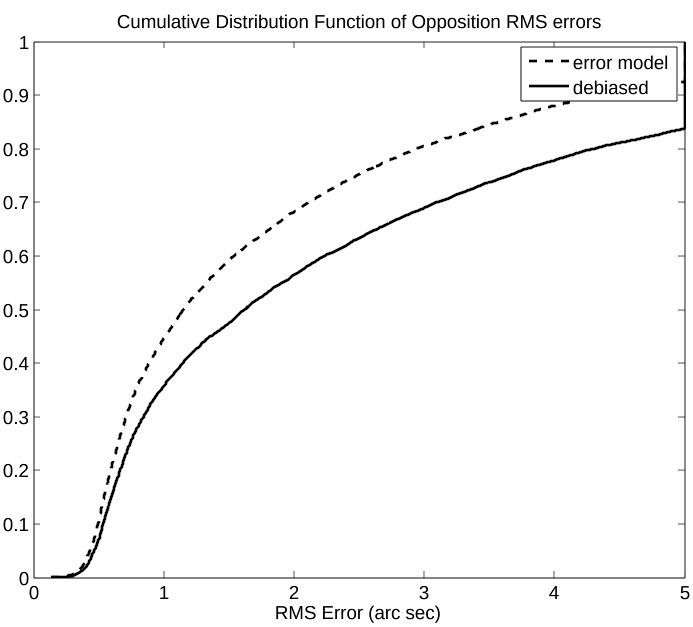


Figure 39: Cumulative Distribution Function: RMS errors for the error model and the conventional model with debiased observations for opposition n-3.

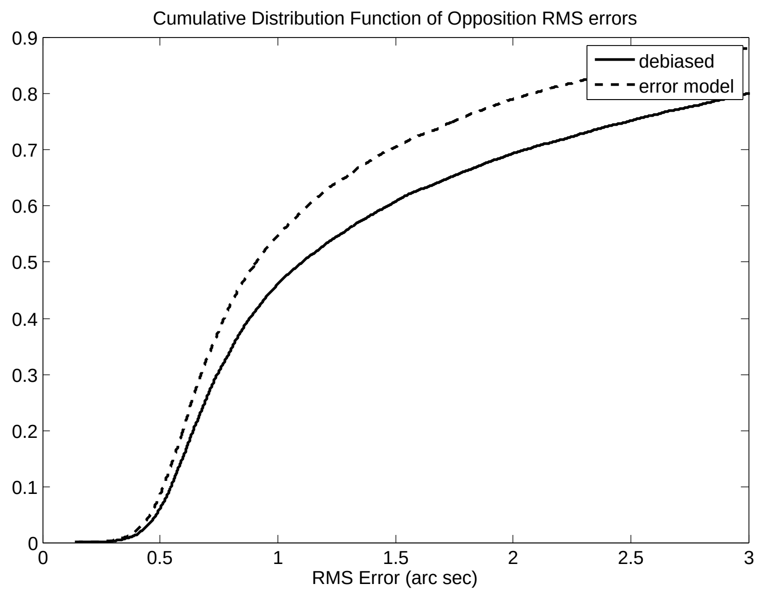


Figure 40: Cumulative Distribution Function: RMS errors for the error model and the conventional model with debiased observations for opposition n-4.

5.3 Error Model Interpretation

It is important to remember that this is a *statistical* error model, based upon Gaussian probability distributions. The resulting least-squares standard deviations should therefore not be interpreted as absolute uncertainties, but rather as 1σ uncertainties. This change in perception is crucial to placing such high-precision applications as asteroid impact analysis, Yarkovsky-effect modeling, and mass determination onto a firm statistical foundation.

Assume, for instance, that we are attempting to recover a newly-discovered asteroid. Then there is a 32% probability that the asteroid will lie outside the 1σ uncertainty ellipsoid, a 5% probability that the asteroid will lie outside the 2σ uncertainty ellipsoid, and a 0.3% probability that the asteroid will lie outside the 3σ uncertainty ellipsoid. The observer must calibrate the size of the search region against the risk they are willing to accept of missing the target. On the other hand, the user can rest assured that, on average, the asteroid will indeed lie within the 1σ uncertainty ellipsoid 68% of the time, etc.

6 Application of the Error Model: Asteroid Mass Determination

As noted in section 3, our objective was to calculate the most accurate possible masses of asteroids; and from them, to deduce the physical properties of those asteroids.

With the debiasing methodology and observational error model validated, we used them (plus the heritage version of the BC-405 asteroid ephemeris) to recalculate both the orbits of the 300 asteroids in the ephemeris, and the masses of as many asteroids from our earlier survey as possible. The newly-revised asteroid orbits and masses were used to recreate the BC-405 ephemeris, which was then used to refine the masses; and this iterative process was repeated a total of 11 times, until each state vector component and mass converged to within 1σ.

While the BC-405 ephemeris was developed solely to assist the mass determinations, we nonetheless believe it could prove valuable in many high-precision dynamical applications requiring an accurate solar system force model. The masses and state vector components of the 300 asteroids at the central epoch of the ephemeris (Julian Date 2453775.0) are listed in Table 15; the full ephemeris is available from the author.

We must note that the resulting masses also benefited from the availability of additional observations beyond those in the MPC database. In collaboration with Rob Matson, we theorized that images from the SkyMorph archive might allow us to precover test asteroids, and establish their pre-encounter trajectories. In several cases, this helped to refine existing masses; in other cases (including 6 Hebe and 8 Flora), it allowed us to calculate new masses in cases where pre-encounter observations had previously not existed.

The resulting masses for 28 main-belt asteroids are listed in Table 9.

Table 9: Masses measured using the observational error model

Subject Asteroid	Test Asteroid	Mass ($M_\odot$)	std dev ($M_\odot$)	Significance
1	91	4.783×10^{-10}	2.742×10^{-12}	174.4
1	348	4.719×10^{-10}	1.198×10^{-12}	394.0
1	5303	4.769×10^{-10}	1.108×10^{-12}	430.3
1	13801	4.795×10^{-10}	1.811×10^{-12}	264.8
1	**Average**	4.756×10^{-10}	7.16×10^{-13}	664.0
2	582	1.055×10^{-10}	7.589×10^{-12}	13.9
2	4971	1.07×10^{-10}	1.75×10^{-11}	6.1
2	**Average**	1.06×10^{-10}	6.96×10^{-12}	15.2
3	251	2.234×10^{-11}	6.536×10^{-12}	3.4
3	17715	1.80×10^{-11}	7.41×10^{-12}	2.4
3	61235	1.340×10^{-11}	2.344×10^{-12}	5.7
3	**Average**	1.47×10^{-11}	2.11×10^{-12}	7.0
4	17	1.346×10^{-10}	2.962×10^{-13}	454.4

Subject Asteroid	Test Asteroid	Mass ($M_\odot$)	std dev ($M_\odot$)	Significance
4	197	1.276×10^{-10}	1.067×10^{-12}	119.5
4	5205	1.304×10^{-10}	1.103×10^{-12}	118.3
4	**Average**	1.3385×10^{-10}	2.76×10^{-13}	484.4
5	17	1.255×10^{-12}	2.500×10^{-15}	501.8
6	1150	6.834×10^{-12}	1.298×10^{-12}	5.3
6	4497	4.412×10^{-12}	9.137×10^{-13}	4.8
6	5295	1.061×10^{-11}	1.463×10^{-12}	7.3
6	**Average**	6.33×10^{-12}	6.65×10^{-13}	9.5
7	12301	1.92×10^{-11}	6.58×10^{-12}	2.9
7	1879	9.31×10^{-12}	2.93×10^{-12}	3.2
7	47544	1.269×10^{-11}	3.580×10^{-12}	3.5
7	52443	9.018×10^{-12}	7.557×10^{-13}	11.9
7	17186	5.197×10^{-12}	6.215×10^{-13}	8.4
7	2346	1.166×10^{-11}	3.140×10^{-12}	3.7
7	1651	9.961×10^{-12}	2.911×10^{-12}	3.4
7	3133	1.113×10^{-11}	3.016×10^{-12}	3.7
7	46529	1.717×10^{-11}	4.116×10^{-12}	4.2
7	**Average**	7.35×10^{-12}	4.50×10^{-13}	16.3
8	330	3.407×10^{-12}	4.382×10^{-13}	7.8
8	1577	3.58×10^{-12}	1.60×10^{-12}	2.2
8	**Average**	3.42×10^{-12}	4.23×10^{-13}	8.1
9	20	9.230×10^{-12}	2.007×10^{-12}	4.6
9	29818	6.722×10^{-12}	1.191×10^{-12}	5.6
9	**Average**	7.38×10^{-12}	1.02×10^{-12}	7.2
10	69	4.638×10^{-11}	1.019×10^{-11}	4.5
10	111	5.091×10^{-11}	4.086×10^{-12}	12.5
10	209	5.715×10^{-11}	5.249×10^{-12}	10.9
10	357	7.614×10^{-11}	8.155×10^{-12}	9.3
10	1259	8.169×10^{-11}	1.006×10^{-11}	8.1
10	3946	4.044×10^{-11}	1.010×10^{-12}	40.0
10	6006	4.691×10^{-11}	9.828×10^{-12}	4.8
10	6143	5.197×10^{-11}	3.017×10^{-12}	17.2
10	13266	6.153×10^{-11}	5.302×10^{-12}	11.6
10	15487	5.723×10^{-11}	1.252×10^{-11}	4.6
10	24433	4.114×10^{-11}	2.933×10^{-12}	14.0
10	48499	4.410×10^{-11}	4.417×10^{-12}	10.0
10	54270	6.245×10^{-11}	1.387×10^{-11}	4.5
10	57493	6.945×10^{-11}	1.089×10^{-11}	6.4
10	75794	6.018×10^{-11}	1.137×10^{-11}	5.3
10	**Average**	4.40×10^{-11}	8.27×10^{-13}	53.2

Subject Asteroid	Test Asteroid	Mass ($M_\odot$)	std dev ($M_\odot$)	Significance
11	17	2.289×10^{-12}	1.119×10^{-14}	204.6
13	14689	7.477×10^{-12}	1.046×10^{-12}	7.1
14	15186	2.40×10^{-12}	9.58×10^{-13}	2.5
14	64537	6.019×10^{-12}	1.449×10^{-12}	4.2
14	**Average**	3.50×10^{-12}	7.99×10^{-13}	4.4
15	14401	1.426×10^{-11}	1.425×10^{-12}	10.0
15	16693	1.526×10^{-11}	2.559×10^{-12}	6.0
15	45690	1.59×10^{-11}	5.42×10^{-12}	2.9
15	1284	1.640×10^{-11}	1.069×10^{-12}	15.3
15	50278	1.595×10^{-11}	1.497×10^{-13}	106.6
15	1313	1.291×10^{-11}	2.920×10^{-12}	4.4
15	**Average**	1.59×10^{-11}	1.47×10^{-13}	108.4
16	13206	1.168×10^{-11}	4.484×10^{-13}	26.1
16	94	9.662×10^{-12}	1.733×10^{-12}	5.6
16	39054	9.661×10^{-12}	1.504×10^{-12}	6.4
16	**Average**	1.14×10^{-11}	4.17×10^{-13}	27.4
17	11	7.013×10^{-13}	2.453×10^{-14}	28.6
19	3486	3.908×10^{-12}	3.719×10^{-13}	10.5
19	27799	9.098×10^{-12}	1.562×10^{-12}	5.8
19	**Average**	4.19×10^{-12}	3.62×10^{-13}	11.6
20	44	1.861×10^{-12}	3.443×10^{-13}	5.4
21	29523	1.27×10^{-12}	4.13×10^{-13}	3.1
29	987	7.777×10^{-12}	3.205×10^{-13}	24.3
29	24123	1.846×10^{-11}	3.045×10^{-12}	6.1
29	48464	6.248×10^{-12}	1.193×10^{-12}	5.2
29	**Average**	7.78×10^{-12}	3.08×10^{-13}	25.3
31	3176	2.681×10^{-11}	7.553×10^{-12}	3.5
39	2416	2.829×10^{-12}	7.266×10^{-13}	3.9
52	124	1.163×10^{-11}	7.823×10^{-13}	14.9
52	306	2.503×10^{-11}	2.159×10^{-12}	11.6
52	**Average**	1.32×10^{-11}	7.35×10^{-13}	17.9
65	526	6.930×10^{-12}	5.125×10^{-13}	13.5
88	7	9.344×10^{-12}	6.023×10^{-13}	15.5
88	7629	8.060×10^{-12}	1.355×10^{-12}	5.9
88	**Average**	9.13×10^{-12}	5.50×10^{-13}	16.6
511	203	1.714×10^{-11}	2.632×10^{-12}	6.5

Subject Asteroid	Test Asteroid	Mass ($M_\odot$)	std dev ($M_\odot$)	Significance
511	532	1.763×10^{-11}	1.257×10^{-12}	14.0
511	1550	2.473×10^{-11}	1.997×10^{-12}	12.4
511	**Average**	1.93×10^{-11}	9.86×10^{-13}	19.6
704	10034	3.136×10^{-11}	3.103×10^{-12}	10.1
704	37	1.905×10^{-11}	3.968×10^{-12}	4.8
704	7461	1.972×10^{-11}	5.880×10^{-12}	3.4
704	1467	1.777×10^{-11}	1.058×10^{-12}	16.8
704	95	2.172×10^{-11}	2.338×10^{-12}	9.3
704	**Average**	1.96×10^{-11}	8.86×10^{-13}	22.1
804	1002	2.061×10^{-12}	3.933×10^{-13}	5.2

6.1 Advantages of the Error Model for Mass Determination

To demonstrate the advantages of the error model for asteroid mass determination, we attempted to calculate these same masses using the conventional assumptions for uncertainty (3 ars seconds from 1800-1890, 2 arc seconds from 1890-1950, 1 arc second from 1950-present) and correlation (all observations uncorrelated). The results are presented in Table 10.

Table 10: Mass and significance comparison: Observational error model vs. conventional uncertainties

Subject Asteroid	Test Asteroid	Error Model Mass ($M_\odot$)	std dev ($M_\odot$)	Significance	Conventional Mass ($M_\odot$)	std dev ($M_\odot$)	Significance
1	91	4.783×10^{-10}	2.742×10^{-12}	174.4	4.70×10^{-10}	6.7×10^{-12}	70.0
1	348	4.719×10^{-10}	1.198×10^{-12}	394.0	4.76×10^{-10}	5.5×10^{-12}	86.1
1	5303	4.769×10^{-10}	1.108×10^{-12}	430.3	4.76×10^{-10}	5.0×10^{-12}	95.2
1	13801	4.795×10^{-10}	1.811×10^{-12}	264.8	4.77×10^{-10}	2.9×10^{-12}	165.1
1	**Average**	4.756×10^{-10}	7.16×10^{-13}	664.0	4.76×10^{-10}	2.2×10^{-12}	220
2	582	1.055×10^{-10}	7.589×10^{-12}	13.9	1.03×10^{-10}	1.5×10^{-11}	6.8
2	4971	1.07×10^{-10}	1.75×10^{-11}	6.1	1.78×10^{-10}	6.8×10^{-11}	2.6
2	**Average**	1.06×10^{-10}	6.96×10^{-12}	15.2	1.06×10^{-10}	1.5×10^{-11}	7.3
3	251	2.234×10^{-11}	6.536×10^{-12}	3.4	invalid		
3	17715	1.80×10^{-11}	7.41×10^{-12}	2.4	invalid		
3	61235	1.340×10^{-11}	2.344×10^{-12}	5.7	invalid		
3	**Average**	1.47×10^{-11}	2.11×10^{-12}	7.0	invalid		
4	17	1.346×10^{-10}	2.962×10^{-13}	454.4	1.33×10^{-10}	1.4×10^{-12}	94.0
4	197	1.276×10^{-10}	1.067×10^{-12}	119.5	1.34×10^{-10}	2.9×10^{-12}	46.1
4	5205	1.304×10^{-10}	1.103×10^{-12}	118.3	1.29×10^{-10}	1.3×10^{-12}	101.4
4	**Average**	1.3385×10^{-10}	2.76×10^{-13}	484.4	1.31×10^{-10}	9.0×10^{-13}	145
5	17	1.255×10^{-12}	2.500×10^{-15}	501.8	invalid		
6	1150	6.834×10^{-12}	1.298×10^{-12}	5.3	6.13×10^{-12}	2.27×10^{-12}	2.7
6	4497	4.412×10^{-12}	9.137×10^{-13}	4.8	7.87×10^{-12}	2.01×10^{-12}	3.9
6	5295	1.061×10^{-11}	1.463×10^{-12}	7.3	1.17×10^{-11}	4.44×10^{-12}	2.6
6	**Average**	6.33×10^{-12}	6.65×10^{-13}	9.5	7.57×10^{-12}	1.4×10^{-12}	5.3
7	12301	1.92×10^{-11}	6.58×10^{-12}	2.9	1.76×10^{-11}	8.1×10^{-12}	2.2
7	1879	9.31×10^{-12}	2.93×10^{-12}	3.2	1.04×10^{-11}	2.8×10^{-12}	3.8
7	47544	1.269×10^{-11}	3.580×10^{-12}	3.5	invalid		
7	52443	9.018×10^{-12}	7.557×10^{-13}	11.9	9.46×10^{-12}	1.9×10^{-12}	5.0
7	17186	5.197×10^{-12}	6.215×10^{-13}	8.4	6.81×10^{-12}	1.9×10^{-12}	3.5
7	2346	1.166×10^{-11}	3.140×10^{-12}	3.7	1.77×10^{-11}	8.6×10^{-12}	2.1
7	1651	9.961×10^{-12}	2.911×10^{-12}	3.4	invalid		
7	3133	1.113×10^{-11}	3.016×10^{-12}	3.7	invalid		
7	46529	1.717×10^{-11}	4.116×10^{-12}	4.2	invalid		
7	**Average**	7.35×10^{-12}	4.50×10^{-13}	16.3	8.9×10^{-12}	1.2×10^{-12}	7.5
8	330	3.407×10^{-12}	4.382×10^{-13}	7.8	3.25×10^{-12}	7.0×10^{-13}	4.6
8	1577	3.58×10^{-12}	1.60×10^{-12}	2.2	7.01×10^{-12}	2.0×10^{-12}	3.4
8	**Average**	3.42×10^{-12}	4.23×10^{-13}	8.1	3.65×10^{-12}	6.6×10^{-13}	5.5
9	20	9.230×10^{-12}	2.007×10^{-12}	4.6	9.8×10^{-12}	3.1×10^{-12}	3.1
9	29818	6.722×10^{-12}	1.191×10^{-12}	5.6	invalid		

Subject Asteroid	Test Asteroid	Error Model Mass ($M_\odot$)	std dev ($M_\odot$)	Significance	Conventional Mass ($M_\odot$)	std dev ($M_\odot$)	Significance
9	**Average**	7.38×10^{-12}	1.02×10^{-12}	7.2	9.8×10^{-12}	3.1×10^{-12}	3.1
10	69	4.638×10^{-11}	1.019×10^{-11}	4.5	4.53×10^{-11}	2.2×10^{-11}	2.0
10	111	5.091×10^{-11}	4.086×10^{-12}	12.5	6.13×10^{-11}	5.2×10^{-12}	11.7
10	209	5.715×10^{-11}	5.249×10^{-12}	10.9	4.57×10^{-11}	1.0×10^{-11}	4.6
10	357	7.614×10^{-11}	8.155×10^{-12}	9.3	6.39×10^{-11}	8.7×10^{-12}	7.3
10	1259	8.169×10^{-11}	1.006×10^{-11}	8.1	7.03×10^{-11}	1.8×10^{-11}	3.8
10	3946	4.044×10^{-11}	1.010×10^{-12}	40.0	4.54×10^{-11}	1.5×10^{-12}	30.3
10	6006	4.691×10^{-11}	9.828×10^{-12}	4.8	6.18×10^{-11}	1.2×10^{-11}	5.1
10	6143	5.197×10^{-11}	3.017×10^{-12}	17.2	5.53×10^{-11}	3.5×10^{-12}	15.9
10	13266	6.153×10^{-11}	5.302×10^{-12}	11.6	6.04×10^{-11}	6.6×10^{-12}	9.2
10	15487	5.723×10^{-11}	1.252×10^{-11}	4.6	5.79×10^{-11}	1.5×10^{-11}	3.9
10	24433	4.114×10^{-11}	2.933×10^{-12}	14.0	3.97×10^{-11}	5.5×10^{-12}	7.3
10	48499	4.410×10^{-11}	4.417×10^{-12}	10.0	4.82×10^{-11}	6.1×10^{-12}	7.8
10	54270	6.245×10^{-11}	1.387×10^{-11}	4.5	invalid		
10	57493	6.945×10^{-11}	1.089×10^{-11}	6.4	6.58×10^{-11}	1.9×10^{-11}	3.5
10	75794	6.018×10^{-11}	1.137×10^{-11}	5.3	6.19×10^{-11}	3.0×10^{-11}	2.0
10	**Average**	4.40×10^{-11}	8.27×10^{-13}	53.2	4.86×10^{-11}	1.2×10^{-12}	40.3
11	17	2.289×10^{-12}	1.119×10^{-14}	204.6	3.16×10^{-12}	6.0×10^{-14}	56.2
13	14689	7.477×10^{-12}	1.046×10^{-12}	7.1	8.35×10^{-12}	2.7×10^{-12}	3.1
14	15186	2.40×10^{-12}	9.58×10^{-13}	2.5	invalid		
14	64537	6.019×10^{-12}	1.449×10^{-12}	4.2	invalid		
14	**Average**	3.50×10^{-12}	7.99×10^{-13}	4.4	invalid		
15	14401	1.426×10^{-11}	1.425×10^{-12}	10.0	1.84×10^{-11}	2.8×10^{-12}	6.6
15	16693	1.526×10^{-11}	2.559×10^{-12}	6.0	1.33×10^{-11}	3.3×10^{-12}	4.0
15	45690	1.59×10^{-11}	5.42×10^{-12}	2.9	2.35×10^{-11}	7.3×10^{-12}	3.2
15	1284	1.640×10^{-11}	1.069×10^{-12}	15.3	1.88×10^{-11}	3.5×10^{-12}	5.4
15	50278	1.595×10^{-11}	1.497×10^{-13}	106.6	1.67×10^{-11}	9.0×10^{-13}	18.9
15	1313	1.291×10^{-11}	2.920×10^{-12}	4.4	1.32×10^{-11}	3.5×10^{-12}	3.7
15	**Average**	1.59×10^{-11}	1.47×10^{-13}	108.4	1.66×10^{-11}	7.8×10^{-13}	21.3
16	13206	1.168×10^{-11}	4.484×10^{-13}	26.1	1.36×10^{-11}	2.0×10^{-12}	6.9
16	94	9.662×10^{-12}	1.733×10^{-12}	5.6	1.08×10^{-11}	3.5×10^{-12}	3.1
16	39054	9.661×10^{-12}	1.504×10^{-12}	6.4	1.04×10^{-11}	2.1×10^{-12}	4.9
16	**Average**	1.14×10^{-11}	4.17×10^{-13}	27.4	1.19×10^{-11}	1.3×10^{-12}	8.9
17	11	7.013×10^{-13}	2.453×10^{-14}	28.6	6.17×10^{-13}	6.4×10^{-14}	9.6
19	3486	3.908×10^{-12}	3.719×10^{-13}	10.5	4.46×10^{-12}	1.3×10^{-12}	3.4
19	27799	9.098×10^{-12}	1.562×10^{-12}	5.8	1.01×10^{-11}	2.3×10^{-12}	4.5
19	**Average**	4.19×10^{-12}	3.62×10^{-13}	11.6	5.83×10^{-12}	1.1×10^{-12}	5.1
20	44	1.861×10^{-12}	3.443×10^{-13}	5.4	invalid		
21	29523	1.27×10^{-12}	4.13×10^{-13}	3.1	invalid		
29	987	7.777×10^{-12}	3.205×10^{-13}	24.3	9.71×10^{-12}	7.8×10^{-13}	12.4
29	24123	1.846×10^{-11}	3.045×10^{-12}	6.1	invalid		
29	48464	6.248×10^{-12}	1.193×10^{-12}	5.2	1.00×10^{-11}	3.5×10^{-12}	2.9
29	**Average**	7.78×10^{-12}	3.08×10^{-13}	25.3	9.72×10^{-12}	7.6×10^{-13}	12.8
31	3176	2.681×10^{-11}	7.553×10^{-12}	3.5	invalid		
39	2416	2.829×10^{-12}	7.266×10^{-13}	3.9	invalid		

Subject Asteroid	Test Asteroid	Error Model Mass ($M_\odot$)	std dev ($M_\odot$)	Significance	Conventional Mass ($M_\odot$)	std dev ($M_\odot$)	Significance
52	124	1.163×10^{-11}	7.823×10^{-13}	14.9	1.00×10^{-11}	3.74×10^{-12}	2.7
52	306	2.503×10^{-11}	2.159×10^{-12}	11.6	9.61×10^{-12}	2.73×10^{-12}	3.5
52	**Average**	1.32×10^{-11}	7.35×10^{-13}	17.9	9.75×10^{-12}	2.2×10^{-12}	4.4
65	526	6.930×10^{-12}	5.125×10^{-13}	13.5	7.59×10^{-12}	1.82×10^{-12}	4.2
88	7	9.344×10^{-12}	6.023×10^{-13}	15.5	5.09×10^{-12}	1.87×10^{-12}	2.7
88	7629	8.060×10^{-12}	1.355×10^{-12}	5.9	1.06×10^{-11}	5.20×10^{-12}	2.0
88	**Average**	9.13×10^{-12}	5.50×10^{-13}	16.6	5.72×10^{-12}	1.8×10^{-12}	3.2
511	203	1.714×10^{-11}	2.632×10^{-12}	6.5	2.24×10^{-11}	4.0×10^{-12}	5.7
511	532	1.763×10^{-11}	1.257×10^{-12}	14.0	2.90×10^{-11}	3.5×10^{-12}	8.2
511	1550	2.473×10^{-11}	1.997×10^{-12}	12.4	3.18×10^{-11}	5.6×10^{-12}	5.6
511	**Average**	1.93×10^{-11}	9.86×10^{-13}	19.6	2.72×10^{-11}	2.4×10^{-12}	11.4
704	10034	3.136×10^{-11}	3.103×10^{-12}	10.1	5.79×10^{-11}	1.0×10^{-11}	5.8
704	37	1.905×10^{-11}	3.968×10^{-12}	4.8	5.35×10^{-11}	1.2×10^{-11}	4.5
704	7461	1.972×10^{-11}	5.880×10^{-12}	3.4	1.84×10^{-11}	7.7×10^{-12}	2.4
704	1467	1.777×10^{-11}	1.058×10^{-12}	16.8	1.88×10^{-11}	2.7×10^{-12}	7.0
704	95	2.172×10^{-11}	2.338×10^{-12}	9.3	3.36×10^{-11}	6.6×10^{-12}	5.1
704	**Average**	1.96×10^{-11}	8.86×10^{-13}	22.1	2.38×10^{-11}	2.3×10^{-12}	10.5
804	1002	2.061×10^{-12}	3.933×10^{-13}	5.2	4.69×10^{-12}	1.8×10^{-12}	2.5

The error model was able to derive valid masses in all 81 of these encounters; but using the conventional assumptions, valid masses were only obtained in 65 encounters (the rest yielding negative or physically unrealistic values).

In 64 of the 65 successful conventional encounters, the uncertainty in the calculated mass produced by the error model was smaller than that produced by the conventional assumptions; the mean reduction was by a factor of 3.34. In the single exception (7/1879), the calculated uncertainties were nearly equal (2.93×10^{-12} for the error model vs. 2.8×10^{-12} for the conventional assumptions). And in 61 of the 65 successful conventional encounters, the error model significance was higher; the mean improvement was a factor of 2.80. Thus, the error model produced masses with both smaller relative and absolute uncertainties than did the conventional assumptions.

We therefore conclude that the error model permits the calculation of significantly more masses than do the conventional assumptions, and with significantly greater precision.

6.2 PanSTARRS Mass Determination Simulations

Table 11: Improvements in mass determination for simulated PanSTARRS observations (first set of encounters). All masses are in units of $10^{-12} M_{\odot}$

	1/5303			7/52443		
	Mass	Uncertainty	Significance	Mass	Uncertainty	Significance
Nominal mass for encounter	476.7	1.109	429.8	9.275	0.868	10.7
Modeled mass	475.7			7.230		
Mass using nominal observations, with PanSTARRS observations added starting at						
encounter minus 4 opps	479.9	0.441	1088.1	7.707	0.133	58.1
encounter minus 3 opps	478.7	0.501	955.2	6.836	0.212	32.3
encounter minus 2 opps	no obs			6.770	0.312	21.7
encounter minus 1 opp	476.6	0.778	612.2	9.249	0.449	20.6
encounter plus 1 opp	476.7	0.781	610.3	9.597	0.626	15.3
encounter plus 2 opps	477.0	0.794	600.8	9.435	0.766	12.3
encounter plus 3 opps	475.5	0.808	588.6	9.626	0.727	13.2
encounter plus 4 opps	477.1	0.858	555.8	9.364	0.744	12.6
Mass using PanSTARRS-only observations starting at						
encounter minus 4 opps	474.1	0.534	887.5	10.56	0.177	59.6
encounter minus 3 opps	438.6	0.617	711.3	8.901	0.209	42.5
encounter minus 2 opps	no obs			10.06	0.293	34.3
encounter minus 1 opp	447.9	18.79	23.8	invalid mass		

As noted in section 3, one of the primary motivations for pursuing a statistical error model of asteroid observations is to properly weight the highly-precise observations to be contributed by PanSTARRS and other planned surveys. In order to demonstrate how the introduction of PanSTARRS observations might improve asteroid mass determinations, we ran a series of simulations, based on six encounters in which observations are available for at least three (and preferably four or more) oppositions before and after the time of closest approach. In each case, the nominal mass for that encounter is listed, obtained using only the observations from the Minor Planet Center database.

Then we began replacing the observations in the later oppositions with simulated PanSTARRS observations, to determine the extent to which the introduction of new, highly-precise observations might improve the uncertainty in an ongoing mass determination campaign. The simulated PanSTARRS observations were generated by integrating the test asteroid's nominal best-fit trajectory to the time of the observation (using the modeled mass of the subject asteroid), and adding Gaussian observational noise of mean zero and standard deviation 0.10 arc seconds to the RA and Dec coordinates. The uncertainties in the simulated PanSTARRS observations were also assumed to be 0.10 arc seconds.

The results are presented in Tables 11, 12, and 13.

The 1/5303 encounter in Table 11 is typical. The nominal mass is determined with a significance of 429.8 (where, as before, the *significance* is defined as the ratio of the measured mass to its uncertainty). When we simulate the appearance of PanSTARRS

Table 12: Improvements in mass determination for simulated PanSTARRS observations (second set of encounters). All masses are in units of $10^{-12}M_\odot$

	10/3946			15/50278		
	Mass	Uncertainty	Significance	Mass	Uncertainty	Significance
Nominal mass for encounter	40.51	1.010	40.1	15.95	0.1535	103.9
Modeled mass	44.50			15.90		
Mass using nominal observations, with PanSTARRS observations added starting at						
encounter minus 4 opps	41.79	0.420	99.4	no obs		
encounter minus 3 opps	39.60	0.471	84.1	15.90	0.06268	253.7
encounter minus 2 opps	40.46	0.832	48.7	15.88	0.08348	190.3
encounter minus 1 opp	40.23	0.856	47.0	15.92	0.09771	162.9
encounter plus 1 opp	39.61	0.858	46.2	15.83	0.1136	139.3
encounter plus 2 opps	39.59	0.869	45.6	15.87	0.1472	107.8
encounter plus 3 opps	39.81	0.868	45.9	15.80	0.1460	108.2
encounter plus 4 opps	40.34	0.924	43.6	15.92	0.1465	108.7
Mass using PanSTARRS-only observations starting at						
encounter minus 4 opps	40.82	0.472	86.4	no obs		
encounter minus 3 opps	32.95	0.525	62.8	15.49	0.07363	210.4
encounter minus 2 opps	36.32	3.031	12.0	15.55	0.1212	128.3
encounter minus 1 opp	52.98	7.461	7.1	15.84	4.150	3.8

observations in the fourth opposition after the encounter, the significance jumps to 555.8. Introducing PanSTARRS observations a bit earlier, in the third opposition following the encounter, yields a significance of 588.6. This improvement trend continues, culminating in a significance of 1088.1 for an introduction four oppositions prior to the encounter. In short, the use of PanSTARRS observations more than doubled the significance of the calculated mass.

Similar results were obtained for the 10/3946 and 15/50278 encounters in Table 12. The results for the 7/52443 (Table 11) and 10/24433 (Table 13) encounters were even better, with the signficance of the calculated mass increasing by approximately a factor of five. In the 29/987 encounter in Table 13, the significance of the calculated mass increased by about 65%;

In short, the addition of PanSTARRS observations (and those from similar high-precision surveys) could potentially yield meaningful improvements in ongoing mass determination campaigns; the earlier PanSTARRS observations are introduced, the greater the improvement in the precision of the mass determination.

However, the uncertainty of the calculated mass is not determined solely by the precision of the observations. The length of the observational baseline is also critical in establishing the test asteroid's pre-encounter trajectory, and thus the deflection caused by the subject asteroid. To assess whether the increased precision of PanSTARRS observations might outweigh the benefit of a long (but relatively imprecise) observational baseline, we ran another series of simulations, in which all of the legacy observations

Table 13: Improvements in mass determination for simulated PanSTARRS observations (third set of encounters). All masses are in units of $10^{-12}M_{\odot}$

	10/24433			29/987		
	Mass	Uncertainty	Significance	Mass	Uncertainty	Significance
Nominal mass for encounter	40.43	2.365	17.1	9.221	0.3139	29.4
Modeled mass	44.50			7.410		
Mass using nominal observations, with PanSTARRS observations added starting at						
encounter minus 4 opps	41.43	0.4201	98.6	9.190	0.1902	48.3
encounter minus 3 opps	39.49	0.4881	80.9	8.979	0.2025	44.3
encounter minus 2 opps	41.78	0.9166	45.6	9.169	0.2081	44.1
encounter minus 1 opp	42.79	0.9575	44.7	9.100	0.2069	44.0
encounter plus 1 opp	43.96	1.458	30.1	9.052	0.2069	43.8
encounter plus 2 opps	41.55	1.781	23.3	9.262	0.2118	43.7
encounter plus 3 opps	41.95	1.759	23.8	9.080	0.2137	42.5
encounter plus 4 opps	40.49	2.304	17.6	10.63	0.2489	42.7
Mass using PanSTARRS-only observations starting at						
encounter minus 4 opps	41.30	0.4287	96.3	10.07	0.3619	27.8
encounter minus 3 opps	43.52	0.4477	97.2	9.153	0.5510	16.6
encounter minus 2 opps	37.43	2.567	14.6	10.05	1.226	8.2
encounter minus 1 opp	44.44	3.639	12.2	invalid mass		

prior to a particular opposition were discarded, and the remaining observations were replaced by simulated PanSTARRS observations.

Returning to the 1/5303 encounter in Table 11, we find that utilizing only PanSTARRS observations starting with the first opposition before the encounter yields comparatively poor results; the calculated mass does not agree well with the nominal value, and the significance is comparatively low. (There are no observations in the MPC dataset lying in the second opposition prior to the encounter.) Extending the observational baseline by adding PanSTARRS-only observations to the third opposition prior to the encounter improves the significance; but the calculated mass still differs from the nominal value. Only when PanSTARRS observations are available in the fourth opposition prior to the encounter do we get a satisfactory mass and significance. Even so, the significance (887.5) is still less than that obtained in the previous simulations, when legacy observations extending back another 18 years were available (1088.1).

In the 29/987 encounter in Table 13, a single opposition's worth of PanSTARRS observations prior to the encounter is insufficient to even calculate a valid mass. As additional oppositions prior to the encounter are added, the calculated mass begins to agree with the nominal value, and the significance improves. Once again, however, the significance (27.8) is still less than that obtained when legacy observations extending back another 88 years were available (48.3).

In five of the six cases, retaining legacy observations prior to the PanSTARRS observations yielded masses with higher significances; in the sixth case (7/52443), the legacy observations only extended the observational baseline back another four years, yielding little benefit.

We conclude, therefore, that PanSTARRS-level precision is not a panacea. Incorporating PanSTARRS-level observations in an ongoing mass determination campaign will likely improve the significance of the calculated mass. But a long observational baseline is still invaluable in establishing the pre-encounter trajectory of the test asteroid; and it would be a mistake to discard legacy observations, and to rely solely on a truncated set of PanSTARRS observations.

6.3 Interpretation of Masses

To place our results into context, in Table 14, we have listed our mass determinations alongside our earlier values, and those of other authors. The best available three-axis ellipsoid model of each asteroid is also listed, so the bulk density can be calculated.

Furthermore, with the help of Dan Britt (D. Britt, priv. comm. and Consolmagno et al. (2008)), we have made assumptions for each asteroid's mineral grain density, based on the meteorite class that represents the closest analogue to each asteroid's taxonomic class. This allows estimation of each asteroid's bulk porosity; and since a negative bulk porosity is impossible, this derived quantity can help indicate unrealistic results. In general,

- S class asteroids are modeled using L chondrites;
- G, B, F, and inner-belt C class asteroids are modeled using CM chondrites;
- P, D, and outer-belt C class asteroids are modeled using CI chondrites;
- M class asteroids are modeled as nickel-irons.

However, assigning a meteoritic analogue to an asteroid is often problematic; absent samples returned from these bodies, the assumed grain densities must be recognized as an unmodeled source of uncertainty in the resulting bulk porosities. Additionally, while we have used the best available data on each asteroid's size and shape, we must note that the calculated densities and porosities assume that there are no significant concavities that would reduce the asteroid's volume, and increase its bulk density. This should be recognized as another unmodeled source of uncertainty in the resulting derived quantities.

Table 14: Recent Asteroid Mass Determinations

Asteroid	Mass (in $M_\odot$)	Mass Uncertainty (in $M_\odot$)	Bulk Density (g/cm^3)	Bulk Density Uncertainty (g/cm^3)	Assumed Grain Density (g/cm^3)	Bulk Porosity	Uncertainty in Bulk Porosity	Taxonomic *Class*[1]	Dimensions (km) a	b	c	Δ radius (km)	Mass Reference
1 Ceres	4.700×10^{-10}	3.00×10^{-11}	2.07	0.14	2.12	0.02	0.00	G	975[2]	975[2]	909[2]	3.6[2]	Goffin (1991)
	4.796×10^{-10}	8.50×10^{-12}	2.11	0.06	2.12	0.00	0.00	G	975[2]	975[2]	909[2]	3.6[2]	Sitarski and Todorovic-Juchniewicz (1992)
	4.800×10^{-10}	2.20×10^{-11}	2.11	0.11	2.12	0.00	0.00	G	975[2]	975[2]	909[2]	3.6[2]	Williams (1992)
	4.622×10^{-10}	7.10×10^{-12}	2.03	0.06	2.12	0.04	0.00	G	975[2]	975[2]	909[2]	3.6[2]	Sitarski and Todororovic-Juchniewicz (1995)
	5.000×10^{-10}	2.00×10^{-11}	2.20	0.10	2.12	-0.04	0.00	G	975[2]	975[2]	909[2]	3.6[2]	Viateau and Rapaport (1995)
	4.670×10^{-10}	9.00×10^{-12}	2.05	0.06	2.12	0.03	0.00	G	975[2]	975[2]	909[2]	3.6[2]	Carpino and Knezevic (1996)
	4.160×10^{-10}	1.90×10^{-11}	1.83	0.09	2.12	0.14	0.01	G	975[2]	975[2]	909[2]	3.6[2]	Kuzmanoski (1996)
	4.785×10^{-10}	3.90×10^{-12}	2.10	0.05	2.12	0.01	0.00	G	975[2]	975[2]	909[2]	3.6[2]	Viateau and Rapaport (1997a)
	4.759×10^{-10}	2.30×10^{-12}	2.09	0.05	2.12	0.01	0.00	G	975[2]	975[2]	909[2]	3.6[2]	Viateau and Rapaport (1998)
	4.390×10^{-10}	4.00×10^{-12}	1.93	0.05	2.12	0.09	0.00	G	975[2]	975[2]	909[2]	3.6[2]	Hilton (1999)
	4.700×10^{-10}	4.00×10^{-12}	2.07	0.05	2.12	0.02	0.00	G	975[2]	975[2]	909[2]	3.6[2]	Michalak (2000)
	4.762×10^{-10}	1.50×10^{-12}	2.09	0.05	2.12	0.01	0.00	G	975[2]	975[2]	909[2]	3.6[2]	Standish (2001)
	4.810×10^{-10}	1.00×10^{-12}	2.12	0.05	2.12	0.00	0.00	G	975[2]	975[2]	909[2]	3.6[2]	Pitjeva (2001)
	4.749×10^{-10}	2.00×10^{-12}	2.09	0.05	2.12	0.01	0.00	G	975[2]	975[2]	909[2]	3.6[2]	Pitjeva (2004)
	4.753×10^{-10}	7.00×10^{-13}	2.09	0.05	2.12	0.01	0.00	G	975[2]	975[2]	909[2]	3.6[2]	Pitjeva (2005)
	4.699×10^{-10}	2.80×10^{-12}	2.07	0.05	2.12	0.03	0.00	G	975[2]	975[2]	909[2]	3.6[2]	Konopliv et al. (2006)
	4.736×10^{-10}	2.60×10^{-12}	2.08	0.05	2.12	0.02	0.00	G	975[2]	975[2]	909[2]	3.6[2]	Kovačević and Kuzmanoski (2007)
	4.755×10^{-10}	8.00×10^{-13}	2.09	0.05	2.12	0.01	0.00	G	975[2]	975[2]	909[2]	3.6[2]	Baer et al. (2008)
	4.756×10^{-10}	7.16×10^{-13}	2.09	0.05	2.12	0.01	0.00	G	975[2]	975[2]	909[2]	3.6[2]	This paper
2 Pallas	1.590×10^{-10}	5.00×10^{-12}	4.04	0.19	2.90	-0.39	-0.02	B	570[3]	525[3]	500[3]	3[3]	Hilton (1999)
	1.210×10^{-10}	2.60×10^{-11}	3.07	0.67	2.90	-0.06	-0.01	B	570[3]	525[3]	500[3]	3[3]	Michalak (2000)
	1.170×10^{-10}	3.00×10^{-12}	2.97	0.13	2.90	-0.02	0.00	B	570[3]	525[3]	500[3]	3[3]	Goffin (2001)
	1.078×10^{-10}	3.80×10^{-12}	2.74	0.13	2.90	0.06	0.00	B	570[3]	525[3]	500[3]	3[3]	Standish (2001)
	1.000×10^{-10}	1.00×10^{-12}	2.54	0.09	2.90	0.12	0.00	B	570[3]	525[3]	500[3]	3[3]	Pitjeva (2001)
	1.036×10^{-10}	2.00×10^{-12}	2.63	0.10	2.90	0.09	0.00	B	570[3]	525[3]	500[3]	3[3]	Pitjeva (2004)
	1.027×10^{-10}	3.00×10^{-13}	2.61	0.09	2.90	0.10	0.00	B	570[3]	525[3]	500[3]	3[3]	Pitjeva (2005)
	1.026×10^{-10}	2.80×10^{-12}	2.61	0.11	2.90	0.10	0.00	B	570[3]	525[3]	500[3]	3[3]	Konopliv et al. (2006)
	1.060×10^{-10}	4.00×10^{-12}	2.69	0.14	2.90	0.07	0.00	B	570[3]	525[3]	500[3]	3[3]	Baer et al. (2008)
	1.060×10^{-10}	6.96×10^{-12}	2.69	0.20	2.90	0.07	0.01	B	570[3]	525[3]	500[3]	3[3]	This paper
3 Juno	2.090×10^{-11}	3.50×10^{-12}	4.65	0.84	3.56	-0.31	-0.06	S	320[5]	267[4]	200[5]	3[4]	Chernetenko and Kochetova (2002)
	1.420×10^{-11}	6.00×10^{-13}	3.16	0.26	3.56	0.11	0.01	S	320[5]	267[4]	200[5]	3[4]	Pitjeva (2004)
	1.510×10^{-11}	3.00×10^{-13}	3.36	0.24	3.56	0.06	0.00	S	320[5]	267[4]	200[5]	3[4]	Pitjeva (2005)
	1.490×10^{-1}1	1.50×10^{-12}	3.31	0.41	3.56	0.07	0.01	S	320[5]	267[4]	200[5]	3[4]	Konopliv et al. (2006)
	1.340×10^{-11}	2.30×10^{-12}	2.98	0.55	3.56	0.16	0.03	S	320[5]	267[4]	200[5]	3[4]	Baer et al. (2008)
	1.470×10^{-11}	2.11×10^{-12}	3.27	0.52	3.56	0.08	0.01	S	320[5]	267[4]	200[5]	3[4]	This paper
4 Vesta	1.396×10^{-10}	4.30×10^{-12}	3.58	0.23	3.56	-0.01	0.00	V	578[6]	560[6]	458[6]	5[6]	Sitarski and Todororovic-Juchniewicz (1995)
	1.690×10^{-10}	5.00×10^{-12}	4.33	0.28	3.56	-0.22	-0.01	V	578[6]	560[6]	458[6]	5[6]	Hilton (1999)
	1.360×10^{-10}	5.00×10^{-12}	3.49	0.24	3.56	0.02	0.00	V	578[6]	560[6]	458[6]	5[6]	Michalak (2000)
	1.306×10^{-10}	1.60×10^{-12}	3.35	0.19	3.56	0.06	0.00	V	578[6]	560[6]	458[6]	5[6]	Viateau and Rapaport (2001)
	1.341×10^{-10}	1.50×10^{-12}	3.44	0.20	3.56	0.03	0.00	V	578[6]	560[6]	458[6]	5[6]	Standish (2001)
	1.360×10^{-10}	1.00×10^{-12}	3.49	0.20	3.56	0.02	0.00	V	578[6]	560[6]	458[6]	5[6]	Pitjeva (2001)
	1.380×10^{-10}	3.00×10^{-12}	3.54	0.21	3.56	0.01	0.00	V	578[6]	560[6]	458[6]	5[6]	Konopliv (2002)
	1.358×10^{-10}	2.00×10^{-12}	3.48	0.20	3.56	0.02	0.00	V	578[6]	560[6]	458[6]	5[6]	Pitjeva (2004)

Asteroid	Mass (in $M_{\odot}$)	Mass Uncertainty (in $M_{\odot}$)	Bulk Density (g/cm^3)	Bulk Density Uncertainty (g/cm^3)	Assumed Grain Density (g/cm^3)	Bulk Porosity	Uncertainty in Bulk Porosity	Taxonomic *Class*[1]	Dimensions (km) a	b	c	Δ radius (km)	Mass Reference
	1.344×10^{-10}	1.00×10^{-13}	3.45	0.20	3.56	0.03	0.00	V	578[6]	560[6]	458[6]	5[6]	Pitjeva (2005)
	1.290×10^{-10}	8.00×10^{-12}	3.90	0.24	3.56	-0.10	-0.01	V	501[7]	501[7]	501[7]	0[7]	Kovačević (2005)
	1.310×10^{-10}	2.00×10^{-12}	3.96	0.06	3.56	-0.11	0.00	V	501[7]	501[7]	501[7]	0[7]	Kovačević (2005)
	1.120×10^{-10}	5.00×10^{-12}	3.39	0.15	3.56	0.05	0.00	V	501[7]	501[7]	501[7]	0[7]	Kovačević (2005)
	1.120×10^{-10}	1.70×10^{-11}	3.39	0.51	3.56	0.05	0.01	V	501[7]	501[7]	501[7]	0[7]	Kovačević (2005)
	1.358×10^{-10}	1.60×10^{-12}	3.48	0.20	3.56	0.02	0.00	V	578[6]	560[6]	458[6]	5[6]	Konopliv et al. (2006)
	1.319×10^{-10}	3.00×10^{-13}	3.38	0.19	3.56	0.05	0.00	V	578[6]	560[6]	458[6]	5[6]	Baer et al. (2008)
	1.338×10^{-10}	2.76×10^{-13}	3.43	0.19	3.56	0.04	0.00	V	578[6]	560[6]	458[6]	5[6]	This paper
5 Astraea	1.255×10^{-12}	2.50×10^{-15}	3.48	0.56	3.56	0.02	0.00	S	155[9]	115[4]4	77[9]	3[4]4	This paper
6 Hebe	6.900×10^{-12}	2.20×10^{-12}	4.07	1.31	3.72	-0.09	-0.03	S	205[10]	185[8]	170[10]	1.45[8]	Michalak (2001)
	6.900×10^{-12}	9.00×10^{-13}	4.07	0.56	3.72	-0.09	-0.01	S	205[10]	185[8]	170[10]	1.45[8]	Kochetova (2004)
	6.460×10^{-12}	3.20×10^{-13}	3.81	0.26	3.72	-0.02	0.00	S	205[10]	185[8]	170[10]	1.45[8]	Baer et al. (2008)
	6.330×10^{-12}	6.65×10^{-13}	3.73	0.43	3.72	0.00	0.00	S	205[10]	185[8]	170[10]	1.45[8]	This paper
7 Iris	1.410×10^{-11}	1.40×10^{-12}	5.58	0.96	3.56	-0.57	-0.10	S	240[11]	200[8]	200[11]	5[8]	Chernetenko and Kochetova (2002)
	5.200×10^{-12}	8.00×10^{-13}	2.06	0.43	3.56	0.42	0.09	S	240[11]	200[8]	200[11]	5[8]	Pitjeva (2004)
	6.300×10^{-12}	1.00×10^{-13}	2.49	0.35	3.56	0.30	0.04	S	240[11]	200[8]	200[11]	5[8]	Pitjeva (2005)
	6.860×10^{-12}	5.00×10^{-13}	2.72	0.43	3.56	0.24	0.04	S	240[11]	200[8]	200[11]	5[8]	Baer et al. (2008)
	7.350×10^{-12}	4.50×10^{-13}	2.91	0.45	3.56	0.18	0.03	S	240[11]	200[8]	200[11]	5[8]	This paper
8 Flora	4.260×10^{-12}	4.50×10^{-13}	3.89	1.76	3.56	-0.09	-0.04	S	160.8[12]	160.8[12]	160.8[12]	11.8[13]	Baer et al. (2008)
	3.420×10^{-12}	4.23×10^{-13}	3.13	1.43	3.56	0.12	0.06	S	160.8[12]	160.8[12]	160.8[12]	11.8[13]	This paper
9 Metis	5.700×10^{-12}	1.40×10^{-12}	4.12	1.33	3.72	-0.11	-0.03	S	222[14]	182[14]	130[14]	6[14]	Baer et al. (2008)
	7.380×10^{-12}	1.02×10^{-12}	5.34	1.33	3.72	-0.44	-0.11	S	222[14]	182[14]	130[14]	6[14]	This paper
10 Hygiea	5.570×10^{-11}	7.00×10^{-12}	2.65	0.36	2.46	-0.08	-0.01	C	530[11]	407[8]	370[11]	3.4[8]	Michalak (2001)
	5.010×10^{-11}	4.10×10^{-12}	2.39	0.23	2.46	0.03	0.00	C	530[11]	407[8]	370[11]	3.4[8]	Chernetenko and Kochetova (2002)
	4.540×10^{-11}	1.30×10^{-12}	2.16	0.12	2.46	0.12	0.01	C	530[11]	407[8]	370[11]	3.4[8]	Chesley et al. (2005)
	4.450×10^{-11}	7.00×10^{-13}	2.12	0.11	2.46	0.14	0.01	C	530[11]	407[8]	370[11]	3.4[8]	Baer et al. (2008)
	2.500×10^{-11}	4.00×10^{-12}	1.19	0.20	2.46	0.52	0.09	C	530[11]	407[8]	370[11]	3.4[8]	Ivantsov (2008)
	4.400×10^{-11}	8.27×10^{-13}	2.10	0.11	2.46	0.15	0.01	C	530[11]	407[8]	370[11]	3.4[8]	This paper
11 Parthenope	2.580×10^{-12}	1.00×10^{-13}	2.74	0.20	3.56	0.23	0.02	S	153[8]	153[8]	153[8]	1.55[8]	Viateau and Rapaport (1997b)
	2.560×10^{-12}	7.00×10^{-14}	2.72	0.18	3.56	0.24	0.02	S	153[8]	153[8]	153[8]	1.55[8]	Viateau and Rapaport (2001)
	3.090×10^{-12}	2.00×10^{-14}	3.28	0.20	3.56	0.08	0.00	S	153[8]	153[8]	153[8]	1.55[8]	Baer et al. (2008)
	2.290×10^{-12}	1.12×10^{-14}	2.43	0.15	3.56	0.32	0.02	S	153[8]	153[8]	153[8]	1.55[8]	This paper
13 Egeria	8.200×10^{-12}	1.60×10^{-12}	3.46	0.79	2.90	-0.19	-0.04	G	208[8]	208[8]	208[8]	4.15[8]	Baer et al. (2008)
	7.480×10^{-12}	1.05×10^{-12}	3.16	0.58	2.90	-0.09	-0.02	G	208[8]	208[8]	208[8]	4.15[8]	This paper
14 Irene	4.130×10^{-12}	7.30×10^{-13}	4.42	1.59	3.56	-0.24	-0.09	S	167[15]	152[15]	139[15]	8	Baer et al. (2008)
	3.500×10^{-12}	7.99×10^{-13}	3.75	1.46	3.56	-0.05	-0.02	S	167[15]	152[15]	139[15]	8	This paper
15 Eunomia	1.260×10^{-11}	3.00×10^{-12}	2.48	0.72	3.72	0.33	0.10	S	357[11]	255[8]	212[11]	7.5[8]	Michalak (2001)
	1.220×10^{-11}	1.60×10^{-12}	2.40	0.51	3.72	0.35	0.08	S	357[11]	255[8]	212[11]	7.5[8]	Chernetenko and Kochetova (2002)

Asteroid	Mass (in $M_{\odot}$)	Mass Uncertainty (in $M_{\odot}$)	Bulk Density (g/cm^3)	Bulk Density Uncertainty (g/cm^3)	Assumed Grain Density (g/cm^3)	Bulk Porosity	Uncertainty in Bulk Porosity	Taxonomic *Class*[1]	Dimensions (km) a	b	c	Δ radius (km)	Mass Reference
	1.060×10^{-11}	1.60×10^{-12}	2.09	0.47	3.72	0.44	0.10	S	357[11]	255[8]	212[11]	7.5[8]	Kochetova (2004)
	1.640×10^{-11}	6.00×10^{-13}	3.23	0.55	3.72	0.13	0.02	S	357[11]	255[8]	212[11]	7.5[8]	Vitagliano and Stoss (2006)
	8.000×10^{-12}	3.00×10^{-12}	1.58	0.65	3.72	0.58	0.24	S	357[11]	255[8]	212[11]	7.5[8]	Ivantsov (2008)
	1.570×10^{-11}	2.00×10^{-13}	3.09	0.52	3.72	0.17	0.03	S	357[11]	255[8]	212[11]	7.5[8]	Baer et al. (2008)
	1.620×10^{-11}	5.00×10^{-13}	3.19	0.54	3.72	0.14	0.02	S	357[11]	255[8]	212[11]	7.5[8]	Zielenbach (2010)
	1.590×10^{-11}	1.47×10^{-13}	3.13	0.53	3.72	0.16	0.03	S	357[11]	255[8]	212[11]	7.5[8]	This paper
16 Psyche	8.700×10^{-12}	2.60×10^{-12}	5.14	2.78	7.50	0.32	0.17	M	240[17]	185[17]	145[17]	14[17]	Viateau (2000)
	3.380×10^{-11}	2.80×10^{-12}	6.98	0.58	7.50	0.07	0.01	M	264[16]	264[16]	264[16]	0	Kuzmanoski and Kovačević (2002)
	1.340×10^{-11}	2.20×10^{-12}	7.91	3.80	7.50	-0.05	-0.03	M	240[17]	185[17]	145[17]	14[17]	Kochetova (2004)
	1.100×10^{-11}	4.00×10^{-13}	6.49	2.94	7.50	0.13	0.06	M	240[17]	185[17]	145[17]	14[17]	Baer et al. (2008)
	1.140×10^{-11}	4.17×10^{-13}	6.73	3.05	7.50	0.10	0.05	M	240[17]	185[17]	145[17]	14[17]	This paper
17 Thetis	5.910×10^{-13}	3.80×10^{-14}	3.79	1.11	3.56	-0.06	-0.02	S	100[10]	77[8]	77[10]	4[8]	Baer et al. (2008)
	7.010×10^{-13}	2.45×10^{-14}	4.49	1.29	3.56	-0.26	-0.08	S	100[10]	77[4]4	77[10]	4[4]4	This paper
18 Melpomene	1.510×10^{-12}	5.10×10^{-13}	1.69	0.66	3.56	0.53	0.21	S	170[14]	155[14]	129[10]	5[14]	Baer et al. (2008)
19 Fortuna	6.380×10^{-12}	2.50×10^{-13}	2.70	0.48	2.90	0.07	0.01	G	225[14]	205[14]	195[14]	6[14]	Baer et al. (2008)
	4.190×10^{-12}	3.62×10^{-13}	1.77	0.34	2.90	0.39	0.08	G	225[14]	205[14]	195[14]	6[14]	This paper
20 Massalia	2.400×10^{-12}	4.00×10^{-13}	2.98	0.76	3.56	0.16	0.04	S	160[11]	145[8]	132[11]	4.65[8]	Bange (1998)
	2.850×10^{-12}	4.10×10^{-13}	3.54	0.85	3.56	0.01	0.00	S	160[11]	145[8]	132[11]	4.65[8]	Baer et al. (2008)
	1.860×10^{-12}	3.44×10^{-13}	2.31	0.62	3.56	0.35	0.09	S	160[11]	145[8]	132[11]	4.65[8]	This paper
21 Lutetia	1.290×10^{-12}	1.20×10^{-13}	4.21	1.61	7.50	0.44	0.17	M	124[42]	101[42]	93[42]	6.5[42]	Baer et al. (2008)
	1.270×10^{-12}	4.13×10^{-13}	4.14	2.04	7.50	0.43	0.22	M	124[42]	101[42]	93[42]	6.5[42]	This paper
22 Kalliope	3.700×10^{-12}	2.22×10^{-13}	2.37	0.38	3.56	0.33	0.05	M	181[8]	181[8]	181[8]	4.5[8]	Margot and Brown (2003)
													Note: Binary. Mass stated for system
	4.100×10^{-12}	1.30×10^{-13}	3.35	0.33	3.56	0.06	0.01	M	235[18]	164[18]	124[18]	2.8[18]	Descamps et al. (2008)
									28[18]	28[18]	28[18]	2[18]	Note: Binary. Mass stated for primary
	4.070×10^{-12}	1.00×10^{-13}	2.80	0.20	3.56	0.21	0.02	M	243[19]	196[19]	175[19]	10[19]	Marchis et al. (2008a)
									20[19]	20[19]	20[19]		Note: Binary. Mass stated for system
24 Themis	2.890×10^{-12}	1.26×10^{-12}	1.42	0.75	2.46	0.42	0.23	C	198[20]	198[20]	198[20]	10	Lopez Garcia et al. (1997)
	5.670×10^{-12}	2.15×10^{-12}	2.78	1.35	2.46	-0.13	-0.06	C	198[20]	198[20]	198[20]	10	Baer and Chesley (2008)
29 Amphitrite	7.700×10^{-12}	1.30×10^{-12}	3.07	0.60	3.56	0.14	0.03	S	233[11]	212[8]	193[11]	3.4[8]	Kochetova (2004)
	5.920×10^{-12}	3.00×10^{-13}	2.36	0.26	3.56	0.34	0.04	S	233[11]	212[8]	193[11]	3.4[8]	Baer et al. (2008)
	7.780×10^{-12}	3.08×10^{-13}	3.10	0.32	3.56	0.13	0.01	S	233[11]	212[8]	193[11]	3.4[8]	This paper
31 Euphrosyne	9.400×10^{-12}	5.20×10^{-12}	2.13	1.21	2.90	0.27	0.15	C	256[11]	256[8]	256[11]	5.75[8]	Kochetova (2004)
	3.130×10^{-11}	5.90×10^{-12}	7.09	1.64	2.90	-1.45	-0.33	C	256[11]	256[8]	256[11]	5.75[8]	Baer et al. (2008)
	2.680×10^{-11}	7.55×10^{-12}	6.07	1.90	2.90	-1.09	-0.34	C	256[11]	256[8]	256[11]	5.75[8]	This paper
39 Laetitia	2.830×10^{-12}	7.27×10^{-13}	2.49	0.85	3.56	0.30	0.10	S	228[11]	163[4]4	116[11]	6[4]4	This paper
45 Eugenia	3.000×10^{-12}	1.00×10^{-13}	1.14	0.08	2.90	0.61	0.04	FC	308[11]	220[8]	147[11]	2.1[8]	Merline et al. (1999) Note: Binary

Asteroid	Mass (in $M_{\odot}$)	Mass Uncertainty (in $M_{\odot}$)	Bulk Density (g/cm^3)	Bulk Density Uncertainty (g/cm^3)	Assumed Grain Density (g/cm^3)	Bulk Porosity	Uncertainty in Bulk Porosity	Taxonomic *Class*[1]	Dimensions (km) a	b	c	Δ radius (km)	Mass Reference
	2.860×10^{-12}	6.00×10^{-14}	1.10	0.10	2.90	0.62	0.06	FC	232[19]	193[19]	161[19]	8[19]	Marchis et al. (2008a)
									7[19]	7[19]	7[19]		Note: Binary. Mass stated for system
47 Aglaja	1.090×10^{-12}	4.30×10^{-13}	2.02	0.88	2.90	0.30	0.13	C	127[8]	127[8]	127[8]	3.85[8]	Baer et al. (2008)
48 Doris	6.100×10^{-12}	3.00×10^{-12}	2.12	1.07	2.90	0.27	0.13	CG	221.8[8]	221.8[8]	221.8[8]	3.8[8]	Kochetova (2004)
49 Pales	1.350×10^{-12}	2.50×10^{-13}	1.52	0.30	2.90	0.48	0.10	CG	150[8]	150[8]	150[8]	1.9[8]	Baer et al. (2008)
52 Europa	2.610×10^{-11}	8.80×10^{-12}	3.94	1.80	2.90	-0.36	-0.16	CF	352[11]	293[4]4	244[11]	15[4]4	Michalak (2001)
	1.280×10^{-11}	2.50×10^{-12}	1.93	0.70	2.90	0.33	0.12	CF	352[11]	293[4]4	244[11]	15[4]4	Chernetenko and Kochetova (2002)
	8.290×10^{-12}	8.10×10^{-13}	1.25	0.40	2.90	0.57	0.18	CF	352[11]	293[4]4	244[11]	15[4]4	Baer et al. (2008)
	4.200×10^{-11}	1.10×10^{-11}	6.34	2.56	2.90	-1.19	-0.48	CF	352[11]	293[4]4	244[11]	15[4]4	Ivantsov (2008)
	1.320×10^{-11}	7.35×10^{-13}	1.99	0.62	2.90	0.31	0.10	CF	352[11]	293[4]4	244[11]	15[4]4	This paper
65 Cybele	5.800×10^{-12}	1.50×10^{-12}	1.08	0.30	2.46	0.56	0.15	P	302[21]	290[21]	232[21]	4[21]	Chernetenko and Kochetova (2002)
	8.930×10^{-12}	6.10×10^{-13}	1.67	0.19	2.46	0.32	0.04	P	302[21]	290[21]	232[21]	4[21]	Baer et al. (2008)
	6.930×10^{-12}	5.12×10^{-13}	1.30	0.15	2.46	0.47	0.05	P	302[21]	290[21]	232[21]	4[21]	This paper
87 Sylvia	7.340×10^{-12}	5.03×10^{-13}	1.20	0.15	2.46	0.51	0.06	P	384[22]	262[22]	232[22]	5[22]	Margot and Brown (2001) Note: Binary. Mass stated for primary
	7.431×10^{-12}	3.00×10^{-14}	1.21	0.13	2.46	0.51	0.05	P	384[22]	262[22]	232[22]	5[22]	Marchis et al. (2005a) Note: Binary. Mass stated for primary
88 Thisbe	7.400×10^{-12}	1.30×10^{-12}	2.46	0.59	2.90	0.15	0.04	CF	255[10]	232[23]	193[10]	6[23]	Michalak (2001)
	5.900×10^{-12}	1.20×10^{-12}	1.96	0.51	2.90	0.32	0.08	CF	255[10]	232[23]	193[10]	6[23]	Kochetova (2004)
	5.300×10^{-12}	9.00×10^{-13}	1.76	0.41	2.90	0.39	0.09	CF	255[10]	232[23]	193[10]	6[23]	Baer et al. (2008)
	9.130×10^{-12}	5.50×10^{-13}	3.04	0.52	2.90	-0.05	-0.01	CF	255[10]	232[23]	193[10]	6[23]	This paper
90 Antiope	2.060×10^{-13}	6.00×10^{-14}	1.24	0.37	2.90	0.57	0.17	C	85.8[24]	85.8[24]	85.8[24]	1[24]	Merline et al. (2002)
	2.060×10^{-13}	6.00×10^{-14}	1.24	0.37	2.90	0.57	0.17	C	85.8[24]	85.8[24]	85.8[24]	1[24]	Note: Binary. Mass stated for each component
	4.173×10^{-13}	1.00×10^{-14}	1.25	0.05	2.90	0.57	0.02	C	93[25]	87[25]	83.6[25]	0.5[25]	Descamps et al. (2007)
									89.4[25]	82.8[25]	79.6[25]	0.5[25]	Note: Binary. Mass stated for system
107 Camilla	5.630×10^{-12}	1.50×10^{-13}	1.40	0.30	3.41	0.59	0.13	C	344[10]	246[19]	205[10]	7[19]	Marchis et al. (2008a)
									16[19]	16[19]	16[19]	6[19]	Note: Binary. Mass stated for system
121 Hermione	4.700×10^{-12}	8.00×10^{-13}	1.96	0.61	2.90	0.32	0.10	C	268[26]	186[26]	183[26]	9[26]	Viateau (2000)
	2.705×10^{-12}	1.50×10^{-13}	1.13	0.30	2.90	0.61	0.16	C	268[26]	186[26]	183[26]	9[26]	Marchis et al. (2005b)
	2.363×10^{-12}	1.006×10^{-13}	1.37	0.14	2.90	0.53	0.06	C	187[27]	187[27]	187[27]	3[27]	Descamps et al. (2009)
130 Elektra	3.320×10^{-12}	2.00×10^{-13}	1.30	0.30	2.90	0.55	0.13	G	108[28]	108[28]	108[28]	7.5[28]	Marchis et al. (2008b) Note: Binary
189 Phthia	1.930×10^{-14}	4.10×10^{-15}	1.34	0.51	3.56	0.62	0.24	S	38[8]	38[8]	38[8]	2[8]	Baer et al. (2008)
243 Ida	1.900×10^{-14}	1.00×10^{-15}	2.56	0.33	3.54	0.28	0.04	S	59.8[29]	25.4[29]	18.6[29]	0.6[29]	Petit et al. (1997)
253 Mathilde	5.194×10^{-14}	2.20×10^{-15}	1.35	0.21	2.90	0.53	0.08	C	66[31]	48[31]	46[31]	1.3[30]	Yeomans et al. (1997)
283 Emma	6.938×10^{-13}	1.51×10^{-14}	0.81	0.08	2.90	0.72	0.07	P	148[8]	148[8]	148[8]	2.3[8]	Marchis et al. (2008b) Note: Binary

Asteroid	Mass (in $M_\odot$)	Mass Uncertainty (in $M_\odot$)	Bulk Density (g/cm^3)	Bulk Density Uncertainty (g/cm^3)	Assumed Grain Density (g/cm^3)	Bulk Porosity	Uncertainty in Bulk Porosity	Taxonomic *Class*[1]	Dimensions (km) a	b	c	Δ radius (km)	Mass Reference
324 Bamberga	5.100×10^{-12}	8.00×10^{-13}	1.61	0.30	2.46	0.34	0.06	CP	229[8]	229[8]	229[8]	3.7[8]	Pitjeva (2004)
	5.500×10^{-12}	1.00×10^{-13}	1.74	0.17	2.46	0.29	0.03	CP	229[8]	229[8]	229[8]	3.7[8]	Pitjeva (2005)
	4.700×10^{-12}	7.00×10^{-13}	1.49	0.26	2.46	0.40	0.07	CP	229[8]	229[8]	229[8]	3.7[8]	Konopliv et al. (2006)
379 Huenna	1.926×10^{-13}	1.00×10^{-14}	0.93	0.07	2.90	0.68	0.05	C	92.3[8]	92.3[8]	92.3[8]	0.85[8]	Marchis et al. (2008b) Note: Binary
433 Eros	3.362×10^{-15}	1.50×10^{-18}	2.67	0.03	3.56	0.25	0.00	S	34.4[32]	11.2[32]	11.2[32]	0.1[32]	Yeomans et al. (2000)
444 Gyptis	3.600×10^{-12}	1.60×10^{-12}	3.16	1.52	2.90	-0.09	-0.04	C	163[8]	163[8]	163[8]	5[8]	Michalak (2001)
	6.300×10^{-12}	1.20×10^{-12}	5.53	1.46	2.90	-0.91	-0.24	C	163[8]	163[8]	163[8]	5[8]	Kochetova (2004)
451 Patientia	1.020×10^{-11}	3.40×10^{-12}	3.40	1.20	2.90	-0.17	-0.06	CU	225[8]	225[8]	225[8]	4.4[8]	Kochetova (2004)
511 Davida	3.340×10^{-11}	2.80×10^{-12}	5.24	2.32	2.90	-0.81	-0.36	C	357[33]	294[33]	231[33]	21[33]	Michalak (2001)
	2.400×10^{-11}	2.40×10^{-12}	3.76	1.68	2.90	-0.30	-0.13	C	357[33]	294[33]	231[33]	21[33]	Chernetenko and Kochetova (2002)
	2.200×10^{-11}	1.00×10^{-12}	3.45	1.51	2.90	-0.19	-0.08	C	357[33]	294[33]	231[33]	21[33]	Baer et al. (2008)
	1.930×10^{-11}	9.86×10^{-13}	3.03	1.33	2.90	-0.04	-0.02	C	357[33]	294[33]	231[33]	21[33]	This paper
532 Herculina	1.680×10^{-11}	2.80×10^{-12}	5.80	1.17	3.56	-0.63	-0.13	S	222.4[8]	222.4[8]	222.4[8]	4.2[8]	Kochetova (2004)
617 Patroclus	6.840×10^{-13}	5.50×10^{-14}	0.80	0.08	2.12	0.62	0.06	P	121.8[34]	121.8[34]	121.8[34]	1.6[34]	Marchis et al. (2006)
									112.6[34]	112.6[34]	112.6[34]	1.6[34]	Note: Binary. Mass stated for system
	6.033×10^{-13}	1.006×10^{-13}	1.08	0.33	2.12	0.49	0.15	P	106[35]	106[35]	106[35]	5.5[35]	Mueller et al. (2010)
									98[35]	98[35]	98[35]	5[35]	Note: Binary. Mass stated for system
702 Alauda	3.040×10^{-12}	2.00×10^{-13}	1.56	0.19	2.90	0.46	0.05	C	194.73[8]	194.73[8]	194.73[8]	3.2[8]	Margot and Rojo (2007)
									5.5[36]	5.5[36]	5.5[36]		Note: Binary
704 Interamnia	3.700×10^{-11}	1.70×10^{-11}	4.34	2.19	2.90	-0.50	-0.25	F	349[43]	339[43]	274[43]	11[43]	Landgraff (1992)
	3.520×10^{-11}	9.30×10^{-12}	4.13	1.39	2.90	-0.42	-0.14	F	349[43]	339[43]	274[43]	11[43]	Michalak (2001)
	8.100×10^{-12}	4.20×10^{-12}	0.95	0.53	2.90	0.67	0.38	F	349[43]	339[43]	274[43]	11[43]	Chernetenko and Kochetova (2002)
	1.860×10^{-11}	1.10×10^{-12}	2.18	0.47	2.90	0.25	0.05	F	349[43]	339[43]	274[43]	11[43]	Baer et al. (2008)
	5.700×10^{-11}	1.60×10^{-11}	6.68	2.33	2.90	-1.30	-0.45	F	349[43]	339[43]	274[43]	11[43]	Ivantsov (2008)
	1.960×10^{-11}	8.86×10^{-13}	2.30	0.49	2.90	0.21	0.04	F	349[43]	339[43]	274[43]	11[43]	This paper
762 Pulcova	1.300×10^{-12}	2.00×10^{-13}	1.92	0.32	2.90	0.34	0.06	F	137[8]	137[8]	137[8]	1.6[8]	Merline et al. (2002)
	7.040×10^{-13}	5.00×10^{-14}	0.90	0.10	2.90	0.69	0.08	F	137[8]	137[8]	137[8]	1.6[8]	Marchis et al. (2008a)
									20[19]	20[19]	20[19]		Note: Binary. Mass stated for system
804 Hispania	5.000×10^{-12}	4.00×10^{-12}	4.82	3.89	2.46	-0.96	-0.77	PC	158[8]	158[8]	158[8]	2.9[8]	Landgraff (1992)
	2.020×10^{-12}	4.30×10^{-13}	1.95	0.47	2.46	0.21	0.05	PC	158[8]	158[8]	158[8]	2.9[8]	Baer et al. (2008)
	2.060×10^{-12}	3.93×10^{-13}	1.98	0.44	2.46	0.19	0.04	PC	158[8]	158[8]	158[8]	2.9[8]	This paper
3749 Balam	2.560×10^{-16}	1.00×10^{-17}	2.61	0.45	3.56	0.27	0.05	S	7.2[2]8	7.2[2]8	7.2[2]8	0.2[2]8	Marchis et al. (2008b) Note: Binary
25143 Itokawa	1.760×10^{-20}	5.30×10^{-22}	1.90	0.13	3.56	0.47	0.03	S	0.535[37]	0.294[37]	0.209[37]	0.00	Fujiwara et al. (2006)
1999 KW4	1.183×10^{-18}	5.00×10^{-20}	1.97	0.24	3.56	0.45	0.05	S	1.532[38]	1.495[38]	1.347[38]	0.04[38]	Ostro et al. (2006)

Asteroid	Mass (in $M_\odot$)	Mass Uncertainty (in $M_\odot$)	Bulk Density (g/cm^3)	Bulk Density Uncertainty (g/cm^3)	Assumed Grain Density (g/cm^3)	Bulk Porosity	Uncertainty in Bulk Porosity	Taxonomic *Class*[1]	Dimensions (km) a	b	c	Δ radius (km)	Mass Reference
(66391)	6.788×10^{-20}	1.21×10^{-20}	2.81	0.82					0.571[38]	0.463[38]	0.349[38]	0.034[38]	Note: Binary. Mass stated for each component
2000 DP107	2.300×10^{-19}	2.50×10^{-20}	1.71	1.04	2.90	0.41	0.25	C	0.8[39]	0.8[39]	0.8[39]	0.08[39]	Margot et al. (2002)
(185851)	1.211×10^{-20}	1.316×10^{-21}	1.70	1.04	2.90	0.41	0.25	C	0.3[39]	0.3[39]	0.3[39]	0.03[39]	Note: Binary. Mass stated for each component
2000 UG11	4.700×10^{-21}	8.00×10^{-22}	1.47	0.81					0.23[39]	0.23[39]	0.23[39]	0.02[39]	Margot et al. (2002)
2002 CE26	1.950×10^{-17}	2.50×10^{-18}	1.73	0.63	2.90	0.40	0.15	C	3.5[40]	3.5[40]	3.5[40]	0.2[40]	Shepard et al. (2006)
2003 YT1	6.38×10^{-19}	2.00×10^{-19}	2.01	0.7					0.86[41]	0.86[41]	0.86[41]	0.5[41]	Brooks (2006)

References:
[1] Neese (2005)
[2] Thomas et al. (2005)
[3] Dunham et al. (1990)
[4] Millis et al. (1981)
[5] Kaasalainen et al. (2002)
[6] Thomas et al. (1997)
[7] Kovačević (2005)
[8] Tedesco et al. (2002)
[9] López-González and Rodríguez (2005)
[10] Torppa et al. (2003)
[11] Kaasalainen et al. (2002)
[12] Shevchenko and Tedesco (2006)
[13] Shevchenko and Tedesco (2007)
[14] Storrs et al. (2005)
[15] Yeomans (2010a)
[16] Kuzmanoski and Kovačević (2002)
[17] Shepard et al. (2008)
[18] Descamps et al. (2008)
[19] Marchis et al. (2008a)
[20] Yeomans (2010b)
[21] Müller and Blommaert (2004)
[22] Marchis et al. (2005a)
[23] Millis et al. (1983)
[24] Merline et al. (2002)
[25] Descamps et al. (2007)
[26] Marchis et al. (2005b)
[27] Descamps et al. (2009)
[28] Marchis et al. (2008b)
[29] Thomas et al. (1996)
[30] Yeomans et al. (1997)
[31] Veverka et al. (1997)
[32] Veverka et al. (2000)
[33] Conrad et al. (2007)
[34] Marchis et al. (2006)
[35] Mueller et al. (2010)
[36] Margot and Rojo (2007)

Asteroid	Mass (in $M_\odot$)	Mass Uncertainty (in $M_\odot$)	Bulk Density (g/cm^3)	Bulk Density Uncertainty (g/cm^3)	Assumed Grain Density (g/cm^3)	Bulk Porosity	Uncertainty in Bulk Porosity	Taxonomic *Class*[1]	Dimensions (km) a	b	c	Δ radius (km)	Mass Reference

[37] Fujiwara et al. (2006)
[38] Ostro et al. (2006)
[39] Margot et al. (2002)
[40] Shepard et al. (2006)
[41] Brooks (2006)
[42] Drummond et al. (2010)
[43] Drummond et al. (2009)
[44] Zurec et al. (2008)

Several of our results merit commentary.

1 Ceres, 2 Pallas, and 4 Vesta

The masses of these asteroids are already well-determined; our results here are given simply for comparison purposes. We note that our masses agree very well with those of Pitjeva (2005) and Standish (1998). We have assumed a ”dusty ice” composition for 1 Ceres, a CM analogue for 2 Pallas, and an L chondrite analogue for 4 Vesta; the resulting small porosities are consistent with monolithic bodies.

3 Juno

The mass of 3 Juno is less certain, owing to its lower mass, which reduces the perturbations on other bodies. Nevertheless, our mass is in good agreement with that of Pitjeva (2005). An L chondrite analogue yields a bulk porosity of approximately 8%, suggesting that this large asteroid is not completely monolithic.

5 Astraea

We believe our mass is the first published value for 5 Astraea. The 5/17 encounter is potentially problematic, as 17 Thetis is involved in several other encounters with large asteroids. By modeling these encounters with an integrated ephemeris, however, we were able to isolate the deflection due to 5 Astraea. Again, we would note that the least-squares standard deviation may understate the actual mass uncertainty. Assuming an L chondrite analogue, 5 Astraea appears to be fractured, with a porosity of approximately 20%.

6 Hebe

Dynamical studies suggest that 6 Hebe, lying near the 3:1 mean motion and ν_6 secular resonances, is a significant source of chondritic meteorites (Farinella et al., 1993). However, there is disagreement as to whether 6 Hebe may be the source of the H-chondrite and IIE iron meteorites (Gaffey and Gilbert, 1998), or whether its surface contains hydrated minerals, which would exclude the heating necessary to create stony-irons (Rivkin et al., 2001). The SkyMorph precovery observations allowed us to obtain a mass for this asteroid. While the resulting bulk density closely matches an H chondrite analogue, the uncertainty is such that an L chondrite analogue cannot be excluded.

8 Flora

Also bordering the ν_6 secular resonance, 8 Flora is the largest member of a dynamical family believed to result from the catastrophic disruption of a larger parent body a few hundred million years ago (Nesvorný et al., 2002). Spectroscopic studies further suggest that 8 Flora may be a significant source of both LL chondrites and near-Earth asteroids (Vernazza et al., 2008). Once again, the SkyMorph precovery observations allowed us to calculate the mass of this body. Assuming an LL chondrite analogue, we derive a bulk porosity of approximately 12%, consistent with an impact-fractured body.

9 Metis

9 Metis has been classified as S-class, leading one to expect a chondritic analogue. While the masses of 9 Metis obtained from encounters with asteroids 20 and 29818 are

fairly consistent, the resulting negative bulk porosity nonetheless suggests that these masses are inconsistent with its taxonomic classification.

Based on dynamical family classification and spectroscopic analysis, Kelley and Gaffey (2000) have suggested that 9 Metis is a mantle/core fragment of a 300-600 km diameter differentiated parent body, whose other surviving fragments include 113 Amalthea. Spectroscopic modeling suggests that the composition of 9 Metis is 50% olivine, and 50% nickel-iron, which would lead to an average bulk density of approximately 5.37 g/cm^3, in excellent agreement with our reported value.

We would therefore speculate that the taxonomic classification may reflect only the surface composition of 9 Metis; the high bulk density suggests that 9 Metis contains a significant internal percentage of nickel-iron.

21 Lutetia

This asteroid is listed as M-class; but there is considerable disagreement as to its composition. Recent spectroscopic analyses in support of the Rosetta fly-by have suggested that its surface is more consistent with carbonaceous chondrites (Carvano et al., 2008), or even enstatite chondrites (Vernazza et al., 2009). While we have formally adopted a nickel-iron analogue, this results in a significant level of bulk porosity. Our bulk density value appears closer to stony-iron, suggesting a more moderate grain density; but given the uncertainty in our bulk density, a CM/CI chondrite or even porous nickel-iron analogue cannot be excluded.

31 Euphrosyne

A comparison of the reflectance spectra of several carbonaceous chondrites with that of 31 Euphrosyne reinforces its classification as C class (Hiroi et al., 1993). However, our measured mass yields a bulk density that is inconsistent with a C-class asteroid. Moreover, our mass value is significantly larger than that derived by Kochetova. Having said that, we would note that Kochetova's technique differed significantly from our own, in that masses were accepted based upon the absolute size of the mass uncertainty ($\sigma < 1.0 \times 10^{-10} M_{\odot}$), rather than its relative size; since this would likely result in the use of cases where the measured mass was less than the uncertainty in that mass, we are skeptical as to the resulting mass for this asteroid. Additionally, Kochetova lists a conference presentation by Kuznetsov in which a mass very similar to our own was reported ($2.83 \pm 1.25 \times 10^{-11} M_{\odot}$).

Since our mass is derived from only a single encounter (with 3176 Paolicchi), and since the resulting bulk density matches the assumed mineralogy so poorly, we must consider this mass suspect. Nevertheless, we know of no procedural error that would cause to withhold our result; and we are frankly reluctant to self-censor what might be a significant finding.

39 Laetitia

We believe our mass is the first published value for 39 Laetitia. The dimensions, which are derived from IRAS and lightcurve studies, are consistent with several occulation observations (Dunham and Herald, 2009). Gaffey et al. (1993) has classified this as an S(II) asteroid, with a high ratio of olivine to calcic pyroxene; we have therefore used an L chondrite analogue, yielding a very reasonable porosity.

52 Europa

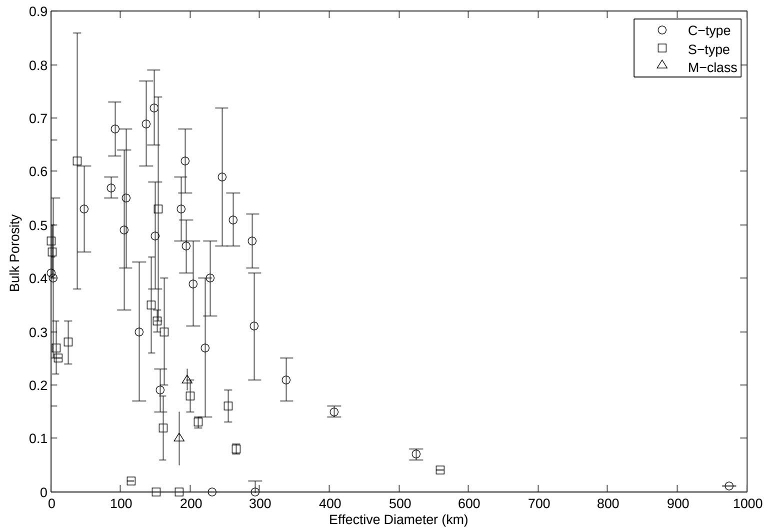


Figure 41: Bulk porosity as a function of effective diameter for the asteroids in Table 14.

There have been multiple published masses for 52 Europa; but they tend to vary widely. Our new value clusters close to our previous value, and that of Chernetenko and Kochetova (2002). This asteroid is classified as CF class, so we have used a CM analogue; this implies a significant porosity, suggesting 52 Europa may be a rubble pile.

704 Interamnia

This asteroid is classified as F class; and Hiroi et al. (1993) suggests a good match to carbonaceous chondrites. We have therefore used a CM analogue.

Again, there is considerable spread in the reported masses for 704 Interamnia. Our new value lies within 1σ of our previous value; and while fairly close to that of Chernetenko and Kochetova (2002), our new value suggests a significantly smaller porosity.

7 Porosity Implications

In the discussion that follows, we will refer to S and V class asteroids as ”S-type”, and C, G, B, F, P, T, and D class asteroids as ”C-type”.

The data in Table 14 yield a sampling of the physical properties of over fifty asteroids. When the derived bulk porosities are plotted against effective diameter in Figure 41, an interesting observation can be made.

The very largest asteroids are either monolithic or fractured, with porosities less than 20%. As an asteroid’s size decreases below 300 km, however, an abrupt change occurs; and we observe a wide range of porosities, from near zero up to 70% (or more).

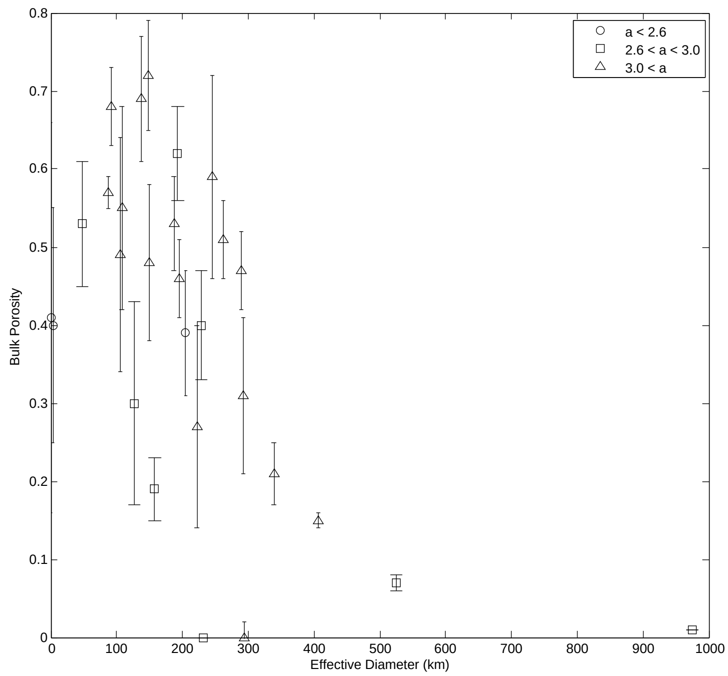


Figure 42: Bulk porosity as a function of effective diameter for the C-type asteroids in Table 14.

Significantly, slightly more than half of the asteroids smaller than 300 km in diameter would be characterized as ”rubble piles”, with porosities in excess of 30%. Moreover, Figures 42 and 43 clearly demonstrate that the proportion of rubble piles appears to increase as asteroid size decreases.

Once asteroids cooled soon after formation, their porosities could only be altered dynamically, either by collisions, or by the YORP effect (although the YORP effect cannot fracture an asteroid - it merely redistributes unconsolidated material). But the YORP effect is only noticeable over the age of the solar system for minor planets smaller than 10 km in diameter (Rubincam, 2000); so changes in porosity due to YORP-driven rotational torques could only be significant for the very smallest asteroids.

We conclude, therefore, that asteroids as large as 300 km in diameter must have experienced collisions that were sufficiently violent as to disrupt them, leaving them to recombine subsequently as loose aggregates.

7.1 Rubble Pile Evidence

The fact that a majority of large asteroids may be rubble piles is not unexpected; circumstantial evidence has been accumulating for some time.

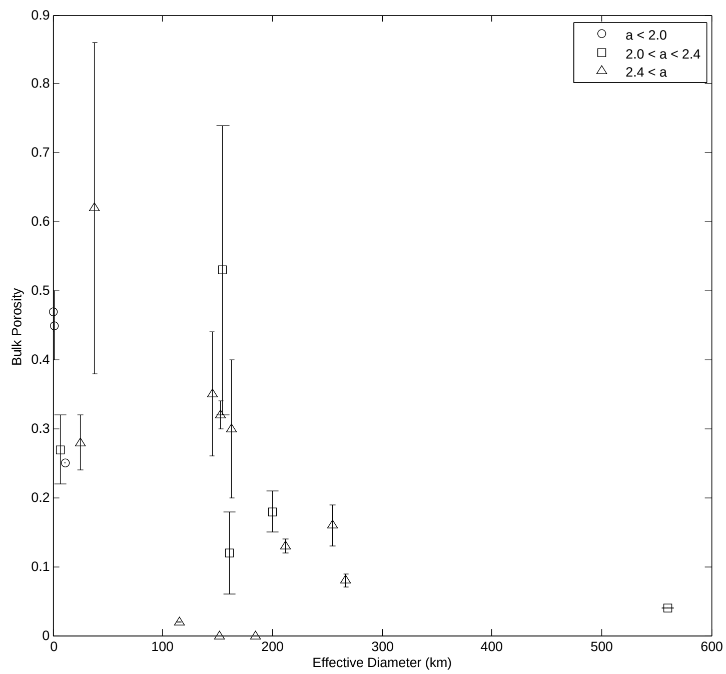


Figure 43: Bulk porosity as a function of effective diameter for the S-type asteroids in Table 14.

Long linear grooves have been observed on the surfaces of asteroids 951 Gaspra (Veverka et al., 1994), 243 Ida (Belton et al., 1994), 433 Eros (Veverka et al., 2001), and 21 Lutetia (Keller et al., 2010). Britt et al. (2002) explains that, as an asteroid is disrupted by a large impact, the larger fragments are ejected with smaller velocities, and attract one another gravitationally, making it likely that they will be the first to recombine. Progressively smaller pieces would be ejected with relatively higher velocities, and attract one another to a lesser degree. So the fragments of the recombined asteroid would be sorted by size, with the largest fragments at the center, and the smallest fragments near the surface. This would leave large voids in the interior, and significant fissures (i.e., gaps between fragments) at the surface; Thomas et al. (1979) speculates that subsequent impacts could widen those fissures and jostle the surface regolith, causing it to fall into the fissures and leave surface depressions along their lengths.

Large impact craters (in terms of proportional size) have been observed on several asteroids, most notably 253 Mathilde, which has four craters whose diameters are comparable to the asteroid's radius (Veverka et al., 1999). Such impacts might be expected to disrupt and disperse a monolithic body; the structural properties of Mathilde must have somehow dissipated the impact energy, not unlike a foam cushion or an airbag.

Pravec and Harris (2000) examined rotational periods and lightcurve amplitudes for 750 asteroids. Significantly, no asteroids larger than 0.15 km in diameter were found to be rotating faster than the break-up limit for spherical aggregates lacking tensile strength (Note: A small number of exceptions have since been discovered - see Pravec et al. (2002)). Moreover, as spin rate increased, lightcurve amplitude decreased, suggesting that the faster rotating bodies were more spherical; since the bodies were too small to be rounded by gravity, they must have fluidly reaccumulated into a spherical shape. From this, the authors concluded that asteroids larger than 0.15 km in diameter are likely rubble piles. By contrast, in a follow-up paper, Pravec et al. (2002) found that most near-Earth and Mars-crossing asteroids smaller than 0.15 km rotate faster than the non-tensile limit, indicating that they are held together in a state of tension (though their tensile strength may be quite weak). For asteroids larger than 40 km in diameter, the spin rates exhibit a Maxwellian distribution, consistent with the simulations of Salo (1987) for the end state of a population of colliding particles.

The evidence of spin rates therefore presents us with a model consisting of three different size regimes:

- Asteroids larger than 40 km. in diameter are either surviving planetesimals, or their largest, collisionally-relaxed fragments; most are likely rubble piles.

- Asteroids between 0.15 km and 40 km in size are either fractured or rubble piles, derived from collisions that failed to fully disperse the resulting fragments.

- Asteroids smaller than 0.15 km are coherent bodies, perhaps even monolithic, representing the collisional fragments of dispersed parent bodies.

We should emphasize that the conclusions derived from spin rates are circumstantial. The fact that an asteroid is rotating slower than the non-tensile limit does not prove that it is a rubble pile; but the fact that almost no asteroids larger than 0.15 km in diameter rotate faster than this limit is compelling. Moreover, the spin rate size regimes are consistent with hydrocode simulations which predict a transition between the small asteroid ”strength regime” (where impact craters must break apart rock held together with tensile strength, and where craters form largely through ejection), and the large asteroid ”gravity regime” (where gravity, as opposed to the tensile strength of rock, is the predominant force holding a body together) at a diameter near 150 m (Asphaug et al., 2002). Obviously, rubble piles exist only within the gravity regime.

We define Q_S^* to be the specific energy required to shatter a body (such that the largest fragment is less than one-half the size of the original body); and we define Q_D^* to be the specific energy required to disrupt a body (such that the remaining mass is less than one-half the mass of the original body). An impact with energy $Q_S^* < Q < Q_D^*$ would likely leave an asteroid a gravitational aggregate with a porosity of $20-40\%$ Wilson et al. (1999).

Holsapple et al. (2002) estimate that the energy required to disperse a large asteroid is approximately 100 times greater than that required to shatter it (that is, $Q_D^* \approx 100 Q_S^*$). Since asteroid population increases rapidly as size decreases (Farinella et al., 1998), impacts with small asteroids are far more common than impacts with large asteroids; and since impact energy is proportional to mass, impacts with $Q_S^* < Q < Q_D^*$ are far more likely than impacts with $Q > Q_D^*$. Moreover, experimental studies of collisional dynamics demonstrate that highly porous targets exhibit significantly higher impact strength than non-porous targets, as the voids dissipate impact energy and disrupt the propogation of shock waves (Holsapple et al., 2002). Additionally, Love et al. (1993) found that increasing target porosity had the effect of decreasing ejecta velocity, thus making the dispersal of fragments more difficult. We would therefore expect that rubble piles should be highly resistant to catastrophic disruption. Indeed, Britt et al. (2002) estimates that collisional lifetime is proportional to $(1-n)^{-2.2}$, where n is the bulk porosity; thus, a rubble pile with n = 0.6 would survive 7.5 times longer than a monolith with n = 0.

So if the energy Q of an asteroid's initial impact is such that $Q_S^* < Q < Q_D^*$, we would expect that the asteroid would likely become a rubble pile; and since it would henceforth be resistant to disruption, we would expect it to remain a rubble pile (barring subsequent internal heating or impact-driven compaction - see sections 7.2.1 and 7.2.2).

Therefore, we would conclude that gravitationally-bound aggregates are the inevitable collision-driven evolutionary outcome for asteroids larger than about 150 m.

Since rubble piles are so resistant to disruption, their disperal lifetimes are considerably longer than their shattering lifetimes (although these lifetimes are also dependent upon target size). Specifically, using the model of Farinella et al. (1998) for the population of main-belt asteroids as a function of radius r (in km),

$$N_r = (3.5x10^5)r^{-2.5} \tag{13}$$

and experimentally-derived estimates of the kinetic energy required to either shatter or disrupt an asteroid, Holsapple et al. (2002) provide the following relations for the estimated lifetime in years between such events:

$$t_{shatter} = (1.8x10^5)R^{1.875} \tag{14}$$

and

$$t_{disrupt} = (8.4x10^6)R^{1.875} \tag{15}$$

where R is the radius of the target asteroid in km.

Clearly, the smaller an asteroid, the shorter the time between disruption (and shattering) events, and thus the more likely it has evolved into a rubble pile. Intuitively, this makes sense, since the smaller the target, the smaller the projectile required to disrupt (or shatter) it; and since the population of suitable projectile asteroids grows with decreasing size, we would not need to wait as long for a projectile of the required size to appear.

Moreover, asteroids greater than 300 km in diameter would have $t_{shatter} > 2.16$ billion years, and $t_{disrupt} > 101$ billion years. Thus, while it is likely that such large asteroids might have experienced a few shattering events during the lifetime of the solar system, it is highly unlikely that they would have experienced a disruptive event.

By contrast, asteroids 50 km in diameter would have $t_{shatter} = 75$ million years, and $t_{disrupt} = 3.5$ billion years, making it likely that such asteroids would have experienced perhaps 60 shattering impacts, and at least one disruptive event in which the resulting fragments would have recombined into a rubble pile. Indeed, it's now clear why the spin rate study concluded that asteroids between 0.15 km and 40 km in size are likely rubble piles; given the number of shattering and disruptive collisions they would have experienced, it's highly unlikely any would have remained intact (any small monoliths in the spin rate study would presumably be fragments from relatively recent disruptive events).

We must note that the above equations are approximations. Nevertheless, we believe the above discussion accounts for most of the qualitative features of Figure 41.

Moreover, the fact that rubble piles begin to appear in Figure 41 at a diameter of approximately 300 km is significant in the context of models which seek to predict the collision-evolved size distribution of asteroids. Specifically, the velocity of a collision fragment as a function of its mass is modeled as

$$V(m) = Cm^{-k} \tag{16}$$

where the value of k is experimentally estimated to be approximately 0.088 (Giblin, 1998). Clearly, if k = 0, all fragments depart from the collision with the same velocity; and if that velocity exceeds the escape velocity $V_{esc} = \sqrt{\frac{2GM}{r}}$ where M is the mass of the asteroid and r is its radius, reaccumulation into a gravitational aggregate is impossible. On the other hand, if k has a positive value, the largest fragments may not escape, allowing reaccumulation. Thus, if we apply the condition

$$Cm^{-k} < \sqrt{\frac{2GM}{r}} \tag{17}$$

where r = 150 km, we find

$$k > \frac{log\left\{\frac{C^2 r}{2GM}\right\}}{2logm} \tag{18}$$

which should provide a useful constraint on the value of k.

7.2 Interpreting C-type porosity

One final aspect of asteroid porosity must be addressed.

Figure 41 suggests that the vast majority of asteroids with porosities greater than 0.4 are C-type. Indeed, Figures 42 and 43 show that, below 300 km in diameter, the bulk porosities of C-type asteroids range from $30-70\%$, while the bulk porosities of S-type asteroids range from $10-50\%$. While there is some overlap in these plots, it appears that C-type asteroids tend to have a significantly higher macroporosity than S-type asteroids. (We would note that a similar observation was made independently by Consolmagno et al. (2008)).

7.2.1 Collisional Hypothesis

From the contents of the previous section, we might conclude that C-type asteroids must have experienced a more violent collisional history, with a larger number of shattering-level events resulting in a higher percentage of rubble piles.

However, there are at least two objections to this hypothesis.

First, the volume density of asteroids in a spherical shell of thickness δr decreases as the square of the distance from the Sun; and since most C-type asteroids are concentrated in the outer main belt (in contrast to S-type asteroids, which are concentrated in the inner main belt), Figure 44 demonstrates that we would expect most C-type asteroids to encounter significantly fewer collisions per unit time than most S-type asteroids. (Note that this figure applies only to the current asteroid belt; we cannot exclude the possibility that the outer main belt might have had a greater volume density than the inner main belt earlier in solar system history. Additionally, objects in the outer main belt are more distant, and generally have a lower albedo; so we cannot exclude the possibility that Figure 44 is subject to selection, with inner main belt S-type asteroids being over-represented. Nevertheless, we believe the geometric fact that the volume density decreases as r^2 is highly compelling.)

An additional problem arises from experimental studies of collisional dynamics. Holsapple et al. (2002) notes that impacts on a body that is already shattered differ little from those on an intact body; the resulting fragment size is very similar, indicating that the body has not been fractured further. Thus, multiple shattering-level events would likely not be sufficient to create a rubble-pile; only an event where $Q > Q_S^*$ would suffice.

Even assuming that a sufficiently energetic event occurs, and an asteroid becomes a rubble pile, Housen and Holsapple (1999) found that impact cratering on highly porous bodies is caused by compaction, rather than ejection; the density of material below a crater is increased, as the intervening voids are collapsed by the impact shock waves. Specifically, impact compaction can occur either as a geometric rearrangement of the mineralogical grains into a more efficient packing, or as a fracturing of the grains themselves Britt et al. (2002).

Equations 14 and 15 suggest that an asteroid larger than 50 km in diameter should have experienced only one disruptive-level event during the lifetime of the solar system; but for every disruptive-level impact event, the asteroid will experience perhaps 60 shattering-level events. Thus, it is likely that, once an asteroid experiences an im-

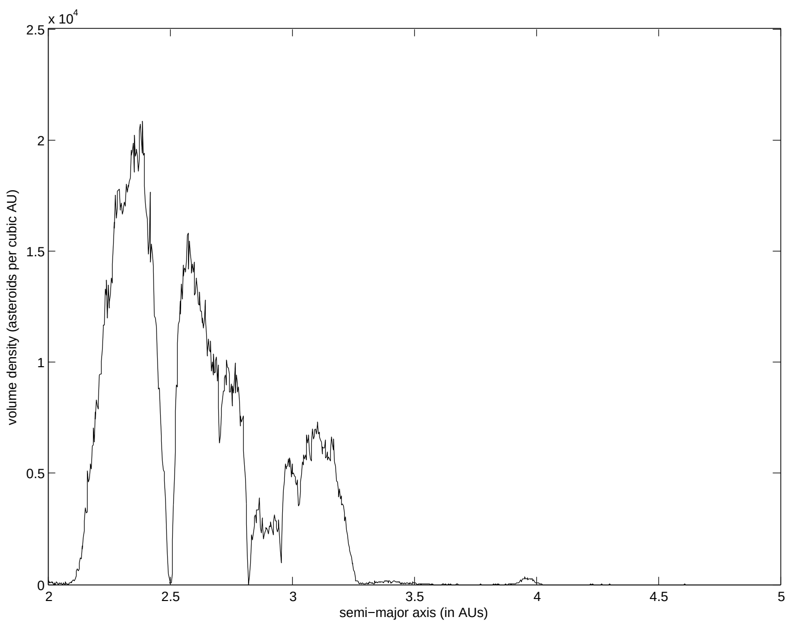


Figure 44: Density of asteroids per unit volume as a function of semi-major axis. The semi-major axes for the numbered asteroids are drawn from the Minor Planet Center MPCORB file for January 5, 2009.

pact that renders it a rubble pile, subsequent (and relatively frequent) shattering-level impacts will actually compact it, progressively increasing its bulk density and reducing its bulk porosity.

Therefore, it is unlikely that C-type asteroids would have experienced a more violent collisional history than S-type asteroids; and even if they did, the overwhelming relative frequency of shattering-level compacting events makes it unlikely that C-type asteroids would have developed a significantly higher bulk porosity purely through collisional processes.

We are therefore compelled to seek an alternate explanation.

7.2.2 Thermal Evolution

Figure 42 indicates that nearly all of the C-type asteroids with porosities greater than 0.45 have semi-major axes a of 3.0 AU or more, indicating that they lie in the outer main belt. Furthermore, 3/4 of all C-type asteroids with $a > 3.0$ AU have porosities greater than 0.45. We believe this symmetrical correlation is highly significant.

Meteorites show ample evidence that their parent asteroids were heated to varying degrees; HED achondrites and nickel-iron meteorites indicate that some asteroids melted and differentiated, while H6 chondrites show evidence of metamorphism, and CM chondrites show evidence of aqueous alteration Scott (2002). The most likely heat source was the radioactive decay of Al^{26}; and since the ratio of Al^{26} to Al^{27} is relatively consistent for all chondrites, regardless of class, Al^{26} was likely distributed uniformly throughout the solar nebula. Thus, any slight differences in the Al^{26}/Al^{27} ratio likely represent differences in accretion date (Huss et al., 2001).

Wetherill (1980) proposes an accretion model in which accretion rate varies inversely with the semi-major axis a:

$$\frac{dr}{dt} \propto \frac{v_c M_p}{a^2 \delta a} \tag{19}$$

where v_c is the circular orbital velocity $\sqrt{\frac{GM_S}{a}}$ at distance a from the Sun, M_p is the mass of all matter in an accretion zone of width δa, and M_S is the mass of the Sun. Thus, more distant objects would have accreted more slowly than objects nearer the Sun. This is highly significant, since the half-life of Al^{26} is only 0.72 million years (Grimm and McSween, 1993b), meaning that objects farther from the Sun would have had less undecayed Al^{26} for post-accretion warming.

Specifically, Grimm and McSween (1993a) present a model in which

- objects forming within 2.7 AU of the Sun accrete within 2.6 million years after the formation of calcium-aluminum inclusions (CAIs), leaving sufficient Al^{26} derived heat to yield bodies that are either melted and differentiated, or significantly metamorphosed;
- objects forming between 2.7 AU and 3.4 AU from the Sun accrete between 2.6 and 4.7 million years after CAI formation, leaving only enough Al^{26} derived heat to yield bodies in which low-level metamorphosis and aqueous alteration might occur;

- objects forming more than 3.4 AU from the Sun accrete more than 4.7 million years after CAI formation, leaving so little Al^{26} derived heat that bodies are essential unaltered.

For example, Bennett and McSween (1996) presents a theoretical model for the formation of an 88-km radius chondrite parent body in the first zone, in which accretion ended ~ 2 million years after the formation of CAIs. The peak temperature due to radioactive heating is limited to ~ 1175 K, based on study of the most highly metamorphised H6 chondrites. An onion-shell stratigraphy emerges, in which higher metamorphic H6 grades dominate the bulk of the asteroid's interior, with thin veneers of H5-H3 chondrites as one nears the surface.

By contrast, for objects in the second zone, the absolute amount of heat available would have been more limited; and since these objects would have accreted in a region where water ice could exist, the large fusion heat of ice, the large heat capacity of water, and water-based thermal circulation would have acted as thermal buffers, limiting temperatures in (at least) the upper layers of these bodies to within ~ 50 K of the melting point of ice. While lithification by high temperature metamorphic crystalization might still have occurred near the center, lithification in the upper layers was dominated by low temperature aqueous alteration (McSween et al., 2002).

For objects forming beyond 3.4 AU from the Sun, no post-accretion metamorphic process is evident. As noted above, the amount of Al^{26} derived heat would have been insufficient to melt water ice, much less cause metamorphic changes. Some authors have speculated that rapidly varying magnetic fields from the T-Tauri Sun might have induced currents in protoplanets, thus heating them; but observations of other T-Tauri systems indicate that the effect is centered at high latitudes, well above and below the protoplanetary disk (Edwards et al., 1987). Other authors have proposed that large-scale impacts may have heated protoplanets. But such effects appear to be localized; both experiments and simulations demonstrate that even disruptive impacts cannot raise an asteroid's global temperature by more than a few degrees K (Keil et al., 1997).

We are therefore left to conclude that asteroids forming beyond 3.4 AU from the Sun failed to undergo any large-scale global metamorphic lithification or aqueous alteration. These bodies would initially have been highly porous gravitational aggregates, consisting of accreted dust grains and water ice. Subsequent collisions would have compacted the bodies somewhat, with localized impact lithification amongst a matrix of compressed but still relatively pristine nebular material (Consolmagno and Britt, 2004).

The thermal evolution, composition, and structure of these asteroids is qualitatively similar to that of comets. Indeed, comets are believed to consist of a mixture of water ice and dust grains composed of hydrated silicates, mafic silicates, and organics, with an estimated mean bulk porosity of 0.6 (Britt et al., 2006). While comets are believed to have a higher proportion of water ice, we believe it is entirely appropriate to describe asteroids forming beyond 3.4 AU from the Sun as being almost "cometary" in nature.

Based on their region of formation, we would expect meteorites originating from these bodies to be rich in carbon and volatiles, with little sign of either metamorphosis or aqueous alteration; and based upon the lack of global lithification, we would expect such meteorites to be highly porous and structurally weak, with very low tensile strength (Consolmagno et al., 2008).

From amongst our current meteorite samples, the best available analogue would be the Tagish Lake meteorite. Modeling of the atmospheric breakup of this meteorite suggests that the porosity of the pre-atmospheric body was $37 - 58\%$, with a minimal binding strength (Hildebrand et al., 2006). If we were to assume that the C-type asteroids with $a > 3.0$ AU are composed of similar material, Figure 42 is no longer anomalous; the bulk porosity of these asteroids is a very good match for the porosity of this meteorite.

One possible objection to this hypothesis would be that the Tagish Lake meteorite is essentially unique; if a significant number of asteroids share this composition, why haven't more examples of this type of meteorite been recovered?

We would respond to this question by first noting the extreme fragility of this meteorite. The samples which were recovered rested on newly-fallen snow that would have cushioned the impact of landing on Earth's surface; black patches on adjacent areas of ice indicate that impact on less-forgiving surfaces destroyed the fragments involved. Subsequent searches demonstrated that other fragments weathered quickly (several dissolving rapidly into meltwater), leaving only a short timeframe for recovery (Hildebrand et al., 2006). As noted by Asphaug et al. (2002), strong rock fragments are ejected from an asteroid collision at the highest speeds; so weak, porous fragments would be more likely to recombine, rather than escape to eventual entry into Earth's atmosphere. And the low tensile strength suggests that most meteorites of this type would not survive entry into Earth's atmosphere, leaving few fragments to reach the surface; indeed, reconstruction of the Tagish Lake meteorite's trajectory indicates an especially low entry angle, which would have limited aerodynamical stresses, thus suggesting why it survived. Finally, we would note that the initial Tagish Lake specimens were recovered by an experienced meteorite hunter who lived nearby, was aware of the recent fireball, and had sufficient foresight to both equip himself with the necessary specialized tools and to keep the samples frozen (Hildebrand et al., 2006).

Additionally, any macroscopic asteroid fragments originating from the outer main belt would most likely be ejected from the solar system by Jupiter, rather than perturbed into the inner solar system, where they might encounter Earth's atmosphere (Morbidelli and Gladman, 1998).

In short, we believe many selective factors drastically limit the opportunities for collection.

We would therefore suggest that the especially high porosities of distant C-type asteroids are due, at least in part, to a cometary-type structure and composition that results from a lack of global heating following their initial accretion.

7.2.3 The Nice Model

The preceding discussion implicitly assumes that the asteroids (and the major planets) formed at, or near, their current distances from the Sun; the resulting thermal and dynamical predictions might be termed the "Standard Model".

Another view of solar system evolution recently emerged in a series of papers ((Tsiganis et al., 2005), (Gomes et al., 2005), and (Morbidelli et al., 2005)) positing that Jupiter, Saturn, Uranus, and Neptune initially formed within a relatively compact region 5-15 AUs from the Sun, with a large 35 earth-mass disk of cometary bodies extending from 16-30 AU. The main belt of asteroids would have extended from approximately 1-3 AUs from the Sun, and consisted largely of chondritic S and C class asteroids (Walsh et al., 2010). Saturn, Uranus and Neptune would have interacted gravitationally with the inner edge of the disk of distant comets, perturbing these bodies into the inner solar system; since the planets gained orbital energy in these exchanges, they would have slowly spiraled outward. When the perturbed comets encountered Jupiter, they would have been ejected from the solar system; and since Jupiter lost energy in these encounters, it would have slowly spiraled inward. Thus, the ratio of the orbital periods of Jupiter and Saturn would have slowly increased.

After approximately 600 million years, the mutually receding Jupiter and Saturn crossed their 1:2 mean motion resonance. As a result, the system was destabilized; the eccentricities of the major planets increased, and they began interacting directly with one another. Uranus and Neptune were thrown outward, where they encountered and scattered the disk of distant cometary bodies. Some of these cometary bodies (and some pre-existing chondritic main belt asteroids, passing through secular resonances with Jupiter and Saturn) would have been perturbed into the inner solar system, resulting in the Late Heavy Bombardment; but others would have been captured in stable orbits in the outer main belt, where they are found today as the D and P class asteroids (Levison et al., 2009).

Termed the ”Nice model”, this series of dynamical simulations predicts that the comets that were perturbed into the outer main belt would have been chemically similar to the C-class asteroids that originally formed there; but they would have been structurally much weaker, with a density of approximately 1 g/cm^3, and a disruption energy Q_D^* approximately one-fourth that of water ice (Levison et al., 2009). Thus, as these former cometary bodies began colliding with the pre-existing chondritic asteroids, most would have have completely disrupted, with others left as gravitationally-bound aggregates.

Figure 42 may represent the confirming signature of this model, depicting a moderate porosity population for $a < 3.0$ AU, and a high porosity population for $a > 3.0$ AU. Indeed, we assumed a CI chondrite analogue for the outer C-type asteroids; if their grain densities are actually closer to 1 g/cm^3, then our observed low bulk densities are easily understood.

However, since the Standard Model and the Nice model both predict a population of low-density cometary-type objects in the outer main belt, we are unfortunately unable to exclude either scenario.

8 Research Plan

With the construction and performance of the observational error model validated, we look forward to its operational implementation. However, it will require regular maintenance, both to accommodate the introduction of new observatories, and to account for changes in performance in existing observatories, as new technology, software, and procedures are adopted.

The availability of high-precision astrometric data, and the rapid discovery of small main-belt asteroids (each a potential test body), should enable many future mass determinations. With new computing techniques, however, we can improve upon the methodology described above.

First, our current mass determination algorithm assumes that the orbit of the test asteroid and the mass of the subject asteroid are the only uncertain quantities; while perturbations due to the planets and the 300 most significant asteroids are included in the force model, the state vectors and masses of these perturbers are regarded as absolutely known quantities with no uncertainties of their own. Clearly this is not realistic. If the observational baseline of the test asteroid is sufficiently long, it will be perturbed by objects other than the subject asteroid; and small changes in the orbits and/or masses of such perturbers could noticeably alter the trajectory of the test asteroid, and hence impact the derived mass of the subject asteroid. Indeed, the dependency may be so great that the current least-squares mass uncertainty may be significantly understated.

Ideally, we would like to simultaneously solve for the orbits and masses of all of the bodies involved, including the subject asteroid, the test asteroid, and all relevant perturbing bodies. However, this is a significantly more complex task, even more ambitious than the construction of planetary ephemerides. In particular, the vector b containing the "observed - computed" residuals in Equation 1 would include residuals from all of the 300+ bodies in the solution; and assuming an average of 500 optical observations per body, the resulting covariance matrix alone would be $300,000 \times 300,000$ in size, requiring 670 gigabytes of RAM storage.

To make this task manageable, we are developing a technique for supplementing the RAM with hard disk storage; matrix calculations are essentially done one row at a time, and the algorithm only reads as many rows into RAM as are needed. Additionally, we believe it should be possible to use control points to consolidate all of the observations of an asteroid within a given opposition into a single representative observation, thus greatly reducing the number of observations in the solution, and hence the sizes of the matrices involved. If these two techniques were applied, we believe a simultaneous solution would be feasible; and that will be the immediate focus of our future work.

Second, the two-body algorithm used to identify potential mass determination events is an approximation. In practice, some events forecast to yield significant perturbations have not; and several successful events discovered by other researchers have been missed by this algorithm. With the availability of multi-processor workstations, the approach described in section 2.1, in which the orbit of a small test asteroid is integrated through the period of available observations, both with and without the influence of the large subject asteroid, now appears feasible, especially if efforts are focused on identifying suitable encounters for large asteroids like 12 Victoria, whose masses remain unknown.

Third, uncertainties in asteroid volume are often the dominant factor in the uncertainties in bulk densities and porosities. While extended radar or adaptive optics observations are capable of yielding precise dimensions and shape models, access to these resources is both limited and expensive. A better option might be to engage in collaboration with lightcurve and occultation specialists, combining their results to obtain more accurate volumes.

Finally, there is a large volume of photometric asteroid observations. The development of a photometric error model, similar in principle to the astrometric model developed herein, could potentially enable the development of more precise shape models, and thus more precise volume, density, and porosity estimates.

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Appendices

A Extract from the BC-405 Asteroid Ephemeris

Table 15: Asteroid Ephemeris Extract: Epoch = JD 2453775.0

Asteroid	Mass ($M_\odot$)	a (AU)	e (rad)	i (rad)	w (rad)	Ω (rad)	M (rad)
1	4.756E-10	2.7653923803	0.0800181041	0.1847763909	1.2781928866	1.4034154135	2.1731720069
2	1.06E-10	2.7723342054	0.2306344594	0.6080791488	5.4179236132	3.0219721821	1.8976962822
4	1.338E-10	2.3613507461	0.089067884	0.1245024563	2.6232898675	1.8138501502	3.9424118113
29	7.8E-12	2.554614119	0.0723341839	0.1064008326	1.106274109	6.2222342938	3.48018233
16	1.14E-11	2.9203517252	0.139471396	0.0540243917	3.9783860597	2.624066302	0.9976904073
15	1.59E-11	2.6433988244	0.1870603141	0.2048599967	1.7085615306	5.1185969482	4.4912069433
10	4.40E-11	3.1376113785	0.118281604	0.0670502131	5.4636818671	4.9473003054	0.2826217344
7	7.3E-12	2.3850764703	0.231342671	0.0964703344	2.5383746808	4.5330777011	5.0521956263
6	6.3E-12	2.4252389004	0.2016342661	0.2574606972	4.1805578185	2.4215769936	4.6662400788
3	1.5E-11	2.6679974781	0.2582962788	0.226390572	4.3255824941	2.9692294015	0.4355885782
345	2.94098E-13	2.3254470843	0.0614131763	0.1701951246	4.0099948926	3.7139637865	5.3377899903
12	1.01926E-12	2.3339216829	0.2207332323	0.1459631878	1.2160124284	4.111000382	4.1802058019
442	1.0017E-13	2.3453199231	0.0713852068	0.1058014923	1.4822575867	2.3568548367	3.7749297979
27	1.59779E-12	2.3477125151	0.171491007	0.0276397774	6.2252722905	1.654744324	1.6087108234
287	2.19556E-13	2.3531028571	0.0235969702	0.1749236331	2.101212795	2.4868706207	2.8227811815
43	2.0322E-13	2.2034822071	0.1678119859	0.0605204016	0.2782569972	4.6239955256	2.1648186801
84	1.7497E-13	2.3627560343	0.2368472354	0.1629357645	0.2541707674	5.7197141764	4.1510532636
30	9.51E-13	2.3665138525	0.1265231053	0.03660002	1.5076509009	5.3735552025	2.8400702439
536	1.22461E-12	3.5045398451	0.0808578838	0.3382723815	5.2661848923	1.0379094484	1.4161674573
163	1.35143E-13	2.367716878	0.1904926422	0.0838772835	5.1922751985	2.7989483514	5.6841939193
105	5.95612E-13	2.3736795755	0.1764441206	0.3746242211	0.9874306944	3.2875536269	5.3506141973
554	3.1081E-13	2.3739495702	0.1542733201	0.0513024353	2.2247114549	5.1583488749	4.6290409533
313	3.15404E-13	2.3760363932	0.1795598853	0.2032564358	5.5115515743	3.0861623539	5.4545006442
115	3.6158E-13	2.3812241106	0.191288498	0.2023401562	1.6845682212	5.394454423	2.8220290782
230	9.20165E-13	2.3827935306	0.0612444043	0.1646806496	2.4275060675	4.1882265328	2.981987832
337	2.88138E-13	2.3824820645	0.1386538345	0.1370278677	1.7186189787	6.2057188149	3.9290047629
80	3.42364E-13	2.2955851917	0.2008595057	0.1512305243	2.428452059	3.8191469508	2.9794994448
9	7.4E-12	2.3863322819	0.1215772534	0.0973249171	0.0962240375	1.2038749321	1.1823808096
63	7.79807E-13	2.3959038914	0.1263281122	0.1009955725	5.1606693847	5.8982610148	5.1805405185
25	3.01402E-13	2.3999569355	0.2554442029	0.3767150812	1.573269927	3.739684366	5.8236334272
192	7.82532E-13	2.4028342136	0.2469270118	0.1190881094	0.5196903711	5.994492043	2.8326370523
304	1.10227E-13	2.4032886861	0.2213474198	0.2764354739	3.0080290249	2.7789938333	2.300565424
20	1.9E-12	2.4091624987	0.1429561018	0.0123365194	4.4598809611	3.6042248425	5.0055767027
566	1.67732E-12	3.3815822177	0.1106353557	0.085499636	5.1429216392	1.4009091807	5.1530565233
654	7.29382E-13	2.2970607967	0.2316525676	0.3162159106	3.7366002159	4.8622811478	0.8465910108
135	6.94147E-13	2.4281624929	0.2064829045	0.0402401916	5.9351982147	6.0021627191	2.8149368035

Asteroid	Mass ($M_\odot$)	a (AU)	e (rad)	i (rad)	w (rad)	Ω (rad)	M (rad)
618	6.13953E-13	3.1878195399	0.0790162913	0.2969313945	3.9822795919	1.9414773527	3.4910573014
635	3.34435E-13	3.1414593928	0.0794973275	0.1927920023	3.8228142714	3.2022943322	2.2498560189
21	1.3E-12	2.434697195	0.1638598347	0.0534846159	4.3661579956	1.4122624	3.0127990239
42	7.15005E-13	2.4418724583	0.2226975307	0.1488613829	4.1300258224	1.4730585884	0.6598646985
19	4.19E-12	2.4418181385	0.1593644182	0.0274613507	3.1766694282	3.6891332985	0.5418619065
11	2.29E-12	2.4525842128	0.0999681415	0.0807097011	3.4093431443	2.192644596	2.1128227208
168	1.15255E-12	3.3750614195	0.0671312257	0.08088179	2.9354381946	3.60354575	5.0542583058
17	7.0E-13	2.4703898017	0.1342733485	0.0975057389	2.3730261397	2.1923529293	2.7717758475
1467	4.95565E-13	3.3791241248	0.1345196234	0.3833696631	6.091644314	5.7006734746	5.3348638756
329	1.66106E-13	2.4764487067	0.0239706653	0.2772335725	0.9096974689	3.1162006975	0.6822947628
46	6.74159E-13	2.5249148281	0.1720415086	0.0408834877	3.0873988235	3.1620055428	5.6800908352
751	4.7592E-13	2.5499174325	0.1533795975	0.2725271322	5.2764689573	1.377758871	1.9070944754
89	2.46945E-12	2.550391041	0.1837230453	0.281684003	0.7862455402	5.4393616327	0.8783290067
449	2.21165E-13	2.5529843841	0.1710113546	0.0539257501	0.8091224778	1.5016488755	5.0304660789
334	1.33449E-12	3.8877255345	0.0247707209	0.0810131858	2.6249859441	2.2730789345	5.878967309
134	6.60722E-13	2.5634385106	0.1167345795	0.2022568607	1.4609947144	6.042603527	0.5628651947
535	1.45794E-13	2.569149019	0.0229675457	0.1183799291	1.1865022963	1.4813285229	5.6956600676
626	3.60515E-13	2.5737022967	0.2428696256	0.4425068473	0.7601876834	5.9655420031	1.4735648001
5	1.2551E-12	2.5732831563	0.1928584343	0.0937080733	6.2400877976	2.4729516361	3.7040707207
712	7.32306E-13	2.574265098	0.1882117835	0.223078685	3.1624750041	4.0325727295	0.4718269207
107	5.63E-12	3.4780247635	0.0787396461	0.1753540783	5.4078313803	3.0219104854	5.4507664366
409	1.48858E-12	2.5759208734	0.0707222555	0.1962404362	6.1497055537	4.230106359	1.2178852841
362	3.3199E-13	2.5784528567	0.0438590375	0.1408869183	0.5672781256	0.4782194872	3.6528781291
405	6.87281E-13	2.5836276972	0.2445434203	0.2085815271	5.3975041869	4.4558560246	5.2275511546
32	3.74365E-13	2.5867948088	0.0825850159	0.096524749	5.9322759585	3.8497942065	5.739097545
14	3.5E-12	2.5846060213	0.1682793439	0.1589575292	1.6807340847	1.5090854486	1.7959245286
91	4.67187E-13	2.5917747306	0.1045438774	0.036860174	1.2729202177	0.1901816379	1.8677688905
111	3.06E-12	2.5942688858	0.1008965535	0.0859362587	2.8947780367	5.3389055148	0.1514021092
1015	3.21333E-13	3.2117255368	0.0806325653	0.1649553747	4.9220698241	2.1037942211	3.448782681
404	3.29051E-13	2.5946890161	0.1982908726	0.2463431958	2.1130722157	1.6175022375	3.8082424887
344	8.15894E-13	2.595147024	0.3157959127	0.3203808441	4.143050552	0.8421557963	2.0790369253
849	3.29613E-13	3.1552134826	0.1951585181	0.3401004069	1.1169537144	3.9883059656	2.1133869171
389	3.50152E-13	2.6086696668	0.0652895378	0.1419651905	4.5987321309	4.9317382221	3.0590695905
347	1.88132E-13	2.6129577965	0.1643019289	0.204096807	1.480896782	1.4983744631	3.4273814661
70	6.43192E-13	2.6157657712	0.1810720707	0.2021941579	4.4652661803	0.8343525583	0.4452497344
194	1.68511E-12	2.6170476549	0.2364661443	0.3227781808	2.8433096167	2.7845246927	4.0502128888
53	5.41799E-13	2.6186802769	0.2039623951	0.0899567359	5.4487540427	2.5102749477	0.393321584
78	6.18712E-13	2.6202107008	0.2074636729	0.1516341823	2.6427461797	5.822279444	4.8550319505
407	3.03094E-13	2.6245984765	0.0706946578	0.1315062498	1.4323845513	5.1459152711	6.0796053132
454	1.91442E-13	2.6270594819	0.1112319653	0.1099688237	3.1126433466	0.5668153088	5.0927275168
23	8.83679E-13	2.6277230483	0.233085212	0.1770640281	1.0350999061	1.1733529444	5.2299924529
124	3.16449E-13	2.6305269872	0.0764080174	0.0515004243	1.1007298729	3.2845293411	3.1083857282
164	4.07401E-13	2.6324243679	0.3453478089	0.4272490085	4.9497484009	1.3465621021	1.0010838242
37	9.0405E-13	2.6413639927	0.1766811832	0.0536432892	1.0947653336	0.1294351077	5.4898834469

Asteroid	Mass ($M_\odot$)	a (AU)	e (rad)	i (rad)	w (rad)	Ω (rad)	M (rad)
72	2.2522E-13	2.2662988712	0.1203876215	0.0945521258	1.7908047526	3.6327263011	0.923868128
224	3.29613E-13	2.6446432871	0.0458875049	0.101895143	4.957798075	6.1613810608	3.5833105846
369	3.0135E-13	2.6486388006	0.0975196009	0.2217969357	4.7052005752	1.6473823702	5.5608322776
50	3.50832E-13	2.6493144028	0.2863471528	0.0494794953	3.4900108428	3.0331338748	2.3841920153
476	5.61473E-13	2.6501517984	0.0739232015	0.1909858003	0.0310605922	5.0006347816	2.1232154759
713	4.1443E-13	3.3967311351	0.1662702465	0.1808133338	2.3648005563	3.8012474883	4.3951676746
85	1.3082E-12	2.6526313507	0.1928029196	0.2088595717	2.134552363	3.550690268	3.5101949699
26	6.10712E-13	2.6558223182	0.0869404035	0.0621734626	3.3690758912	0.8008309024	1.5207382803
455	2.12143E-13	2.6555464259	0.2941272968	0.2098505725	4.7533638041	1.3371872389	1.2206557754
144	1.00487E-12	2.6541807575	0.2354712268	0.0839213605	5.1255927207	1.3349647274	6.0869313217
488	1.19334E-12	3.1579883106	0.1693693212	0.2007053949	1.2025787048	1.4832530101	4.3645927629
466	5.43915E-13	3.3589592094	0.0825113059	0.3344439652	4.2904047379	5.0823592419	5.4097174135
511	1.93E-11	3.1656237238	0.1856218608	0.2781875406	5.909111354	1.8792324723	3.6336932748
240	3.95634E-13	2.6638478697	0.2067819995	0.0367311788	5.2455315341	2.0110416697	4.7712693406
1036	2.25548E-14	2.6658631706	0.5343771379	0.4656883499	2.3117704643	3.7633284468	4.5378087734
141	7.93522E-13	2.6655988589	0.2146879576	0.2073902031	1.0062554255	5.5637342568	2.5647146997
97	7.92831E-13	2.6680473699	0.2569823706	0.2056675305	4.6897846977	2.7886982498	5.247867334
326	2.83724E-13	2.3172254656	0.1904845839	0.4140742007	4.1618797993	0.5643335832	0.652201312
77	4.63316E-13	2.667875849	0.1326541229	0.0424648169	1.0738073056	0.0232546298	4.7643372839
694	2.63887E-13	2.6695166337	0.3247222731	0.276508227	1.9364775954	4.0217524046	0.9937832785
145	1.21783E-12	2.6747139922	0.1439292481	0.2204616978	0.7872840357	1.3518888939	1.5659424256
75	2.40573E-13	2.6733687645	0.3047632648	0.0873108929	5.9260186097	6.2741838068	5.4618074735
225	6.17021E-13	3.3860567376	0.267161997	0.3647917261	1.823196056	3.4417543378	4.7926538615
201	4.46268E-13	2.6791417703	0.179284488	0.1004850508	3.1622164815	2.7422723602	5.2147101922
324	5.1E-12	2.6826889697	0.338296193	0.1938545774	0.7686394769	5.7256060632	1.546099224
34	5.1629E-13	2.6848833029	0.1088428027	0.0960567162	5.7616116077	3.2207097427	2.2251563747
98	4.0195E-13	2.6841527723	0.1897556575	0.2725253723	2.7678075446	6.1808037889	2.1979139188
31	2.7E-11	3.1501294732	0.2260241033	0.4593202453	1.0823964564	0.5452556737	5.5345003806
175	3.62559E-13	3.1853858518	0.2323001184	0.0561783163	5.6074529861	0.3736578781	1.5895712535
109	2.52373E-13	2.6954474299	0.2974237609	0.1376400441	0.9882414427	0.0559378659	4.5156455254
58	2.87677E-13	2.6996240532	0.0430354574	0.0882789575	0.5999427425	2.8151503217	5.2862006558
103	5.39126E-13	2.7020823977	0.0793849256	0.0946208016	3.3178376356	2.3785788407	0.0468981766
59	1.57877E-12	2.715015478	0.1174213622	0.15079533	3.6720086734	2.9723876584	3.0663494861
54	1.60623E-12	2.711804564	0.1963101513	0.2060296844	6.0308853911	5.470856425	0.5591110487
146	8.14969E-13	2.7183562585	0.0649788122	0.2281946097	2.5005920604	1.4692531231	1.4106168547
45	2.86E-12	2.7199458693	0.0820948399	0.1153657888	1.4860788515	2.5820157345	1.0754005613
209	1.44317E-12	3.1464478407	0.0632103226	0.1251704806	4.3658077256	0.0140649734	6.1851890054
410	6.64589E-13	2.728208405	0.2365241872	0.1906334736	3.0014517936	1.6966824172	0.1709601174
160	1.89128E-13	2.7273000333	0.0672124026	0.0667433521	0.8706655995	0.1544892175	0.5337923551
140	4.66805E-13	2.7331238946	0.2161552903	0.0556240933	3.4424227284	1.8726738895	1.4864177854
156	6.24734E-13	2.7329606049	0.2222554835	0.1701285361	5.896973467	4.2269147842	2.5729402699
110	8.90176E-13	2.7348095746	0.0786748754	0.1042598327	4.9128553683	0.9947699167	4.1186440166
187	7.97526E-13	2.7316835299	0.2368134241	0.184983002	3.4051264661	0.382275797	1.8195282291
18	1.51E-12	2.2953676812	0.2186417803	0.1767241236	3.9796181121	2.6273895531	5.9290420843

Asteroid	Mass ($M_\odot$)	a (AU)	e (rad)	i (rad)	w (rad)	Ω (rad)	M (rad)
387	7.21662E-13	2.7394603304	0.2368852269	0.3164623388	2.7519185413	2.2396167642	2.2974719502
200	7.45995E-13	2.7365312752	0.1337440117	0.1204624355	1.5022707033	5.6670732866	4.4824241809
185	1.37839E-12	2.7407761269	0.1269250132	0.4052737336	3.9067351861	2.6876362536	3.7640786244
57	1.01439E-12	3.1498926525	0.1183779612	0.2652968287	3.7168721139	3.4792019572	0.1830931224
247	8.5691E-13	2.7403986604	0.2444220025	0.4361962698	0.9611308245	0.0041265754	5.6743651094
372	2.36706E-12	3.1450897257	0.2626923863	0.416458942	2.0253088357	5.7153802767	5.5816159333
980	4.55068E-13	2.7426553372	0.2009154524	0.2771386468	1.2159583635	4.9917876724	3.6218123197
481	5.12072E-13	2.7394546063	0.1583357248	0.1720596415	6.0860955647	1.1698095008	0.5479686145
521	5.45612E-13	2.7442236429	0.2805246074	0.1846725859	5.5139627577	1.5659395374	3.4484184246
206	5.08958E-13	2.7398146022	0.0409063924	0.0659839898	5.2765033071	2.5356305917	4.1088890678
38	5.49584E-13	2.7413623239	0.1514358118	0.1213850287	2.9403197633	5.1650928144	0.6495342717
173	1.29079E-12	2.74211529	0.2083402155	0.2479488161	3.9802089326	2.589364239	1.1951891321
36	4.15491E-13	2.7470160833	0.3034962246	0.3217000155	0.8230310123	6.2566061261	5.8734180334
171	5.60464E-13	3.1356626212	0.1288804932	0.0444167835	1.0199509607	1.7552967282	0.8570922487
490	1.32757E-12	3.1691809794	0.0989052139	0.1616948025	3.4368950836	3.115591331	1.4086308048
381	6.18405E-13	3.2196946149	0.0955015178	0.2186097711	2.3978182856	2.1878302511	1.1287293756
128	2.34979E-12	2.7487770924	0.1274978182	0.1091566044	5.2784580146	1.3345187007	1.9325283254
93	9.88159E-13	2.7549092075	0.1412839747	0.1493403583	4.8118062434	0.0726125912	2.7228843148
71	4.12588E-13	2.7542898411	0.1762548169	0.4059242359	4.66828348	5.5172244834	5.3000504993
356	7.9862E-13	2.7554701817	0.2397745388	0.1436628902	1.3762330317	6.1935449115	4.9756738105
127	6.61688E-13	2.7561769148	0.0641782368	0.1438989521	1.5962327875	0.5489631552	5.7026056513
41	1.85821E-12	2.7655979154	0.271819224	0.2751694708	0.8061241788	3.1096627239	3.1032520122
143	2.56543E-13	2.7620841286	0.0704143928	0.2002045244	4.3775452497	5.816213986	2.2053840056
94	3.03395E-12	3.1620132419	0.086353939	0.1390482066	1.0391944139	0.0480546069	3.1906222623
39	2.8E-12	2.7683316711	0.1140678587	0.1812290874	3.6582527879	2.7432230678	6.0839421176
88	9.1E-12	2.7681450763	0.1645188062	0.0910704008	0.6390983593	4.8304744771	1.6715110326
433	3.362E-15	1.4580781661	0.2227726997	0.1890023663	3.118143082	5.3126062433	3.941814154
8	3.4E-12	2.2022703787	0.15603284	0.1027332279	4.9776958995	1.9372116192	3.1205645841
532	8.68E-12	2.7718247138	0.1787044349	0.2846423804	1.3422965541	1.8781860778	0.5770349307
92	2.81881E-12	3.190620656	0.1003731934	0.1731521663	4.2286134271	1.7773170737	1.0636548544
275	5.36464E-13	2.7733499693	0.1611790128	0.0832526352	0.6520059785	2.3437717888	3.6176800278
65	6.9E-12	3.4340273263	0.1048109923	0.0619239795	1.8438832302	2.719397499	4.0029517181
444	3.6E-12	2.7723523761	0.1729086211	0.1794050224	2.7063971606	3.4181087248	4.7869096728
393	3.20836E-13	2.7792505309	0.3313019161	0.2595501109	1.5891855264	3.7091662454	1.3692690194
147	8.28544E-13	3.1346880447	0.0340099143	0.0337719809	1.8692931222	4.3411917041	2.2241133599
205	1.87041E-13	2.7765433813	0.0363267185	0.1866575625	2.9862860992	3.7012883782	1.9202042516
28	1.25599E-12	2.7785458101	0.1484025056	0.1640744157	5.9783222719	2.522099651	5.7124981384
139	1.35463E-12	2.7831860951	0.1722835878	0.1903094002	2.9021320002	0.0352404917	5.7047083237
68	1.30875E-12	2.7822007831	0.1852318732	0.1391312507	5.3300096722	0.7711257256	5.5062845893
322	4.95968E-13	2.7858667709	0.2441763107	0.1403998339	2.0085229841	4.4058953499	4.3747362294
416	4.43759E-13	2.7917994458	0.2183815065	0.2244890502	3.4699841644	1.0159319554	3.1131747254
216	3.43791E-12	2.7944162957	0.251445841	0.229280155	3.1280965973	3.764035722	2.3425539055
354	2.65539E-12	2.7998862708	0.1129399842	0.3208179452	0.1238422	2.4522222599	0.6405070291
346	8.59012E-13	2.7949546076	0.1026261983	0.1529030202	5.0611086069	1.6086472321	1.8275651071

Asteroid	Mass ($M_\odot$)	a (AU)	e (rad)	i (rad)	w (rad)	Ω (rad)	M (rad)
236	4.55227E-13	2.8025438761	0.1882483784	0.1342374709	3.0350513009	3.2494579231	3.682973786
365	4.19161E-13	2.8055226203	0.1547867505	0.2233953715	3.7559623059	3.2376211166	2.6489480634
266	4.57933E-13	2.8039239994	0.1572478261	0.2337040469	2.6405707764	4.1190231774	5.7468530487
804	2.06E-12	2.8379302158	0.140648854	0.2683846721	5.9771990911	6.0718200658	3.6962580113
385	5.45E-13	2.8470408908	0.1267148352	0.2367646793	3.2828503834	6.0255738835	1.7856026446
81	5.95612E-13	2.8528071563	0.2111596445	0.1363843884	0.8744211702	0.0262892059	1.450939456
909	5.56869E-13	3.5395419117	0.0999577935	0.3273090069	4.1189672336	2.5592731649	2.1864800298
129	2.72488E-12	2.8671447905	0.2128557382	0.2132642009	1.8871269832	2.3813639627	0.7787713075
508	1.01746E-12	3.1600205908	0.0140982713	0.2332384836	3.1229931448	0.7768486332	1.5796272819
195	2.22096E-13	2.8789190541	0.0399418237	0.1217444988	2.1442903971	0.1263070854	1.0017547292
47	1.09E-12	2.8780452794	0.1351251942	0.0869906119	5.4912714871	0.0567115354	2.7791383275
104	6.67337E-13	3.1593651279	0.1509447545	0.0487844592	0.5372725576	0.7313303677	2.5987989447
426	7.24242E-13	2.8879155629	0.1048054129	0.3409699858	3.8226743328	5.4406526243	3.5464837026
471	1.71738E-12	2.8863905903	0.2335648627	0.2615292868	5.4892308488	1.4677561243	6.2406852744
431	3.02712E-13	3.139782391	0.1732290146	0.0318812984	3.7169149557	2.0475158733	4.8201716287
386	1.58481E-12	2.8949557342	0.1729619097	0.3534969606	3.8430527216	2.9138087358	0.3604822061
238	1.15488E-12	2.9067351011	0.0885825559	0.2165564025	3.6131146819	3.2148740788	2.3307042821
338	3.50681E-13	2.9114926148	0.0201244846	0.1053935485	2.164880523	5.0202266753	4.3699306204
22	4.07E-12	2.9090426772	0.102811852	0.2392896272	6.2161296951	1.1560735801	5.5563676199
24	4.0E-12	3.1302677956	0.13232188	0.0132642307	1.8846114478	0.6283064441	3.7877421965
674	6.55713E-13	2.9283206575	0.1913614354	0.2357697473	0.7410149819	1.0164396113	1.9634019287
702	3.04E-12	3.19593197	0.0234686569	0.3593079842	6.1467450272	5.062013645	5.2182899029
40	8.859E-13	2.2670717103	0.0469489298	0.0742723676	4.6933425025	1.6459003448	2.7097261278
705	8.52901E-13	2.9240461475	0.0522013562	0.4365160619	1.7001525262	0.0529764313	5.5571181241
776	1.21855E-12	2.9378053743	0.1604437249	0.3181133235	5.344625299	1.3943520096	3.5966984195
375	3.55474E-12	3.1236533702	0.1075023325	0.278061963	6.0150529765	5.8760891208	2.6581213232
69	3.6769E-12	2.982601269	0.1660954119	0.149838538	5.0638811077	3.2317606574	1.6428665686
150	1.21783E-12	2.9792803369	0.130514499	0.0382918649	2.6517151396	3.6039256528	2.1904777355
117	1.16002E-12	2.9905923333	0.0282649938	0.2605779956	1.0955544343	6.0911438038	5.2046964413
35	3.86678E-13	2.9912608714	0.228726047	0.1385372345	3.7358218535	6.1756112927	0.267377454
747	1.78549E-12	2.9931066531	0.3442522774	0.317245862	4.8092813792	2.2725459016	0.9204037188
772	5.74557E-13	3.0032288129	0.0921501601	0.5023452851	2.4787427022	1.1178331868	2.8441344469
360	5.4717E-13	2.9989218029	0.1818376854	0.2044087558	5.0367726902	2.3154330052	6.0090177935
388	5.24932E-13	3.0060335303	0.0586673834	0.112727728	5.8120883015	6.1894143019	0.1288890453
250	7.07636E-13	3.1549962779	0.1257095752	0.2240720863	1.3207059025	0.4205889512	1.7941473571
176	6.25509E-13	3.1911917748	0.1642381552	0.3942530799	3.2526947758	3.5037786563	3.9215690631
162	6.91714E-13	3.0259654921	0.1729660581	0.1061972746	1.9603461907	0.636262334	5.3423348977
350	5.84725E-13	3.1115837796	0.1559071309	0.4345605261	5.9166124172	1.5742124849	3.6534377938
506	4.19398E-13	3.0395735954	0.1469767088	0.2966481154	2.5741908262	5.4632491299	3.2342933551
211	1.03558E-12	3.0402652585	0.1622939044	0.0677567366	3.0514569986	4.6035466969	4.670175666
514	4.22136E-13	3.0457757621	0.0463730129	0.0678130632	1.9621787594	4.6946933303	1.0129138258
241	1.69956E-12	3.0510387193	0.0960795574	0.0962012947	1.3697835538	4.7223439493	5.1114498649
740	2.64934E-13	3.0479524738	0.1154946841	0.1891510037	0.858050943	2.0284915036	2.5266084037
96	1.73023E-12	3.0582852265	0.131911946	0.2781315802	3.6107101525	5.6166949975	5.1469464642

Asteroid	Mass ($M_\odot$)	a (AU)	e (rad)	i (rad)	w (rad)	Ω (rad)	M (rad)
663	3.62128E-13	3.0610177952	0.1536777095	0.3115608454	5.4192287122	4.0671819116	2.6834321272
451	4.01571E-12	3.0606647863	0.0772157404	0.2656532762	5.9455272891	1.5603563625	5.0875046087
895	1.00785E-12	3.2016077529	0.1476821028	0.4548466742	3.1331619144	4.6216372533	5.2597799659
423	3.2096E-12	3.0661408509	0.0409753887	0.1961723828	3.6169961145	1.2140604632	4.3375876605
95	8.88069E-13	3.0669942777	0.148815574	0.2268687662	2.7067063656	4.2437750662	4.6629883161
49	1.54E-12	3.0845947872	0.2336509168	0.0555105443	1.9226770185	4.9950771595	1.5352141964
602	6.84314E-13	3.0924623392	0.2439156722	0.2630768816	0.7982970525	5.7885821622	4.5719490519
52	1.32E-11	3.1021001233	0.1021607584	0.1302826585	5.9994564316	2.2508367039	1.4658774722
159	6.88272E-13	3.1004115723	0.1111091399	0.1069535588	5.8570146114	2.344597303	4.2135201875
357	4.21301E-13	3.1558679719	0.0723169844	0.2630076611	4.3450154117	2.4091590502	3.416997742
545	4.86331E-13	3.2011790659	0.1686294015	0.1941674332	5.6875418801	5.8342864247	0.224624883
469	6.984E-13	3.168118967	0.1682643502	0.2042335797	3.5958165072	5.8359276303	3.6640141767
373	3.09838E-13	3.112391441	0.1468736525	0.2696506982	6.0710981354	0.0708051131	2.8248178982
48	1.3E-11	3.1095541759	0.0748547679	0.1143984306	4.4990586758	3.2071553689	4.8435533292
137	1.08472E-12	3.1159610677	0.2203371723	0.2343662884	1.8676704928	3.5335579942	4.4759055616
86	6.18097E-13	3.1201715833	0.2064758327	0.0840423099	5.3646935594	1.5093591962	3.6149007786
121	2.705E-12	3.4517797101	0.1410345132	0.132390138	5.1609954354	1.279311798	3.4712283288
196	1.80126E-12	3.1171015337	0.0236867816	0.1266562501	3.4977331476	1.2665269776	5.3332469859
62	3.06165E-13	3.1203873067	0.1789024883	0.038807581	4.7679982934	2.1948640093	1.8099241346
90	4.173E-13	3.1563603592	0.1560491118	0.0387420384	4.2322816457	1.2258143568	0.3323600271
791	3.91309E-13	3.1151073211	0.1996724974	0.2859847444	3.5271571337	2.2710180178	3.0973545051
120	1.86141E-12	3.115011693	0.0595715166	0.1214012791	4.0447114583	5.9604899255	1.607351597
683	1.94344E-13	3.1161442901	0.0496820793	0.3233917395	4.9563149273	4.5356211776	5.4693021766
212	8.89637E-13	3.1119719963	0.1125595173	0.0744479424	1.737697701	5.4748931773	1.1186025008
283	6.938E-13	3.0424016411	0.1527238026	0.139487028	0.9416763896	5.3146008279	2.3997467434
691	2.37765E-13	3.0184795596	0.1172557972	0.2269216832	5.2707237177	1.5407762639	3.3364341795
596	5.13566E-13	2.9258852711	0.1656879081	0.2560130497	3.0804906708	1.2345657667	4.680893611
709	3.17569E-13	2.9127422099	0.1156505206	0.2843099319	0.2917477154	5.6664425858	3.1383639464
191	3.63746E-13	2.8945553327	0.0888549441	0.2008681847	3.9951011857	2.7832496468	4.8657352264
74	5.90077E-13	2.7778348689	0.2397256771	0.0711256657	3.0463378684	3.4437763464	5.7167009966
203	5.54291E-13	2.7365539805	0.0606782437	0.0555805651	1.0408263677	6.074118019	5.1038651722
377	2.66248E-13	2.6913892788	0.0759317025	0.1166523392	3.4035682289	3.6705320845	2.4424753026
112	1.32647E-13	2.43475032	0.1281597527	0.0454728057	0.2903002959	5.6495705406	4.4808806565
165	1.31786E-12	3.1265653613	0.0826520175	0.1961187335	6.1230258366	5.2823000299	2.7937050158
363	1.34086E-13	2.7468173698	0.0731988311	0.1038657114	5.1395247139	1.1343431347	1.516739175
276	6.34231E-13	3.114004636	0.0725157238	0.3777776928	4.6827999892	3.687843346	4.1205722144
739	4.36734E-13	2.7368808303	0.1431632706	0.3614817297	0.7550371757	2.388555361	2.9106472138
1093	5.61041E-13	3.1310622334	0.2705060889	0.4400017075	4.3974132397	0.9721453443	2.4942240961
268	9.65621E-13	3.0946371152	0.1325387226	0.0425294486	1.2379367212	2.1114169543	5.7235195148
1021	3.46318E-13	2.7387174229	0.2861187579	0.276060044	4.9955391094	2.0209201586	2.2522852848
210	2.29484E-13	2.7212873963	0.1243107732	0.0918272311	0.2413518881	0.5734746465	0.6144279762
505	5.36464E-13	2.685277476	0.2453642618	0.1714535688	5.8651952633	1.5885388844	1.4635496146
99	1.31273E-13	2.6641739912	0.1967952865	0.2418757251	3.4204420039	0.7274912455	4.0225686684
690	8.68629E-13	3.1407212128	0.1850777527	0.1969195876	2.0183637623	4.4214817331	1.6759372931

Asteroid	Mass ($M_\odot$)	a (AU)	e (rad)	i (rad)	w (rad)	Ω (rad)	M (rad)
366	2.90644E-13	3.1437631043	0.0549710688	0.1842213891	5.6591713421	6.0562527576	5.860801761
814	4.6375E-13	3.150569598	0.3093292774	0.3810854897	5.1857965546	1.5508857386	0.8019965462
788	3.93126E-13	3.134612353	0.1244115379	0.2493410365	0.836740587	3.1073025768	3.701259071
303	3.45274E-13	3.1207626748	0.0688562287	0.120025975	1.1537856932	6.0064677943	0.5558539382
780	2.96731E-13	3.115382637	0.0945585904	0.3332184953	3.7825831538	2.5314229196	0.3119585806
259	2.00951E-12	3.1399518434	0.121684422	0.1887952048	2.9483010579	1.5209372126	3.1865515039
489	9.5551E-13	3.1529976671	0.0386690531	0.2265078138	0.2174051142	2.9179326743	5.7313952904
568	2.32196E-13	2.8860064231	0.1650383186	0.3206128629	3.0130268302	4.3632780437	2.0282297772
358	2.52457E-13	2.8823455001	0.1481083474	0.0619632342	4.3975024977	3.0104647311	2.244163672
424	2.33882E-13	2.7727533739	0.1100821096	0.1432670274	5.8133627328	1.7345541452	4.4115176021
412	2.65459E-13	2.7630949301	0.0405496856	0.240444868	1.6612892409	1.8600253499	4.4783803149
762	7.04E-13	3.1601174132	0.0967305476	0.227718956	3.2859073964	5.3412348007	0.6574444601
308	9.82283E-13	2.7494306922	0.0371847262	0.0761610736	1.9297675597	3.1751172246	5.7311468139
102	2.01688E-13	2.6649465234	0.2519053245	0.0903529297	2.5679054615	3.6815760327	4.1168973265
56	5.12208E-13	2.5951188448	0.2380570303	0.1408751695	1.8091281014	3.3769060803	3.3336827408
154	2.23084E-12	3.1906687454	0.0842292139	0.3670785527	2.6929186382	0.6451874163	3.3169776616
83	7.51642E-13	2.4318933541	0.0819488524	0.0866743953	2.9189438892	0.4852257088	0.9977795899
328	1.32E-12	3.1086156697	0.1128241884	0.2806282807	1.7632265458	6.154337714	0.0183483833
769	4.25365E-13	3.1745608748	0.1824220452	0.1284612141	4.4516328816	0.6743270636	2.478781994
181	8.46493E-13	3.1382499209	0.1980470514	0.3282469064	5.5349026225	2.5079385	1.2852324239
221	7.96482E-13	3.0117884458	0.1031718404	0.1900028352	3.4203020034	2.4775333009	1.087152711
491	3.24826E-13	3.1890683306	0.0898033595	0.3296037176	4.1370285304	3.0640772018	6.1063524763
349	1.94065E-12	2.9241478003	0.087661622	0.1441089966	6.065683834	0.5672250321	4.7397854481
148	3.29254E-13	2.7704866971	0.1871542107	0.4415164893	4.4014187697	2.5340948155	0.9441513196
704	1.96E-11	3.0610419484	0.1496490883	0.301805647	1.6721824065	4.8938395018	5.0840023016
595	4.57681E-13	3.2089661978	0.0559750933	0.3121609639	4.788500521	0.4232225672	1.1194085592
213	2.01761E-13	2.7540919346	0.1443386599	0.1187541922	2.8502562201	2.1325405	1.6220542805
419	7.57385E-13	2.5963405152	0.2524324887	0.0685014089	0.7779047428	4.0030075738	2.0203681192
335	2.49253E-13	2.4748419203	0.1739364239	0.0888778251	2.4362620319	2.5924720994	1.875849948
114	3.48938E-13	2.6779063342	0.1371445084	0.0861549107	6.165297663	2.8689777124	0.9602371896
233	3.82977E-13	2.659982457	0.1004914405	0.1339629267	2.2046905958	3.8767379337	6.0809906993
498	7.90536E-13	2.6502786548	0.2250542083	0.1658678982	4.2110650797	1.701698888	0.4261630054
914	1.586E-13	2.4576510904	0.2132541188	0.4402345443	0.8506158582	4.4660114182	3.0264729841
44	2.50529E-13	2.4235811831	0.1486174638	0.0646234381	5.9770325568	2.2969991716	4.5926210113
790	1.74432E-12	3.4091380952	0.15070197	0.3586511968	0.7055726787	4.4012487644	3.6031710814
76	2.1852E-12	3.4166820452	0.163262273	0.036932762	4.4364500537	3.5698309727	4.3349049416
420	9.94059E-13	3.413014778	0.0429361983	0.1162443287	3.9195782099	4.2547822418	6.1737204914
106	1.11112E-12	3.1672480953	0.1743495898	0.0805661309	5.7511805275	1.0891125174	1.8322038222
130	3.32E-12	3.1222059717	0.2113415034	0.3989632528	4.0954527916	2.5441155748	2.923406691
13	7.5E-12	2.5763591665	0.0856189636	0.2887599911	1.4188020064	0.7555648209	2.0378328118
87	7.43E-12	3.4899809011	0.0797043537	0.1894855796	4.6421416546	1.2798325081	1.3927676028
51	1.14025E-12	2.3658726795	0.0665334279	0.1740381329	0.0465653118	3.074839404	3.9907697087
773	3.10907E-13	2.8573602666	0.08158227	0.2911135893	5.8346529236	5.6281940214	2.7420815186
336	1.17394E-13	2.2519798668	0.0952795712	0.0985416028	0.543684589	4.1048147278	5.0317723699

B The Error Model Correlation Coefficients

Table 16: Error Model Extract: Correlation Coefficients

	Right Ascension Correlation Model Coefficients							Declination Correlation Model Coefficients						
obs	A	B	C	D	E	F	G	A	B	C	D	E	F	G
106	0.030	40.000	0.0040	1.0E-4	0.0050	-9.000	0.600	0.044	0.140	0.000	0.000	0.000	0.000	0.000
291	0.160	40.000	0.020	0.0040	0.030	-18.000	2.000	0.075	8.000	0.025	0.030	0.000	0.000	0.000
568	0.085	2.000	0.000	0.000	0.010	1100.000	9.000	0.050	9.000	0.020	1.000	0.0010	-80.000	2.000
608	0.4356	2.000	0.000	0.000	0.000	0.000	0.000	0.623	0.800	0.040	0.050	0.000	0.000	0.000
644	0.0491	2.500	0.013	0.0010	0.000	0.000	0.000	0.016	0.010	0.000	0.000	0.100	-160.000	6.500
673	0.020	0.015	0.010	1.0E-4	0.0060	7.000	1.500	0.036	1.000	0.0060	1.0E-4	0.000	0.000	0.000
683	0.24624	10.000	0.000	0.000	0.000	0.000	0.000	0.52253	2.000	0.000	0.000	0.000	0.000	0.000
689	0.16957	4.000	0.017	4.0E-5	0.000	0.000	0.000	0.19769	2.500	0.0080	1.0E-4	0.000	0.000	0.000
691	0.280	5.500	0.000	0.000	-0.150	2.100	2.600	0.100	4.300	0.025	0.070	0.000	0.000	0.000
699	0.1165	0.900	0.000	0.000	0.000	0.000	0.000	0.0626	0.700	0.015	0.0050	0.000	0.000	0.000
703	0.118	30.000	0.000	0.000	0.010	-100.000	3.300	0.13439	37.03188	0.000	0.000	0.03157	-20.03404	2.87423
704	0.237	10.000	0.000	0.000	-0.050	6.000	2.300	0.262	7.000	0.000	0.000	-0.050	6.000	1.600
E12	0.029	10.000	0.0050	0.0010	0.0050	-50.000	2.000	0.040	10.000	0.010	0.010	0.030	-60.000	3.400
G96	0.031	2.000	0.0050	0.0010	0.000	0.000	0.000	0.0412	2.500	0.012	0.0010	0.000	0.000	0.000
J75	0.02686	1.900	0.0060	5.0E-4	0.000	0.000	0.000	0.025	1.300	0.0070	0.0010	0.000	0.000	0.000
MIX	0.120	0.280	0.040	4.0E-4	0.010	585.000	5.000	0.100	0.800	0.080	0.040	0.0010	6500.000	5.000

C Extract from the Observational Error Model

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Table 17: Error Model Extract: Bin RMS Error, Bias, and Kurtosis

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
10	2447795	2450345	17	18	TFFFFFFFF	FT	1.241	1.348	0.033	-0.145	2.35	2.238
10	2447795	2450345	16	17	TFFFFFFFF	FT	1.218	1.307	-0.042	-0.019	2.48	2.36
10	2447855	2450345	18	19	TFFFFFFFF	FT	1.223	1.362	0.096	-0.107	2.47	2.232
10	2448965	2449745	15	20	TFFFFFFFF	TF	1.125	1.155	-0.025	-0.075	2.334	2.613
10	2443745	2449025	16	18	TFFFFFFFF	FT	1.114	1.087	0.046	-0.221	2.688	3.012
12	2424785	2446775	13	14	TFFFFFFFF	FT	2.208	2.066	0.277	0.212	6.317	9.098
12	2424755	2448665	14	15	TFFFFFFFF	FT	2.201	1.854	0.442	0.282	4.899	5.342
12	2450435	2452385	18	19	FFTFFFFFF	FT	0.568	0.484	-0.102	0.038	4.902	6.349
12	2452535	2455085	18	19	FFTFFFFFF	FT	0.46	0.419	0.051	-0.029	4.87	5.534
12	2450435	2452385	19	20	FFTFFFFFF	FT	0.634	0.561	-0.061	0.057	4.115	4.965
12	2452535	2453525	19	20	FFTFFFFFF	FT	0.628	0.544	0.012	-0.047	3.892	4.497
12	2450675	2455085	20	21	FFTFFFFFF	FT	0.732	0.669	0.021	0.04	3.56	3.721
12	2453615	2455085	19	20	FFTFFFFFF	FT	0.672	0.551	0.094	0.001	3.678	3.815
12	2450435	2454965	17	18	FFTFFFFFF	FT	0.403	0.393	-0.001	-0.016	7.424	10.605
13	2428925	2439635	9	10	TFFFFFFFF	FT	0.466	0.447	-0.057	-0.141	4.318	4.27
13	2428925	2439635	10	11	TFFFFFFFF	FT	0.509	0.479	-0.019	-0.191	12.343	3.618
20	2438975	2443505	10	11	TFFFFFFFF	FT	0.855	0.951	0.114	0.022	3.41	3.286
20	2410835	2443535	11	12	TFFFFFFFF	FT	1.28	1.48	0.163	0.049	11.817	11.876
20	2427845	2443535	13	14	TFFFFFFFF	FT	1.593	1.707	0.27	-0.154	5.578	4.417
20	2426285	2443535	12	13	TFFFFFFFF	FT	1.395	1.476	0.266	-0.024	10.283	8.036
20	2427875	2443505	14	15	TFFFFFFFF	FT	1.657	1.762	0.128	-0.121	4.158	4.193
24	2412455	2438615	14	15	TFFFFFFFF	FT	2.342	1.875	0.301	-0.261	2.637	4.21
24	2412155	2437955	12	13	TFFFFFFFF	FT	2.218	1.798	0.055	-0.155	2.929	4.114
24	2412155	2438075	13	14	TFFFFFFFF	FT	2.303	1.812	0.103	-0.272	2.762	3.415

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
24	2414975	2438615	15	16	TFFFFFFFF	FT	2.302	1.834	0.478	-0.214	2.875	3.566
33	2437235	2448725	16	17	TFFFFFFFF	FT	0.851	0.732	-0.062	-0.134	3.74	3.617
33	2448455	2450075	17	18	TFFFFFFFF	FT	0.674	0.602	-0.187	-0.062	3.491	4.682
33	2448455	2450075	15	17	TFFFFFFFF	FT	0.685	0.567	-0.179	-0.075	3.84	4.64
33	2447735	2448725	17	18	TFFFFFFFF	FT	0.844	0.77	-0.082	-0.087	3.054	3.413
33	2437235	2448725	18	19	TFFFFFFFF	FT	0.818	0.767	-0.031	-0.118	3.263	3.601
33	2437235	2447645	17	18	TFFFFFFFF	FT	0.844	0.739	0.026	-0.181	3.458	3.59
33	2437235	2448725	14	16	TFFFFFFFF	FT	0.792	0.722	-0.085	-0.125	3.974	3.544
46	2441165	2448695	12	16	TFFFFFFFF	FT	1.242	1.388	-0.127	-0.782	6.128	2.19
46	2440745	2448695	13	15	TFFFFFFFF	FT	1.164	1.337	-0.047	-0.794	2.734	2.233
46	2441525	2445845	16	17	TFFFFFFFF	FT	1.243	1.356	-0.181	-0.747	4.743	2.192
46	2450255	2454485	16	17	FFTFFFFFF	FT	0.384	0.419	-0.031	0.116	4.573	4.698
46	2449355	2450255	16	17	FFTFFFFFF	FT	0.482	0.495	-0.018	-0.061	4.626	4.187
46	2450495	2450795	18	19	FFTFFFFFF	FT	0.542	0.493	-0.08	0.028	3.842	3.843
46	2449025	2450045	17	18	FFTFFFFFF	FT	0.612	0.537	-0.083	-0.053	4.57	3.634
46	2450045	2450525	17	18	FFTFFFFFF	FT	0.476	0.473	-0.076	-0.054	4.174	5.82
46	2450105	2450495	18	19	FFTFFFFFF	FT	0.534	0.535	-0.085	-0.001	4.903	4.366
46	2450795	2451545	18	19	FFTFFFFFF	FT	0.477	0.482	-0.034	0.021	5.174	3.784
46	2449025	2450105	18	19	FFTFFFFFF	FT	0.669	0.584	-0.088	-0.007	4.561	3.998
46	2450525	2454755	17	18	FFTFFFFFF	FT	0.421	0.434	-0.03	0.103	4.263	3.982
46	2449385	2451755	19	20	FFTFFFFFF	FT	0.541	0.555	0	0.052	5.036	4.102
46	2446985	2448695	16	17	TFFFFFFFF	FT	1.281	1.405	-0.006	-0.677	2.282	2.093
46	2449385	2453075	15	16	FFTFFFFFF	FT	0.47	0.42	-0.1	0.06	5.188	3.697
46	2445905	2446925	16	17	TFFFFFFFF	FT	1.335	1.375	-0.155	-0.707	2.279	2.189
46	2451545	2454605	18	19	FFTFFFFFF	FT	0.439	0.449	0.054	0.139	4.591	4.566
46	2451755	2454485	19	20	FFTFFFFFF	FT	0.534	0.545	0.04	0.149	4.194	5.029

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
46	2449355	2453375	17	18	FFTFFFFFF	TF	0.402	0.4	-0.051	0.038	6.603	4.219
46	2449715	2454005	18	19	FFTFFFFFF	TF	0.399	0.468	-0.013	0.062	6.536	4.268
46	2449655	2454515	20	21	FFTFFFFFF	FT	0.557	0.563	0.027	0.126	4.914	3.613
49	2452475	2452775	18	19	FFTFFFFFF	FT	0.661	0.555	-0.205	-0.252	3.366	3.86
49	2452955	2453135	18	19	FFTFFFFFF	FT	0.673	0.628	-0.15	-0.299	3.489	3.587
49	2452115	2452415	18	19	FFTFFFFFF	FT	0.598	0.498	-0.083	-0.214	3.586	4.084
49	2452475	2452775	17	18	FFTFFFFFF	FT	0.656	0.504	-0.249	-0.206	3.967	4.417
49	2452115	2452415	17	18	FFTFFFFFF	FT	0.535	0.444	-0.095	-0.168	4.281	5.104
49	2451095	2453765	16	17	FFTFFFFFF	FT	0.698	0.528	0.003	-0.17	3.898	4.912
49	2451785	2452055	18	19	FFTFFFFFF	FT	1.199	0.926	0.725	-0.311	1.911	2.981
49	2452835	2452955	18	19	FFTFFFFFF	FT	0.652	0.471	-0.238	-0.183	3.624	4.307
49	2453195	2453765	18	19	FFTFFFFFF	FT	0.614	0.566	-0.114	-0.252	3.511	4.355
49	2448995	2453495	15	16	FFTFFFFFF	FT	0.712	0.52	-0.051	-0.139	3.316	4.006
49	2452835	2453105	17	18	FFTFFFFFF	FT	0.684	0.497	-0.252	-0.2	3.384	4.436
49	2452475	2452775	19	20	FFTFFFFFF	FT	0.695	0.596	-0.198	-0.23	3.389	3.473
49	2453105	2453765	17	18	FFTFFFFFF	FT	0.552	0.498	-0.165	-0.189	4.05	4.829
49	2452835	2453765	19	20	FFTFFFFFF	FT	0.678	0.615	-0.2	-0.296	3.325	3.509
49	2451095	2451785	18	19	FFTFFFFFF	FT	1.003	0.817	0.64	-0.359	2.042	2.861
49	2448995	2452055	17	18	FFTFFFFFF	FT	1.105	0.749	0.648	-0.291	2.246	2.879
49	2451485	2452415	19	20	FFTFFFFFF	FT	0.921	0.782	0.286	-0.292	2.723	3.848
62	2427845	2435795	15	16	TFFFFFFFF	FT	1.879	1.647	-0.396	0.188	3.462	5.249
62	2428055	2435945	14	15	TFFFFFFFF	FT	2.064	1.797	-0.587	0.259	5.457	7.599
71	2445575	2449295	14	16	TFFFFFFFF	FT	1.18	1.15	-0.275	0.124	2.637	2.618
73	2435105	2448815	9	10	TFFFFFFFF	FT	0.671	0.592	0.007	-0.068	5.639	5.791
73	2435195	2447795	10	11	TFFFFFFFF	FT	0.74	0.603	-0.122	0.017	4.245	5.99
84	2452175	2454605	10	11	FFTFFFFFF	FT	0.158	0.155	-0.043	0.011	5.875	8.782

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
84	2451545	2454605	11	12	FFTFFFFFF	FT	0.17	0.177	-0.048	0.044	7.511	9.96
84	2452295	2454605	18	19	FFTFFFFFF	FT	0.315	0.348	0.003	-0.004	3.741	3.773
84	2451545	2454605	16	17	FFTFFFFFF	FT	0.242	0.267	-0.023	-0.023	5.018	4.186
84	2451905	2454605	14	16	FFTFFFFFF	FT	0.225	0.244	-0.034	-0.028	5.246	5.415
84	2451905	2454605	17	18	FFTFFFFFF	FT	0.291	0.306	-0.014	-0.016	3.927	6.202
84	2452325	2454605	19	20	FFTFFFFFF	FT	0.343	0.379	0.013	-0.014	4.713	3.286
95	2444825	2445605	15	16	TFFFFFFFF	FT	1.293	1.227	-0.074	0.142	2.297	2.485
95	2441915	2444705	13	14	TFFFFFFFF	FT	1.246	1.165	-0.091	0.076	2.45	2.585
95	2438285	2448245	10	13	TFFFFFFFF	FT	1.247	1.217	-0.081	-0.034	2.409	2.502
95	2445755	2448245	14	15	TFFFFFFFF	FT	1.194	1.333	-0.114	-0.125	2.378	2.288
95	2445755	2447435	15	16	TFFFFFFFF	FT	1.233	1.329	-0.064	-0.167	2.381	2.282
95	2447015	2448245	16	17	TFFFFFFFF	FT	1.27	1.384	-0.221	-0.226	2.356	2.165
95	2443565	2443925	16	17	TFFFFFFFF	FT	1.316	1.127	-0.558	0.205	2.203	2.589
95	2441915	2445605	14	15	TFFFFFFFF	FT	1.288	1.19	-0.125	0.097	2.29	2.571
95	2438315	2441795	13	14	TFFFFFFFF	FT	1.279	1.293	0.296	-0.182	2.337	2.43
95	2443565	2444705	15	16	TFFFFFFFF	FT	1.282	1.188	-0.392	0.04	2.268	2.608
95	2447765	2448245	15	16	TFFFFFFFF	FT	1.27	1.427	-0.21	-0.238	2.31	2.129
95	2441915	2443505	15	16	TFFFFFFFF	FT	1.269	1.218	-0.01	0.015	2.362	2.533
95	2438615	2441795	15	16	TFFFFFFFF	FT	1.266	1.342	0.187	-0.251	2.358	2.285
95	2444825	2448245	13	14	TFFFFFFFF	FT	1.257	1.29	-0.037	-0.005	2.383	2.23
95	2444825	2445605	16	17	TFFFFFFFF	FT	1.294	1.259	0.035	0.095	2.25	2.356
95	2439035	2443475	16	17	TFFFFFFFF	FT	1.254	1.261	0.048	-0.104	2.248	2.409
95	2438315	2441795	14	15	TFFFFFFFF	FT	1.289	1.303	0.193	-0.185	2.339	2.417
95	2443955	2444705	16	17	TFFFFFFFF	FT	1.327	1.257	-0.096	-0.163	2.22	2.31
95	2448455	2451065	10	15	TFFFFFFFF	FT	1.131	1.23	-0.167	0.019	2.64	2.562
95	2448275	2451065	15	16	TFFFFFFFF	FT	1.212	1.294	-0.185	0.071	2.369	2.408

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
95	2445755	2446775	16	17	TFFFFFFFF	FT	1.295	1.309	-0.022	-0.127	2.34	2.268
97	2450645	2454695	18	20	FFTFFFFFF	FT	0.672	0.523	0.152	0.034	4.556	5.483
98	2449235	2451125	17	18	TFFFFFFFF	FT	1.089	1.072	-0.42	-0.414	2.743	2.733
98	2449235	2451125	14	17	TFFFFFFFF	FT	0.969	1.054	-0.364	-0.308	2.947	2.761
104	2449325	2452475	17	18	FFTFFFFFF	FT	0.699	0.691	0.02	0.1	4.185	3.886
104	2452925	2454905	17	18	FFTFFFFFF	FT	0.304	0.319	0.025	0.013	9.146	10.553
104	2452925	2454245	18	19	FFTFFFFFF	FT	0.358	0.369	-0.006	0.011	6.535	7.533
104	2449325	2451785	18	19	FFTFFFFFF	FT	0.799	0.726	0.064	0.064	3.783	3.688
104	2454275	2454605	18	19	FFTFFFFFF	FT	0.385	0.387	0.025	-0.029	4.413	5.633
104	2452955	2454245	19	20	FFTFFFFFF	FT	0.499	0.489	0.03	-0.003	4.566	4.659
104	2451875	2452475	18	19	FFTFFFFFF	FT	0.69	0.626	0.04	0.198	4.14	4.074
104	2454635	2454905	18	19	FFTFFFFFF	FT	0.445	0.443	0.047	0.009	5.028	6.039
104	2454275	2454605	19	20	FFTFFFFFF	FT	0.5	0.495	0.063	-0.044	3.987	4.129
104	2454635	2454905	19	20	FFTFFFFFF	FT	0.533	0.536	0.039	0.01	4.233	4.353
104	2449235	2454905	16	17	FFTFFFFFF	FT	0.607	0.55	0.044	0.099	5.939	6.391
104	2449325	2452475	19	20	FFTFFFFFF	FT	0.773	0.777	0.138	0.097	3.777	3.466
104	2449355	2454905	20	21	FFTFFFFFF	FT	0.686	0.701	0.074	0.023	3.871	3.846
106	2455055	2455085	17	18	FFTFFFFFF	FT	0.27	0.293	0.066	0.01	3.682	6.148
106	2454875	2455025	16	17	FFTFFFFFF	FT	0.221	0.245	0.005	-0.054	5.606	6.572
106	2453225	2453405	17	18	FFTFFFFFF	FT	0.314	0.319	-0.002	-0.024	5.754	6.543
106	2455025	2455085	16	17	FFTFFFFFF	FT	0.223	0.245	0.041	0.051	4.957	5.339
106	2453015	2453165	18	19	FFTFFFFFF	FT	0.324	0.34	-0.032	-0.067	4.957	4.466
106	2454275	2454605	16	17	FFTFFFFFF	FT	0.275	0.267	0.053	-0.042	7.289	6.766
106	2453405	2453855	17	18	FFTFFFFFF	FT	0.269	0.306	-0.01	-0.012	5.832	5.678
106	2454905	2455025	17	18	FFTFFFFFF	FT	0.303	0.325	0.015	-0.045	4.497	4.705
106	2452925	2452985	17	18	FFTFFFFFF	FT	0.275	0.253	0.032	-0.037	8.627	5.281

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
106	2454185	2454245	17	18	FFTFFFFFF	FT	0.295	0.342	-0.007	-0.012	4.083	4.793
106	2454425	2454605	17	18	FFTFFFFFF	FT	0.383	0.372	0.047	-0.071	4.798	4.48
106	2454275	2454425	17	18	FFTFFFFFF	FT	0.327	0.375	0.034	-0.081	5.966	4.929
106	2451845	2452055	16	17	FFTFFFFFF	FT	0.458	0.48	0.186	0.3	4.083	3.455
106	2451845	2452175	17	18	FFTFFFFFF	FT	0.567	0.551	0.167	0.246	4.345	3.633
106	2454635	2454755	17	18	FFTFFFFFF	FT	0.311	0.328	0.023	-0.026	4.516	4.581
106	2454635	2454785	16	17	FFTFFFFFF	FT	0.241	0.24	0.03	-0.013	8.064	6.354
106	2453405	2453495	18	19	FFTFFFFFF	FT	0.327	0.378	-0.048	-0.034	4.538	4.652
106	2454785	2454845	16	17	FFTFFFFFF	FT	0.222	0.25	0.009	-0.037	6.912	8.139
106	2453915	2454845	15	16	FFTFFFFFF	FT	0.194	0.209	0.024	0.006	7.901	9.131
106	2451485	2451635	16	17	FFTFFFFFF	FT	0.464	0.461	0.026	0.184	5.916	4.387
106	2454875	2454905	17	18	FFTFFFFFF	FT	0.291	0.313	0.003	-0.072	5.242	5.475
106	2453225	2453855	16	17	FFTFFFFFF	FT	0.229	0.255	-0.021	0.003	9.492	10.792
106	2454755	2454785	17	18	FFTFFFFFF	FT	0.335	0.347	0.027	-0.067	4.645	4.868
106	2451035	2451545	15	16	FFTFFFFFF	FT	0.482	0.558	-0.079	0.299	5.202	3.399
106	2454785	2454815	17	18	FFTFFFFFF	FT	0.296	0.341	0.021	-0.05	4.772	4.746
106	2454905	2454935	18	19	FFTFFFFFF	FT	0.396	0.423	-0.004	-0.054	3.526	4.226
106	2454635	2454695	18	19	FFTFFFFFF	FT	0.419	0.418	0.03	-0.039	3.577	4.213
106	2451545	2451905	15	16	FFTFFFFFF	FT	0.382	0.449	-0.018	0.252	5.711	3.438
106	2452925	2453015	18	19	FFTFFFFFF	FT	0.345	0.324	0.03	-0.077	5.587	4.451
106	2455025	2455055	17	18	FFTFFFFFF	FT	0.351	0.361	0.061	0.013	4.332	4.328
106	2452535	2453165	16	17	FFTFFFFFF	FT	0.311	0.272	-0.007	0.007	12.646	15.605
106	2454815	2454845	17	18	FFTFFFFFF	FT	0.268	0.318	0.018	-0.066	3.925	5.013
106	2454995	2455085	18	19	FFTFFFFFF	FT	0.383	0.394	0.075	-0.007	3.761	4.164
106	2452535	2452895	17	18	FFTFFFFFF	FT	0.435	0.351	-0.066	0.028	6.048	10.942
106	2453915	2454095	17	18	FFTFFFFFF	FT	0.333	0.386	0.051	-0.032	4.418	4.966

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
106	2452895	2452925	17	18	FFTFFFFFF	FT	0.262	0.277	0.009	-0.014	8.631	10.025
106	2454065	2454245	16	17	FFTFFFFFF	FT	0.227	0.268	-0.012	-0.002	5.094	6.696
106	2454875	2454905	18	19	FFTFFFFFF	FT	0.38	0.41	0.022	-0.084	3.967	4.383
106	2452145	2452415	16	17	FFTFFFFFF	FT	0.382	0.353	-0.05	0.006	4.828	4.329
106	2454095	2454185	17	18	FFTFFFFFF	FT	0.314	0.382	-0.006	-0.025	4.942	4.33
106	2453885	2454005	18	19	FFTFFFFFF	FT	0.402	0.488	0.058	-0.127	3.582	3.692
106	2454875	2455085	15	16	FFTFFFFFF	FT	0.204	0.2	-0.009	-0.011	15.531	12.784
106	2452985	2453165	17	18	FFTFFFFFF	FT	0.269	0.251	-0.025	-0.042	6.442	4.296
106	2451635	2451845	16	17	FFTFFFFFF	FT	0.445	0.49	-0.045	0.238	5.929	3.337
106	2454725	2454785	18	19	FFTFFFFFF	FT	0.423	0.439	0.023	-0.08	3.731	4.109
106	2452835	2452895	18	19	FFTFFFFFF	FT	0.472	0.382	-0.05	-0.004	6.274	6.764
106	2453225	2453405	18	19	FFTFFFFFF	FT	0.41	0.409	-0.003	-0.038	4.931	4.303
106	2454695	2454725	18	19	FFTFFFFFF	FT	0.4	0.414	0.031	-0.072	3.992	3.226
106	2454275	2454395	18	19	FFTFFFFFF	FT	0.408	0.48	0.017	-0.071	3.554	3.839
106	2454785	2454815	18	19	FFTFFFFFF	FT	0.392	0.422	0.029	-0.074	3.828	3.9
106	2454395	2454425	18	19	FFTFFFFFF	FT	0.396	0.427	0	-0.104	4.338	4.276
106	2449655	2451485	16	17	FFTFFFFFF	FT	0.623	0.647	-0.118	0.311	5.469	3.591
106	2450705	2453495	19	20	FFTFFFFFF	FT	0.512	0.468	-0.033	-0.012	5.064	4.878
106	2454155	2454245	18	19	FFTFFFFFF	FT	0.434	0.49	-0.01	-0.013	3.645	3.655
106	2454815	2454845	18	19	FFTFFFFFF	FT	0.382	0.435	0.002	-0.099	3.863	3.992
106	2454035	2454155	18	19	FFTFFFFFF	FT	0.433	0.501	0.012	-0.047	4.035	3.445
106	2452265	2452415	17	18	FFTFFFFFF	FT	0.447	0.417	-0.034	-0.038	4.185	4.181
106	2452535	2453855	15	16	FFTFFFFFF	FT	0.231	0.219	-0.003	0.032	15.553	10.521
106	2454935	2454995	18	19	FFTFFFFFF	FT	0.386	0.403	0.039	-0.056	3.925	4.386
106	2452895	2452925	18	19	FFTFFFFFF	FT	0.338	0.324	-0.014	-0.044	6.604	5.311
106	2453915	2454065	16	17	FFTFFFFFF	FT	0.24	0.308	0.04	-0.005	6.434	7.327

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
106	2451065	2455085	13	14	FFTFFFFFF	FT	0.274	0.321	0.033	0.109	11.59	9.446
106	2454635	2454845	19	20	FFTFFFFFF	FT	0.494	0.522	0.012	-0.092	3.289	3.503
106	2454425	2454515	18	19	FFTFFFFFF	FT	0.43	0.488	-0.008	-0.094	4.082	3.96
106	2454515	2454605	18	19	FFTFFFFFF	FT	0.519	0.484	0.177	-0.088	3.27	3.641
106	2451905	2452415	15	16	FFTFFFFFF	FT	0.393	0.396	0.134	0.202	5.791	3.604
106	2451065	2453645	14	15	FFTFFFFFF	FT	0.33	0.415	0.015	0.192	6.153	5.358
106	2454005	2454035	18	19	FFTFFFFFF	FT	0.444	0.519	0.036	-0.021	3.923	4.151
106	2453555	2453855	18	19	FFTFFFFFF	FT	0.356	0.414	0.016	-0.011	3.871	3.97
106	2453585	2454125	19	20	FFTFFFFFF	FT	0.529	0.573	0.04	-0.041	3.406	3.504
106	2454875	2455085	19	20	FFTFFFFFF	FT	0.49	0.508	0.061	-0.08	3.335	3.611
106	2451605	2451845	17	18	FFTFFFFFF	FT	0.562	0.578	-0.081	0.185	4.194	3.821
106	2452535	2452805	18	19	FFTFFFFFF	FT	0.514	0.496	-0.03	0.034	4.061	3.917
106	2453795	2455085	14	15	FFTFFFFFF	FT	0.162	0.165	0.004	0	6.842	10.132
106	2454275	2454605	19	20	FFTFFFFFF	FT	0.536	0.605	0.048	-0.084	3.538	3.358
106	2450645	2451605	17	18	FFTFFFFFF	FT	0.643	0.611	-0.022	0.165	4.086	4.524
106	2454125	2454245	19	20	FFTFFFFFF	FT	0.558	0.594	0.04	0.013	3.059	3.099
106	2450465	2455085	18	19	FFTFFFFFF	TF	0.37	0.409	-0.022	-0.052	5.014	4.159
106	2450675	2452415	18	19	FFTFFFFFF	FT	0.711	0.657	0.044	0.107	3.945	3.984
106	2451365	2455085	16	17	FFTFFFFFF	TF	0.332	0.353	0.001	0.023	5.817	6.025
106	2450465	2455085	17	18	FFTFFFFFF	TF	0.358	0.405	-0.011	-0.025	6.212	5.91
113	2449805	2455085	17	18	FFTFFFFFF	FT	0.701	0.536	-0.225	0.036	4.666	5.749
113	2449835	2452385	18	19	FFTFFFFFF	FT	0.754	0.613	-0.175	0.05	3.803	4.184
113	2452445	2455085	18	19	FFTFFFFFF	FT	0.419	0.387	0.022	0.006	5.778	6.246
113	2450735	2455085	19	20	FFTFFFFFF	FT	0.507	0.496	0.011	0.006	5.018	5.079
114	2454455	2455085	18	21	FFTFFFFFF	FT	0.448	0.426	0.047	-0.008	4.954	5.728
114	2454455	2455085	16	18	FFTFFFFFF	FT	0.314	0.305	0.005	-0.006	5.501	6.876

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
118	2449775	2451095	18	19	FFTFFFFFF	FT	0.554	0.563	0.01	-0.124	4.608	4.881
118	2451095	2455085	18	19	FFTFFFFFF	FT	0.479	0.463	0.061	0.029	5.05	4.719
118	2449745	2450975	19	20	FFTFFFFFF	FT	0.607	0.602	0.059	-0.1	4.223	4.224
118	2449745	2455085	17	21	FFTFFFFFF	FT	0.466	0.477	0.028	-0.003	5.625	5.285
118	2451005	2455085	19	20	FFTFFFFFF	FT	0.464	0.457	0.06	0.037	5.321	4.096
118	2449775	2455085	15	17	FFTFFFFFF	FT	0.367	0.377	0.005	0.014	8.219	6.662
120	2449985	2451395	16	17	FFTFFFFFF	FT	0.648	0.529	0.043	-0.011	4.651	5.173
120	2451425	2452295	16	17	FFTFFFFFF	FT	0.571	0.456	-0.052	0.016	4.568	4.219
120	2451125	2451395	17	18	FFTFFFFFF	FT	0.745	0.584	0.05	-0.061	4.035	4.19
120	2451455	2451575	17	18	FFTFFFFFF	FT	0.68	0.526	0.077	-0.029	3.915	4.058
120	2451575	2451695	17	18	FFTFFFFFF	FT	0.803	0.577	-0.144	-0.018	3.454	3.765
120	2449865	2451125	17	18	FFTFFFFFF	FT	0.738	0.624	0.119	0.004	3.765	3.789
120	2451515	2451695	18	19	FFTFFFFFF	FT	0.867	0.649	-0.016	-0.026	3.144	3.801
120	2451425	2451455	17	18	FFTFFFFFF	FT	0.774	0.588	0.009	-0.002	3.835	4.565
120	2451425	2451515	18	19	FFTFFFFFF	FT	0.844	0.64	0.16	-0.041	3.331	4
120	2449865	2451395	18	19	FFTFFFFFF	FT	0.834	0.676	0.057	-0.057	3.339	3.936
120	2451725	2452295	17	18	FFTFFFFFF	FT	0.734	0.592	0.055	-0.12	3.68	4.722
120	2451755	2452865	18	19	FFTFFFFFF	FT	0.914	0.669	0.12	-0.124	3.157	3.824
120	2449895	2452295	15	16	FFTFFFFFF	FT	0.566	0.43	-0.027	0.045	5.704	5.216
122	2450675	2454785	19	20	FFTFFFFFF	FT	0.363	0.34	0.075	0.009	7.523	6.348
127	2450375	2454995	16	17	FFTFFFFFF	FT	0.543	0.529	0.047	-0.032	7.264	6.619
127	2450585	2454935	17	18	FFTFFFFFF	FT	0.411	0.429	-0.011	0.02	8.445	6.156
130	2451515	2455055	18	19	FFTFFFFFF	FT	0.368	0.395	0.013	-0.042	4.962	5.897
143	2450795	2454725	17	18	FFTFFFFFF	FT	0.75	0.666	0.097	0.099	3.785	4.28
143	2451035	2454965	18	19	FFTFFFFFF	FT	0.8	0.694	0.004	0.073	3.898	4.398
151	2451005	2455085	18	19	FFTFFFFFF	FT	0.459	0.484	-0.072	0.056	6.49	6.713

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
151	2451005	2455085	17	18	FFTFFFFFF	FT	0.515	0.503	-0.047	0.069	7.179	6.185
151	2451155	2455085	19	20	FFTFFFFFF	FT	0.466	0.528	-0.029	0.055	6.951	5.925
152	2453645	2454965	18	19	FFTFFFFFF	FT	0.478	0.432	0.022	0.095	5.988	5.904
152	2453825	2454965	19	20	FFTFFFFFF	FT	0.601	0.563	0.048	0.124	3.873	4.053
152	2452115	2453495	18	19	FFTFFFFFF	FT	0.561	0.471	-0.035	0.036	5.101	5.378
152	2451695	2454995	17	18	FFTFFFFFF	FT	0.487	0.428	0.04	0.104	6.698	8.493
152	2453435	2453675	19	20	FFTFFFFFF	FT	0.554	0.515	0.027	0.104	4.583	4.348
152	2451695	2453315	19	20	FFTFFFFFF	FT	0.681	0.588	0.049	0.088	3.831	4.13
160	2453165	2455085	16	20	FFTFFFFFF	FT	0.287	0.296	0.018	-0.003	9.871	12.339
185	2453285	2453585	18	19	FFTFFFFFF	FT	0.538	0.506	0.115	0.044	3.74	3.86
185	2453315	2454275	17	18	FFTFFFFFF	FT	0.492	0.481	0.084	-0.009	4.222	4.444
185	2453975	2454485	18	19	FFTFFFFFF	FT	0.538	0.51	0.055	-0.046	4.034	4.083
185	2451875	2453285	18	19	FFTFFFFFF	FT	0.465	0.465	-0.031	-0.003	4.551	4.836
185	2453585	2453945	18	19	FFTFFFFFF	FT	0.539	0.503	0.059	-0.021	3.849	4.165
185	2454575	2455085	18	19	FFTFFFFFF	FT	0.397	0.403	-0.016	0.043	5.562	5.875
185	2453345	2453555	19	20	FFTFFFFFF	FT	0.619	0.542	0.149	0.05	3.589	3.661
185	2454305	2455085	17	18	FFTFFFFFF	FT	0.387	0.37	0.036	0.034	5.055	6.544
185	2451785	2453345	19	20	FFTFFFFFF	FT	0.577	0.582	0.034	0.037	3.896	4.028
185	2454575	2455085	19	20	FFTFFFFFF	FT	0.479	0.516	0.04	0.074	3.844	4.72
185	2453555	2454485	19	20	FFTFFFFFF	FT	0.619	0.583	0.086	0	3.191	3.705
185	2451755	2453315	17	18	FFTFFFFFF	FT	0.38	0.396	-0.031	0.01	6.166	6.363
185	2451755	2455085	15	17	FFTFFFFFF	FT	0.393	0.384	0.035	0.019	5.411	6.205
198	2452055	2455085	19	20	FFTFFFFFF	FT	0.33	0.357	0.015	0.046	6.357	7.926
198	2452055	2455085	16	18	FFTFFFFFF	FT	0.232	0.287	0.02	0.034	10.188	8.69
198	2452085	2455085	18	19	FFTFFFFFF	FT	0.284	0.289	0.038	0.02	8.012	6.475
198	2452295	2455085	20	21	FFTFFFFFF	FT	0.315	0.369	0.026	0.104	5.311	5.199

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
201	2451935	2453795	18	20	FFTFFFFFFF	FT	0.384	0.381	0.02	-0.032	6.186	5.92
204	2451995	2455085	17	20	FFTFFFFFFF	FT	0.346	0.322	0.023	0.022	8.078	5.964
209	2452295	2452715	18	19	FFTFFFFFFF	FT	0.596	0.451	0.007	0.128	4.806	3.728
209	2451875	2452715	16	18	FFTFFFFFFF	FT	0.535	0.404	0.034	0.194	4.756	3.396
209	2452295	2452715	19	20	FFTFFFFFFF	FT	0.603	0.505	0.057	0.115	4.221	4.14
209	2451875	2452295	18	19	FFTFFFFFFF	FT	0.568	0.435	0	0.175	5.043	4.138
209	2451935	2452295	19	20	FFTFFFFFFF	FT	0.65	0.5	-0.004	0.202	4.11	3.649
209	2451935	2452715	13	22	FFTFFFFFFF	FT	0.758	0.591	0.019	0.089	3.932	4.313
224	2452055	2454545	15	17	FFTFFFFFFF	FT	0.477	0.465	0.027	0.04	4.96	5.093
224	2452055	2454545	17	18	FFTFFFFFFF	FT	0.565	0.501	0.026	0.024	4.166	4.237
224	2452055	2454605	18	19	FFTFFFFFFF	FT	0.577	0.49	0.085	0.049	4.16	3.996
240	2452205	2454995	19	20	FFTFFFFFFF	FT	0.382	0.35	0.009	0.003	7.742	6.466
240	2452295	2454935	18	19	FFTFFFFFFF	FT	0.328	0.338	0.001	-0.006	7.353	7.582
244	2444465	2455025	12	13	FTFFFFFFFF	FT	0.171	0.08	-0.022	0.011	34.076	4.46
244	2447345	2454995	14	15	FTFFFFFFFF	FT	0.15	0.083	-0.011	-0.02	28.839	9.958
244	2446625	2455025	13	14	FTFFFFFFFF	FT	0.099	0.071	-0.014	0.001	6.787	3.962
246	2453735	2454335	18	19	FFTFFFFFFF	FT	0.396	0.366	0.079	0.038	4.325	4.198
246	2453195	2453495	18	19	FFTFFFFFFF	FT	0.346	0.345	0.021	0.053	4.57	5.11
246	2452295	2453495	17	18	FFTFFFFFFF	FT	0.299	0.285	0.002	0.056	5.868	5.422
246	2452325	2452835	19	20	FFTFFFFFFF	FT	0.468	0.428	0.073	0.024	4.901	4.682
246	2452325	2454725	16	17	FFTFFFFFFF	FT	0.269	0.246	0.017	0.023	7.337	6.569
246	2452805	2453165	18	19	FFTFFFFFFF	FT	0.33	0.32	-0.014	0.048	5.068	5.565
246	2452325	2452805	18	19	FFTFFFFFFF	FT	0.4	0.342	0.031	0.036	5.736	4.303
246	2453735	2454275	19	20	FFTFFFFFFF	FT	0.511	0.468	0.169	0.058	3.401	3.704
246	2453735	2454725	17	18	FFTFFFFFFF	FT	0.299	0.285	0.074	0.009	4.851	4.677
246	2453195	2453495	19	20	FFTFFFFFFF	FT	0.465	0.459	0.069	0.037	3.909	4.428

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
246	2452835	2453165	19	20	FFTFFFFFF	FT	0.45	0.39	0.035	0.032	3.991	4.289
246	2454305	2454725	19	20	FFTFFFFFF	FT	0.43	0.42	0.077	-0.038	3.779	3.701
246	2454365	2454725	18	19	FFTFFFFFF	FT	0.338	0.318	0.094	-0.062	4.892	5.369
246	2452325	2454545	20	21	FFTFFFFFF	FT	0.503	0.551	0.076	0.026	3.721	3.471
248	2447855	2449055	11	13	FFFFFFFFF	FT	0.173	0.122	-0.081	-0.011	4.994	10.548
248	2447855	2449055	9	11	FFFFFFFFF	FT	0.232	0.147	-0.085	-0.015	6.354	12.968
260	2442215	2445545	17	18	TFFFFFFFF	FT	0.679	0.596	-0.087	0.015	3.602	3.515
260	2442215	2447615	16	17	TFFFFFFFF	FT	0.592	0.553	-0.116	0.085	3.51	3.495
260	2447705	2450795	16	17	TFFFFFFFF	FT	0.543	0.501	-0.073	0.14	4.186	4.982
260	2448005	2450675	17	18	TFFFFFFFF	FT	0.693	0.567	-0.071	0.101	3.866	4.6
260	2442215	2451425	18	20	TFFFFFFFF	FT	0.861	0.722	-0.047	-0.018	3.221	3.795
260	2445575	2447855	17	18	TFFFFFFFF	FT	0.71	0.607	-0.063	0.106	3.849	3.3
261	2445545	2448605	17	18	TFFFFFFFF	FT	0.661	0.559	-0.014	0.053	3.903	4.118
261	2448635	2451335	17	18	TFFFFFFFF	FT	0.665	0.568	0.021	0.077	4.38	4.096
261	2445545	2451275	16	17	TFFFFFFFF	FT	0.553	0.481	0.013	0.117	4.31	3.968
261	2433215	2435975	17	20	TFFFFFFFF	FT	0.774	0.657	-0.064	-0.072	3.841	3.402
261	2433215	2435975	16	17	TFFFFFFFF	FT	0.713	0.594	-0.068	-0.043	3.146	4.521
261	2448635	2451275	18	19	TFFFFFFFF	FT	0.807	0.665	0.036	0.041	3.231	3.524
261	2445545	2448605	18	19	TFFFFFFFF	FT	0.818	0.634	0.005	0.019	3.381	4.27
291	2452595	2452715	17	18	FFTFFFFFF	FT	0.498	0.267	-0.196	0.01	3.583	7.524
291	2452955	2452985	20	21	FFTFFFFFF	FT	0.455	0.339	-0.125	0.036	3.976	7.696
291	2452655	2452715	18	19	FFTFFFFFF	FT	0.457	0.266	-0.21	0.036	4.486	6.649
291	2452235	2452535	17	18	FFTFFFFFF	FT	0.439	0.335	-0.159	-0.026	4.361	7.848
291	2452325	2452385	18	19	FFTFFFFFF	FT	0.426	0.308	-0.183	0.003	3.951	6.429
291	2452355	2452385	19	20	FFTFFFFFF	FT	0.396	0.304	-0.137	0.037	4.089	7.135
291	2452535	2452595	17	18	FFTFFFFFF	FT	0.364	0.297	0.001	-0.023	4.85	7.293

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
291	2452925	2452955	11	19	FFTFFFFFF	FT	0.349	0.254	-0.04	-0.071	5.274	4.427
291	2452835	2453015	17	18	FFTFFFFFF	FT	0.487	0.299	-0.152	-0.024	4.327	7.471
291	2452955	2452985	18	19	FFTFFFFFF	FT	0.449	0.289	-0.063	-0.031	4.351	5.786
291	2453015	2453405	17	18	FFTFFFFFF	FT	0.414	0.25	-0.133	0.024	3.87	10.595
291	2452235	2452325	18	19	FFTFFFFFF	FT	0.505	0.367	-0.143	-0.027	3.769	7.041
291	2452715	2452805	17	18	FFTFFFFFF	FT	0.415	0.261	-0.183	0.036	3.779	8.255
291	2452415	2452475	20	21	FFTFFFFFF	FT	0.362	0.341	-0.06	0.083	4.087	4.812
291	2452415	2452475	19	20	FFTFFFFFF	FT	0.39	0.325	-0.109	0.031	5.185	7.628
291	2453675	2453735	19	20	FFTFFFFFF	FT	0.395	0.244	-0.047	0.063	4.077	4.589
291	2452325	2452355	19	20	FFTFFFFFF	FT	0.384	0.317	-0.148	0.03	4.723	6.737
291	2454695	2454905	17	18	FFTFFFFFF	FT	0.36	0.236	-0.19	0.03	4.647	13.353
291	2452175	2452235	18	19	FFTFFFFFF	FT	0.627	0.352	0.056	-0.055	3.949	6.104
291	2451965	2452565	16	17	FFTFFFFFF	FT	0.458	0.363	-0.063	0.007	4.642	9.083
291	2453945	2454335	17	18	FFTFFFFFF	FT	0.397	0.206	-0.158	0.032	3.974	7.265
291	2453945	2454125	18	19	FFTFFFFFF	FT	0.351	0.221	-0.081	0.031	4.048	9.723
291	2453495	2453915	17	18	FFTFFFFFF	FT	0.342	0.25	-0.082	0.011	4.221	11.162
291	2454755	2454845	18	19	FFTFFFFFF	FT	0.362	0.217	-0.181	0.003	4.279	9.084
291	2453495	2453795	18	19	FFTFFFFFF	FT	0.366	0.243	-0.081	0.009	3.878	8.712
291	2454125	2454635	16	17	FFTFFFFFF	FT	0.442	0.232	-0.292	0.06	3.059	11.487
291	2452385	2452535	18	19	FFTFFFFFF	FT	0.386	0.32	-0.127	-0.025	5.071	6.151
291	2452955	2452985	19	20	FFTFFFFFF	FT	0.46	0.315	-0.074	-0.01	4.01	5.8
291	2452565	2452805	16	17	FFTFFFFFF	FT	0.457	0.271	-0.173	0.008	3.988	8.678
291	2453945	2454035	19	20	FFTFFFFFF	FT	0.293	0.228	-0.005	0.024	4.767	6.208
291	2454335	2454485	17	18	FFTFFFFFF	FT	0.484	0.215	-0.297	0.037	3.067	8.079
291	2451965	2452235	17	18	FFTFFFFFF	FT	0.627	0.408	0.019	-0.01	3.978	7.223
291	2454125	2454215	18	19	FFTFFFFFF	FT	0.39	0.207	-0.25	0.071	3.272	7.923

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
291	2453015	2453195	18	19	FFTFFFFFFF	FT	0.437	0.281	-0.117	0.038	4.042	8.655
291	2454305	2454395	18	19	FFTFFFFFFF	FT	0.445	0.267	-0.249	0.013	2.873	7.936
291	2454485	2454635	17	18	FFTFFFFFFF	FT	0.363	0.222	-0.218	0.043	2.98	14.036
291	2454425	2454545	18	19	FFTFFFFFFF	FT	0.526	0.254	-0.369	0.086	2.547	8.117
291	2452985	2453015	18	19	FFTFFFFFFF	FT	0.648	0.327	-0.317	0.091	2.573	5.658
291	2452715	2452745	18	19	FFTFFFFFFF	FT	0.36	0.264	-0.182	0.05	3.293	5.437
291	2452265	2452295	19	20	FFTFFFFFFF	FT	0.476	0.338	-0.175	0.005	3.422	6.623
291	2452625	2452655	19	20	FFTFFFFFFF	FT	0.484	0.306	-0.232	0.048	3.283	5.53
291	2452595	2452655	20	21	FFTFFFFFFF	FT	0.451	0.319	-0.157	0.08	3.542	4.828
291	2452745	2452805	18	19	FFTFFFFFFF	FT	0.401	0.291	-0.155	0.022	4.611	8.84
291	2452745	2452775	19	20	FFTFFFFFFF	FT	0.39	0.306	-0.111	0.061	4.707	6.732
291	2454695	2455085	16	17	FFTFFFFFFF	FT	0.378	0.232	-0.214	0.036	3.716	11.69
291	2454455	2454485	19	20	FFTFFFFFFF	FT	0.477	0.267	-0.288	0.112	2.838	8.199
291	2454575	2454635	18	19	FFTFFFFFFF	FT	0.331	0.281	-0.12	0.062	4.662	10.094
291	2452655	2452685	19	20	FFTFFFFFFF	FT	0.428	0.274	-0.2	0.046	3.509	4.808
291	2454695	2454785	20	21	FFTFFFFFFF	FT	0.349	0.259	-0.168	0.101	3.381	5.525
291	2454905	2455085	17	18	FFTFFFFFFF	FT	0.389	0.246	-0.237	0.034	3.806	10.785
291	2454845	2454935	18	19	FFTFFFFFFF	FT	0.341	0.227	-0.167	0.04	3.529	8.645
291	2454215	2454305	18	19	FFTFFFFFFF	FT	0.433	0.236	-0.209	0.073	3.956	8.235
291	2452295	2452325	19	20	FFTFFFFFFF	FT	0.434	0.382	-0.146	-0.005	4.149	6.882
291	2452535	2452565	19	20	FFTFFFFFFF	FT	0.333	0.319	0.03	-0.056	4.605	6.357
291	2452535	2452565	20	21	FFTFFFFFFF	FT	0.349	0.309	0.031	0.001	4.583	5.656
291	2453105	2453195	19	20	FFTFFFFFFF	FT	0.448	0.314	-0.033	0.068	4.796	6.973
291	2454395	2454425	19	20	FFTFFFFFFF	FT	0.382	0.231	-0.167	0.05	3.822	6.604
291	2452925	2452955	19	20	FFTFFFFFFF	FT	0.368	0.282	-0.071	-0.047	4.161	6.633
291	2452925	2452955	20	21	FFTFFFFFFF	FT	0.399	0.307	-0.096	0.036	4.19	6.746

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
291	2452625	2452655	18	19	FFTFFFFFF	FT	0.527	0.295	-0.209	0.03	3.462	7.196
291	2452685	2452715	20	21	FFTFFFFFF	FT	0.4	0.307	-0.097	0.093	5.064	4.928
291	2452565	2452625	18	19	FFTFFFFFF	FT	0.469	0.303	-0.115	-0.043	4.395	7.766
291	2452835	2452925	18	19	FFTFFFFFF	FT	0.348	0.352	-0.07	-0.057	5.384	8.189
291	2454035	2454155	19	20	FFTFFFFFF	FT	0.398	0.253	-0.128	0.078	3.782	7.476
291	2454395	2454425	18	19	FFTFFFFFF	FT	0.375	0.212	-0.221	0.014	4.17	8.878
291	2453675	2453735	20	21	FFTFFFFFF	FT	0.426	0.298	-0.093	0.138	3.53	6.218
291	2454695	2454755	18	19	FFTFFFFFF	FT	0.305	0.208	-0.155	0.014	3.834	7.437
291	2452715	2452745	19	20	FFTFFFFFF	FT	0.352	0.292	-0.144	0.077	4.355	7.721
291	2454305	2454395	19	20	FFTFFFFFF	FT	0.445	0.255	-0.262	0.039	3.285	4.759
291	2452685	2452715	19	20	FFTFFFFFF	FT	0.422	0.278	-0.184	0.049	4.261	6.225
291	2454935	2455085	18	19	FFTFFFFFF	FT	0.346	0.25	-0.134	0.037	3.584	10.744
291	2454785	2454845	19	20	FFTFFFFFF	FT	0.36	0.23	-0.166	0.068	3.868	6.734
291	2452535	2452565	18	19	FFTFFFFFF	FT	0.344	0.326	0.009	-0.035	4.216	7.155
291	2452385	2452415	19	20	FFTFFFFFF	FT	0.402	0.337	-0.196	0.086	4.099	6.401
291	2453735	2453825	19	20	FFTFFFFFF	FT	0.336	0.265	-0.091	0.084	4.736	5.968
291	2452985	2453045	19	20	FFTFFFFFF	FT	0.624	0.323	-0.311	0.073	2.74	5.111
291	2452355	2452385	20	21	FFTFFFFFF	FT	0.366	0.302	-0.088	0.088	3.732	5.506
291	2453795	2453915	18	19	FFTFFFFFF	FT	0.329	0.269	-0.063	0.045	5.071	7.721
291	2453585	2453675	19	20	FFTFFFFFF	FT	0.346	0.238	0.007	-0.022	6.348	10.723
291	2454545	2454575	18	19	FFTFFFFFF	FT	0.306	0.247	-0.155	0.046	3.685	14.518
291	2452745	2452775	20	21	FFTFFFFFF	FT	0.345	0.299	-0.032	0.078	4.523	4.617
291	2452265	2452295	20	21	FFTFFFFFF	FT	0.423	0.322	-0.134	0.076	3.519	5.887
291	2454755	2454785	19	20	FFTFFFFFF	FT	0.365	0.245	-0.194	0.027	4.745	8.25
291	2454965	2455025	19	20	FFTFFFFFF	FT	0.336	0.275	-0.051	0.091	5.136	7.462
291	2452235	2452265	19	20	FFTFFFFFF	FT	0.56	0.442	-0.078	-0.005	3.715	8.074

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
291	2453105	2453195	20	21	FFTFFFFFF	FT	0.4	0.298	0.011	0.077	4.311	6.231
291	2453075	2453105	19	20	FFTFFFFFF	FT	0.402	0.257	-0.06	0.043	4.488	6.147
291	2453255	2453405	18	19	FFTFFFFFF	FT	0.396	0.245	-0.071	0.005	4.17	11.01
291	2452325	2452475	21	22	FFTFFFFFF	FT	0.358	0.33	-0.015	0.111	4.659	4.578
291	2452565	2452595	19	20	FFTFFFFFF	FT	0.399	0.288	-0.064	-0.039	5.619	7.909
291	2453045	2453075	19	20	FFTFFFFFF	FT	0.45	0.257	-0.174	0.025	4.203	7.632
291	2452565	2452595	20	21	FFTFFFFFF	FT	0.388	0.267	-0.085	0.023	5.378	4.712
291	2452475	2452535	19	20	FFTFFFFFF	FT	0.354	0.287	-0.075	-0.087	5.797	7.849
291	2452385	2452415	20	21	FFTFFFFFF	FT	0.339	0.332	-0.085	0.085	5.329	5.909
291	2452715	2452745	20	21	FFTFFFFFF	FT	0.329	0.305	-0.077	0.107	5.621	5.603
291	2452715	2452745	21	22	FFTFFFFFF	FT	0.33	0.362	-0.015	0.133	4.903	4.391
291	2452835	2452925	20	21	FFTFFFFFF	FT	0.371	0.307	-0.053	0.026	6.557	5.416
291	2452655	2452685	20	21	FFTFFFFFF	FT	0.403	0.297	-0.123	0.098	4.048	5.725
291	2454785	2454845	20	21	FFTFFFFFF	FT	0.371	0.297	-0.163	0.162	3.731	5.667
291	2454185	2454305	19	20	FFTFFFFFF	FT	0.398	0.29	-0.165	0.1	4.169	7.484
291	2452205	2452235	19	20	FFTFFFFFF	FT	0.578	0.362	0.014	-0.054	4.205	6.765
291	2452205	2452235	20	21	FFTFFFFFF	FT	0.508	0.339	-0.039	-0.041	4.543	7.853
291	2454875	2454905	20	21	FFTFFFFFF	FT	0.3	0.254	-0.027	0.122	5.437	3.325
291	2452835	2452925	19	20	FFTFFFFFF	FT	0.375	0.337	-0.072	-0.003	5.975	7.744
291	2454425	2454455	19	26	FFTFFFFFF	FT	0.716	0.328	-0.593	0.203	1.698	3.956
291	2453015	2453075	20	21	FFTFFFFFF	FT	0.439	0.289	-0.109	0.079	3.772	5.905
291	2451965	2453405	15	16	FFTFFFFFF	FT	0.431	0.278	-0.125	0.009	5.021	5.846
291	2452775	2452805	19	20	FFTFFFFFF	FT	0.367	0.284	-0.104	0.034	4.714	8.851
291	2448935	2452175	18	19	FFTFFFFFF	FT	0.57	0.432	0.106	0.128	4.566	6.406
291	2454305	2454455	20	21	FFTFFFFFF	FT	0.538	0.318	-0.316	0.168	2.879	4.656
291	2452835	2453405	16	17	FFTFFFFFF	FT	0.409	0.268	-0.068	0.009	4.831	8.101

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
291	2452235	2452265	20	21	FFTFFFFFF	FT	0.559	0.413	-0.045	0.061	3.774	5.741
291	2454905	2454935	19	20	FFTFFFFFF	FT	0.308	0.24	-0.092	0.077	5.233	6.319
291	2454485	2454515	19	20	FFTFFFFFF	FT	0.416	0.258	-0.24	0.074	3.281	7.251
291	2455025	2455085	19	20	FFTFFFFFF	FT	0.418	0.277	-0.232	0.076	2.973	6.748
291	2454455	2454515	20	21	FFTFFFFFF	FT	0.474	0.292	-0.243	0.155	3.281	4.67
291	2452985	2453015	20	21	FFTFFFFFF	FT	0.599	0.321	-0.293	0.11	3.079	4.214
291	2454845	2454875	19	20	FFTFFFFFF	FT	0.369	0.253	-0.142	0.08	5.68	7.558
291	2451965	2452325	21	22	FFTFFFFFF	FT	0.495	0.407	0.033	0.136	4.5	5.629
291	2454875	2454905	19	20	FFTFFFFFF	FT	0.327	0.259	-0.087	0.066	3.924	10.719
291	2452325	2452355	20	21	FFTFFFFFF	FT	0.376	0.303	-0.099	0.085	4.341	4.783
291	2454515	2454545	20	21	FFTFFFFFF	FT	0.329	0.281	-0.094	0.119	5.155	4.832
291	2454575	2454635	19	20	FFTFFFFFF	FT	0.316	0.283	-0.071	0.093	4.936	8.125
291	2454935	2454965	19	20	FFTFFFFFF	FT	0.282	0.271	-0.017	0.046	6.179	9.596
291	2453495	2454125	16	17	FFTFFFFFF	FT	0.359	0.208	-0.08	0.022	5.152	7.382
291	2452175	2452205	19	20	FFTFFFFFF	FT	0.701	0.349	0.111	-0.032	3.259	5.091
291	2453945	2454125	20	21	FFTFFFFFF	FT	0.391	0.291	-0.102	0.119	4.164	5.652
291	2452295	2452325	20	21	FFTFFFFFF	FT	0.399	0.365	-0.052	0.057	4.301	6.049
291	2453075	2453105	20	21	FFTFFFFFF	FT	0.369	0.273	-0.016	0.085	5.181	8.053
291	2454545	2454575	19	20	FFTFFFFFF	FT	0.313	0.267	-0.111	0.074	5.048	9.471
291	2454545	2454635	20	21	FFTFFFFFF	FT	0.313	0.273	-0.052	0.112	4.729	6.507
291	2454185	2454305	20	21	FFTFFFFFF	FT	0.413	0.288	-0.146	0.113	3.756	4.247
291	2454155	2454185	19	20	FFTFFFFFF	FT	0.356	0.238	-0.148	0.093	3.107	7.497
291	2452595	2452625	19	20	FFTFFFFFF	FT	0.52	0.335	-0.154	0.003	3.447	4.682
291	2453585	2453675	20	21	FFTFFFFFF	FT	0.346	0.247	-0.013	0.052	5.57	7.801
291	2453735	2453825	20	21	FFTFFFFFF	FT	0.334	0.286	-0.032	0.115	4.781	4.325
291	2453825	2453915	19	20	FFTFFFFFF	FT	0.326	0.259	0.025	0.033	5.136	8.218

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
291	2454905	2454965	20	21	FFTFFFFFF	FT	0.318	0.279	0.007	0.091	6.911	6.456
291	2453825	2453915	20	21	FFTFFFFFF	FT	0.328	0.341	0.101	0.025	4.601	6.734
291	2452775	2452805	20	21	FFTFFFFFF	FT	0.372	0.322	0.008	0.085	4.614	9.236
291	2453255	2453315	19	20	FFTFFFFFF	FT	0.334	0.27	-0.029	0.032	4.57	11.736
291	2453255	2453315	20	21	FFTFFFFFF	FT	0.318	0.256	0.005	0.079	4.238	6.886
291	2451965	2452175	19	20	FFTFFFFFF	FT	0.602	0.412	0.127	0.131	4.756	5.902
291	2453495	2453585	19	20	FFTFFFFFF	FT	0.385	0.295	-0.065	-0.005	3.484	7.054
291	2453495	2453915	21	22	FFTFFFFFF	FT	0.42	0.33	-0.058	0.102	3.73	5.49
291	2454845	2454875	20	21	FFTFFFFFF	FT	0.3	0.262	-0.054	0.095	5.13	7.235
291	2454515	2454545	19	20	FFTFFFFFF	FT	0.35	0.242	-0.165	0.044	4.928	6.646
291	2452655	2452685	21	22	FFTFFFFFF	FT	0.414	0.351	-0.07	0.156	4.296	3.698
291	2453015	2453105	21	22	FFTFFFFFF	FT	0.404	0.292	-0.002	0.1	4.364	4.722
291	2454965	2455085	20	21	FFTFFFFFF	FT	0.415	0.296	-0.126	0.101	3.712	6.415
291	2454125	2454185	20	21	FFTFFFFFF	FT	0.36	0.285	-0.085	0.142	4.412	5.089
291	2452475	2452535	20	21	FFTFFFFFF	FT	0.322	0.265	-0.027	-0.028	4.321	6.076
291	2454695	2454755	19	20	FFTFFFFFF	FT	0.29	0.224	-0.113	0.041	4.438	10.753
291	2452835	2453015	21	22	FFTFFFFFF	FT	0.519	0.387	-0.156	0.119	3.792	5.214
291	2453495	2455085	15	16	FFTFFFFFF	FT	0.395	0.222	-0.195	0.047	3.995	13.442
291	2453495	2453585	20	21	FFTFFFFFF	FT	0.392	0.311	-0.048	0.016	3.926	5.149
291	2452595	2452655	21	22	FFTFFFFFF	FT	0.451	0.346	-0.094	0.118	4.127	4.007
291	2453105	2453405	21	22	FFTFFFFFF	FT	0.424	0.333	-0.004	0.081	3.641	5.507
291	2452475	2452595	21	22	FFTFFFFFF	FT	0.391	0.31	-0.037	0.064	4.214	4.154
291	2452175	2452205	20	21	FFTFFFFFF	FT	0.673	0.367	0.104	-0.001	3.459	5.753
291	2452745	2452805	21	22	FFTFFFFFF	FT	0.363	0.336	0.034	0.106	4.497	4.663
291	2454695	2455085	21	22	FFTFFFFFF	FT	0.383	0.316	-0.155	0.119	3.427	5.888
291	2453315	2453405	19	20	FFTFFFFFF	FT	0.428	0.274	-0.1	0.043	4.03	5.861

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
291	2453315	2453405	20	21	FFTFFFFFF	FT	0.439	0.3	-0.08	0.075	4.308	4.301
291	2452685	2452715	21	22	FFTFFFFFF	FT	0.407	0.34	-0.016	0.126	4.98	4.404
291	2453945	2454305	21	22	FFTFFFFFF	FT	0.448	0.337	-0.159	0.132	3.033	6.12
291	2454305	2454635	21	22	FFTFFFFFF	FT	0.565	0.365	-0.249	0.173	3.236	5.249
291	2451965	2452175	20	21	FFTFFFFFF	FT	0.636	0.42	0.22	0.196	3.928	4.811
291	2451965	2453405	22	23	FFTFFFFFF	FT	0.486	0.434	-0.033	0.143	3.772	5.121
291	2453255	2455085	19	20	FFTFFFFFF	TF	0.419	0.263	-0.191	0.014	3.612	12.41
291	2452205	2455085	17	19	FFTFFFFFF	TF	0.474	0.33	-0.23	-0.003	3.661	10.036
291	2452205	2453135	19	20	FFTFFFFFF	TF	0.475	0.327	-0.173	-0.006	4.042	7.127
291	2452205	2455085	20	22	FFTFFFFFF	TF	0.421	0.295	-0.092	0.056	4.667	6.07
291	2453495	2455085	22	23	FFTFFFFFF	FT	0.502	0.407	-0.158	0.109	3.146	4.737
300	2452475	2453135	15	16	FFTFFFFFF	FT	0.524	1.099	-0.172	0.756	5.037	2.314
300	2452475	2453555	16	17	FFTFFFFFF	FT	0.607	1.113	-0.136	0.688	4.662	2.709
300	2451575	2451965	16	17	FFTFFFFFF	FT	0.513	0.362	-0.112	0.115	5.89	6.412
300	2451635	2451875	17	18	FFTFFFFFF	FT	0.622	0.452	-0.141	0.091	5.177	4.866
300	2451575	2452385	15	16	FFTFFFFFF	FT	0.419	0.363	-0.066	0.088	7.946	6.64
300	2451575	2454335	13	14	FFTFFFFFF	FT	0.431	0.699	0.001	0.364	9.144	4.366
300	2451965	2452385	16	17	FFTFFFFFF	FT	0.459	0.427	-0.12	0.024	4.063	4.528
300	2453315	2454785	15	16	FFTFFFFFF	FT	0.578	0.802	0.048	0.405	5.546	4.447
300	2451575	2454125	14	15	FFTFFFFFF	FT	0.487	0.779	-0.022	0.428	6.976	4.031
300	2451875	2452085	17	18	FFTFFFFFF	FT	0.498	0.444	-0.007	0.074	4.39	4.815
300	2451695	2454995	18	19	FFTFFFFFF	FT	0.629	0.721	-0.013	0.194	4.579	5.126
300	2452085	2452385	17	18	FFTFFFFFF	FT	0.562	0.563	-0.088	-0.009	3.982	4.324
300	2452475	2453225	17	18	FFTFFFFFF	FT	0.672	1.174	-0.186	0.691	3.668	2.576
300	2453285	2454965	17	18	FFTFFFFFF	FT	0.583	0.828	0.034	0.377	5.482	4.815
300	2453585	2454935	16	17	FFTFFFFFF	FT	0.62	0.853	0.015	0.427	5.775	4.159

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
300	2451575	2454095	11	13	FFTFFFFFF	FT	0.377	0.638	0.048	0.259	5.851	5.127
300	2451725	2454995	19	20	FFTFFFFFF	FT	0.487	0.627	0.021	0.079	4.576	5.572
327	2450795	2451005	17	18	FFTFFFFFF	FT	0.439	0.469	-0.006	0.021	5.105	4.868
327	2450645	2451005	16	17	FFTFFFFFF	FT	0.431	0.452	-0.039	0.053	4.177	5.076
327	2449625	2450645	16	17	FFTFFFFFF	FT	0.553	0.511	0.007	-0.008	3.754	5.219
327	2450405	2450615	17	18	FFTFFFFFF	FT	0.603	0.485	-0.05	-0.013	3.176	4.087
327	2451005	2451335	16	17	FFTFFFFFF	FT	0.603	0.478	-0.057	0.036	6.254	6.33
327	2450615	2450795	17	18	FFTFFFFFF	FT	0.486	0.498	-0.045	0.004	3.576	5.162
327	2450705	2450855	18	19	FFTFFFFFF	FT	0.514	0.529	-0.046	0.002	4.143	4.758
327	2450855	2450975	18	19	FFTFFFFFF	FT	0.484	0.486	0.036	-0.035	4.43	5.018
327	2451005	2451335	17	18	FFTFFFFFF	FT	0.614	0.505	-0.087	0.016	4.716	4.497
327	2450255	2450495	18	19	FFTFFFFFF	FT	0.582	0.535	-0.063	0.042	3.544	4.249
327	2450255	2450405	17	18	FFTFFFFFF	FT	0.493	0.498	-0.018	0.071	3.527	3.783
327	2449595	2450255	17	18	FFTFFFFFF	FT	0.554	0.531	0.002	-0.027	4.467	3.758
327	2449895	2452265	15	16	FFTFFFFFF	FT	0.476	0.475	-0.033	0.054	4.737	4.694
327	2449595	2450255	18	19	FFTFFFFFF	FT	0.583	0.544	-0.013	0.003	4.108	3.942
327	2451095	2451365	18	19	FFTFFFFFF	FT	0.507	0.54	-0.033	-0.049	3.84	4.287
327	2449805	2452265	14	15	FFTFFFFFF	FT	0.483	0.462	-0.015	-0.011	4.708	4.573
327	2450645	2450975	19	20	FFTFFFFFF	FT	0.564	0.544	-0.028	0.004	4.428	4.611
327	2451005	2451095	18	19	FFTFFFFFF	FT	0.794	0.569	-0.117	0.167	3.668	4.166
327	2450495	2450705	18	19	FFTFFFFFF	FT	0.649	0.533	-0.085	-0.029	3.797	3.938
327	2449595	2450255	19	20	FFTFFFFFF	FT	0.639	0.599	-0.051	0.02	4.197	4.172
327	2450285	2450645	19	20	FFTFFFFFF	FT	0.59	0.561	-0.069	0.023	3.568	3.613
327	2451395	2452535	17	18	FFTFFFFFF	FT	0.488	0.519	-0.066	0.043	5.322	3.919
327	2451425	2452625	18	19	FFTFFFFFF	FT	0.571	0.536	-0.129	0.051	4.383	4.081
327	2451005	2452625	19	20	FFTFFFFFF	FT	0.647	0.579	-0.068	0.045	4.664	4.283

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
327	2451395	2452475	16	17	FFTFFFFFF	FT	0.435	0.467	-0.056	0.023	5.313	4.067
327	2449865	2451905	16	18	FFTFFFFFF	TF	0.527	0.51	-0.059	-0.08	4.994	4.273
330	2435045	2447495	14	15	TFFFFFFFF	FT	1.201	1.147	0.148	-0.06	23.776	3.865
330	2435045	2446055	15	16	TFFFFFFFF	FT	1.166	1.129	0.112	-0.036	2.546	3.688
333	2452565	2452775	16	17	FFTFFFFFF	FT	0.381	0.377	0.067	0.11	7.767	11.656
333	2452985	2454635	17	18	FFTFFFFFF	FT	0.651	0.447	0.154	0.203	6.696	6.263
333	2452745	2452805	17	18	FFTFFFFFF	FT	0.37	0.38	0.099	0.039	6.565	12.315
333	2452775	2452925	16	17	FFTFFFFFF	FT	0.392	0.379	-0.001	0.08	9.245	6.945
333	2452625	2452745	17	18	FFTFFFFFF	FT	0.388	0.4	0.067	0.148	6.846	6.765
333	2452985	2454635	16	17	FFTFFFFFF	FT	0.581	0.447	0.139	0.181	6.448	8.642
333	2452235	2452475	16	17	FFTFFFFFF	FT	0.493	0.48	0.156	-0.001	4.198	4.854
333	2452715	2452745	18	19	FFTFFFFFF	FT	0.43	0.431	0.113	0.133	5.222	7.266
333	2452115	2452235	16	17	FFTFFFFFF	FT	0.476	0.504	0.068	-0.123	3.89	3.417
333	2452805	2452925	17	18	FFTFFFFFF	FT	0.415	0.432	-0.094	0.118	9.379	11.042
333	2452985	2453075	18	19	FFTFFFFFF	FT	0.394	0.405	-0.04	0.178	10.462	6.943
333	2452565	2454635	15	16	FFTFFFFFF	FT	0.47	0.361	0.098	0.105	10.147	10.197
333	2453075	2453225	18	19	FFTFFFFFF	FT	0.723	0.615	0.42	0.242	4.263	6.223
333	2452985	2453075	19	20	FFTFFFFFF	FT	0.408	0.443	-0.048	0.207	6.005	5.919
333	2452655	2452715	18	19	FFTFFFFFF	FT	0.448	0.448	-0.058	0.159	5.113	5.796
333	2452355	2452475	17	18	FFTFFFFFF	FT	0.508	0.497	0.118	0.096	4.054	3.84
333	2452115	2454575	14	15	FFTFFFFFF	FT	0.456	0.438	0.145	0.06	8.672	8.776
333	2452385	2452475	19	20	FFTFFFFFF	FT	0.621	0.586	0.1	0.046	3.239	3.916
333	2452355	2452475	18	19	FFTFFFFFF	FT	0.557	0.511	0.086	0.083	3.496	4.078
333	2452115	2454485	13	14	FFTFFFFFF	FT	0.36	0.334	0.078	0.09	6.249	12.814
333	2452745	2452775	18	19	FFTFFFFFF	FT	0.42	0.365	0.144	0.068	6.727	4.861
333	2452745	2452835	19	20	FFTFFFFFF	FT	0.432	0.426	0.071	0.068	4.419	5.587

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
333	2452985	2453075	20	21	FFTFFFFFF	FT	0.47	0.516	-0.036	0.225	4.502	5.292
333	2452325	2452355	17	18	FFTFFFFFF	FT	0.597	0.554	0.192	0.105	4.53	4.29
333	2452205	2452265	17	18	FFTFFFFFF	FT	0.429	0.485	0.014	-0.103	3.485	3.343
333	2452205	2452265	18	19	FFTFFFFFF	FT	0.492	0.524	0.012	-0.144	3.591	3.8
333	2452325	2452355	18	19	FFTFFFFFF	FT	0.648	0.6	0.189	0.118	3.903	3.907
333	2452565	2452745	19	20	FFTFFFFFF	FT	0.505	0.457	-0.063	0.114	5.01	6.114
333	2452295	2452325	17	18	FFTFFFFFF	FT	0.616	0.589	0.225	-0.07	4.384	4.834
333	2452115	2452175	17	18	FFTFFFFFF	FT	0.554	0.58	0.133	-0.117	3.778	4.199
333	2452565	2452625	17	18	FFTFFFFFF	FT	0.438	0.389	-0.1	0.105	6.382	7.929
333	2452265	2452295	18	19	FFTFFFFFF	FT	0.62	0.55	0.182	-0.082	3.756	3.957
333	2452295	2452325	18	19	FFTFFFFFF	FT	0.66	0.647	0.237	-0.06	4.121	3.817
333	2452895	2452925	18	19	FFTFFFFFF	FT	0.469	0.416	-0.175	0.124	7.182	6.619
333	2452565	2452625	18	19	FFTFFFFFF	FT	0.535	0.42	-0.168	0.088	5.552	8.376
333	2452775	2452835	18	19	FFTFFFFFF	FT	0.368	0.392	0.006	0.069	4.88	5.278
333	2452295	2452325	19	20	FFTFFFFFF	FT	0.754	0.722	0.228	0.004	3.889	3.58
333	2453075	2453345	19	20	FFTFFFFFF	FT	0.566	0.588	0.105	0.238	6.291	6.23
333	2453075	2453195	20	21	FFTFFFFFF	FT	0.492	0.573	0.184	0.217	5.761	6.348
333	2452175	2452205	17	18	FFTFFFFFF	FT	0.501	0.545	0.052	-0.195	3.762	3.431
333	2452265	2452295	17	18	FFTFFFFFF	FT	0.608	0.514	0.189	-0.079	3.924	3.594
333	2452115	2452475	15	16	FFTFFFFFF	FT	0.472	0.495	0.071	-0.034	5.213	5.346
333	2452235	2452295	19	20	FFTFFFFFF	FT	0.685	0.614	0.174	-0.102	3.727	3.779
333	2452355	2452385	19	20	FFTFFFFFF	FT	0.649	0.592	0.159	0.133	3.859	3.981
333	2452175	2452205	18	19	FFTFFFFFF	FT	0.537	0.594	0.048	-0.203	3.455	3.369
333	2452325	2452355	19	20	FFTFFFFFF	FT	0.735	0.656	0.179	0.1	3.965	3.905
333	2452355	2452475	20	21	FFTFFFFFF	FT	0.778	0.682	0.124	0.077	3.007	3.96
333	2452565	2452835	20	21	FFTFFFFFF	FT	0.532	0.508	-0.118	0.174	4.103	4.672

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
333	2452115	2452175	18	19	FFTFFFFFF	FT	0.604	0.59	0.147	-0.091	3.972	4.222
333	2452175	2452205	19	20	FFTFFFFFF	FT	0.623	0.643	-0.016	-0.169	3.541	3.291
333	2452205	2452235	19	20	FFTFFFFFF	FT	0.558	0.579	-0.07	-0.111	3.292	3.798
333	2452895	2452955	19	20	FFTFFFFFF	FT	0.456	0.451	-0.161	0.14	6.871	6.676
333	2452325	2452355	20	21	FFTFFFFFF	FT	0.812	0.719	0.161	0.073	3.373	3.585
333	2452115	2454635	21	22	FFTFFFFFF	FT	0.627	0.654	0.064	0.171	4.6	5.369
333	2452235	2452325	20	21	FFTFFFFFF	FT	0.813	0.819	0.185	0.005	3.558	3.755
333	2452115	2452175	19	20	FFTFFFFFF	FT	0.664	0.641	0.149	-0.125	3.721	3.447
333	2452895	2452955	20	21	FFTFFFFFF	FT	0.445	0.478	-0.172	0.157	5.205	5.365
333	2453255	2454635	18	19	FFTFFFFFF	FT	1.002	0.524	0.219	0.241	3.683	5.095
333	2452115	2452235	20	21	FFTFFFFFF	FT	0.728	0.708	0.038	-0.145	3.63	4.076
333	2453255	2454635	20	21	FFTFFFFFF	FT	0.643	0.571	0.091	0.139	4.785	5.077
333	2453375	2454635	19	20	FFTFFFFFF	FT	0.971	0.558	0.254	0.208	3.877	4.54
333	2452175	2453345	17	20	FFTFFFFFF	TF	0.52	0.499	-0.081	0.034	4.702	6.332
360	2448905	2453465	17	18	FFTFFFFFF	FT	0.383	0.362	0.006	0.003	5.378	4.124
360	2449295	2453315	15	19	FFTFFFFFF	FT	0.394	0.444	0.01	0.02	4.411	4.601
360	2449355	2454065	19	21	FFTFFFFFF	FT	0.415	0.429	0.038	0.022	4.534	3.695
369	2449715	2451185	16	19	FFTFFFFFF	FT	0.631	0.705	-0.087	-0.108	4.635	3.748
372	2447555	2454335	16	17	TFFFFFFFF	FT	1.221	1.098	-0.465	0.105	2.452	2.762
379	2452265	2454875	17	18	FFTFFFFFF	FT	0.309	0.324	0.04	0.053	4.531	4.927
379	2452235	2454905	15	17	FFTFFFFFF	FT	0.253	0.297	0.03	0.067	5.713	8.133
379	2452265	2454875	18	20	FFTFFFFFF	FT	0.404	0.4	0.022	0.04	4.83	3.586
381	2442725	2443265	17	18	TFFFFFFFF	FT	0.916	0.834	0.022	-0.184	3.24	3.524
381	2444255	2450075	17	18	TFFFFFFFF	FT	0.961	0.889	-0.06	-0.067	2.934	3.135
381	2443055	2450075	18	19	TFFFFFFFF	FT	0.923	0.754	-0.052	-0.03	2.977	3.705
385	2448965	2451575	17	18	FFTFFFFFF	FT	0.62	0.634	-0.045	-0.085	4.314	4.337

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
385	2449025	2451545	16	17	FFTFFFFFF	FT	0.55	0.534	-0.044	-0.026	4.484	4.2
399	2446745	2448575	16	17	TFFFFFFFF	FT	1.275	1.178	0.014	-0.404	2.237	2.57
399	2447075	2449145	16	17	TFFFFFFFF	FT	1.324	1.025	-0.73	-0.018	2.161	2.756
399	2449265	2449865	16	17	TFFFFFFFF	FT	1.37	0.999	-0.853	0.13	2.15	2.761
399	2446715	2448575	14	16	TFFFFFFFF	FT	1.173	1.086	0.213	-0.326	2.605	2.662
399	2446895	2451185	15	16	TFFFFFFFF	FT	1.257	0.878	-0.826	-0.036	2.264	3.061
399	2449865	2451215	16	17	TFFFFFFFF	FT	1.347	0.996	-0.828	0.087	2.082	2.898
400	2447375	2450465	15	16	TFFFFFFFF	FT	1.09	1.008	0.064	-0.076	2.683	2.955
400	2447675	2450465	16	17	TFFFFFFFF	FT	1.186	1.08	-0.002	-0.125	2.499	2.804
400	2447075	2448575	15	17	TFFFFFFFF	FT	1.32	1.269	0.278	0.288	2.199	2.348
402	2449865	2452235	17	19	FFTFFFFFF	FT	0.493	0.516	0.003	-0.059	6.325	6.036
411	2449925	2450225	17	18	FFTFFFFFF	FT	0.689	0.705	-0.175	-0.112	3.063	3.429
411	2449955	2450225	16	17	FFTFFFFFF	FT	0.638	0.652	-0.153	-0.093	4.091	3.64
411	2448725	2449865	17	18	FFTFFFFFF	FT	0.695	0.757	-0.098	-0.064	3.637	3.401
411	2448575	2449865	16	17	FFTFFFFFF	FT	0.62	0.669	-0.093	-0.084	3.99	3.706
411	2450285	2450585	16	17	FFTFFFFFF	FT	0.538	0.588	-0.087	-0.112	3.559	4.372
411	2450345	2450585	17	18	FFTFFFFFF	FT	0.583	0.588	-0.102	-0.109	4.044	3.948
411	2450705	2450915	17	18	FFTFFFFFF	FT	0.597	0.609	-0.069	-0.153	3.766	4.462
411	2451035	2451335	17	18	FFTFFFFFF	FT	0.654	0.628	-0.096	-0.141	3.596	3.611
411	2451455	2453615	17	18	FFTFFFFFF	FT	0.767	0.805	-0.048	-0.252	3.341	3.187
411	2450705	2454815	16	17	FFTFFFFFF	FT	0.611	0.655	-0.095	-0.147	4.157	4.271
411	2449325	2453615	17	18	FFTFFFFFF	TF	0.662	0.695	-0.139	-0.196	4.005	3.925
411	2449295	2450915	18	19	FFTFFFFFF	FT	0.699	0.705	-0.088	-0.099	3.647	3.565
411	2448545	2451995	15	16	FFTFFFFFF	FT	0.581	0.61	-0.102	-0.092	4.527	4.512
411	2451065	2452295	18	19	FFTFFFFFF	FT	0.76	0.784	-0.032	-0.199	3.317	3.202
413	2441945	2444735	16	17	TFFFFFFFF	FT	0.972	0.885	-0.204	-0.243	2.7	3.333

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
413	2441885	2444675	17	18	TFFFFFFFF	FT	1.081	0.905	-0.135	-0.097	2.596	3.092
413	2442155	2444675	18	19	TFFFFFFFF	FT	1.231	0.948	-0.117	-0.061	2.352	2.917
413	2444675	2446025	17	18	TFFFFFFFF	FT	1.169	0.964	-0.242	-0.301	2.43	2.9
413	2444675	2445365	18	19	TFFFFFFFF	FT	1.278	0.987	-0.261	-0.262	2.22	2.769
413	2442545	2450195	19	20	TFFFFFFFF	FT	1.291	0.994	-0.195	-0.081	2.253	2.692
413	2444885	2450435	16	17	TFFFFFFFF	FT	0.952	0.841	-0.028	-0.091	3.135	3.506
413	2442215	2450315	14	16	TFFFFFFFF	FT	0.876	0.81	-0.073	-0.104	3.241	3.351
413	2446145	2450435	17	18	TFFFFFFFF	FT	1.007	0.871	-0.068	-0.101	3.178	3.359
413	2448725	2454365	16	18	FFTFFFFFF	FT	0.429	0.415	-0.072	0.026	6.247	5.543
413	2448575	2450405	19	20	FFTFFFFFF	FT	0.531	0.527	-0.084	-0.017	4.516	4.971
413	2448755	2451815	20	21	FFTFFFFFF	FT	0.508	0.462	-0.082	0.026	4.467	4.739
413	2451335	2454425	19	20	FFTFFFFFF	FT	0.246	0.261	0.007	0.041	6.879	9.014
413	2442215	2452505	16	19	TFFFFFFFF	FT	1.016	0.87	-0.25	-0.051	3.059	3.755
413	2451335	2454425	18	19	FFTFFFFFF	FT	0.216	0.251	-0.001	0.032	6.883	16.138
413	2448635	2450405	18	19	FFTFFFFFF	FT	0.508	0.537	-0.172	-0.026	4.125	4.395
413	2451875	2454425	20	21	FFTFFFFFF	FT	0.276	0.3	0.023	0.023	10.011	5.47
413	2445515	2450435	18	19	TFFFFFFFF	FT	1.034	0.956	0.013	-0.084	2.91	3.29
413	2448755	2454365	21	22	FFTFFFFFF	FT	0.435	0.382	-0.001	0.064	7.648	6.605
423	2450105	2455055	16	17	FFTFFFFFF	FT	0.616	0.723	-0.214	0.055	3.667	3.664
423	2450105	2454755	17	18	FFTFFFFFF	FT	0.64	0.79	-0.241	0.045	3.754	3.852
426	2450645	2451485	18	19	FFTFFFFFF	FT	0.544	0.52	-0.071	-0.006	3.877	3.997
426	2450645	2451455	17	18	FFTFFFFFF	FT	0.484	0.467	-0.039	-0.054	3.734	3.79
426	2450645	2451455	16	17	FFTFFFFFF	FT	0.444	0.421	-0.085	0.01	3.733	3.3
426	2450645	2451485	19	21	FFTFFFFFF	FT	0.588	0.556	-0.03	0.023	4.04	3.64
428	2453435	2453765	17	18	FFTFFFFFF	FT	0.354	0.312	0.005	0.063	5.33	5.27
428	2452565	2452985	17	18	FFTFFFFFF	FT	0.442	0.358	-0.071	0.095	4.397	4.886

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
428	2454155	2454725	17	18	FFTFFFFFF	FT	0.339	0.323	0.002	0.023	4.558	5.797
428	2452295	2452955	18	19	FFTFFFFFF	FT	0.599	0.475	-0.076	0.083	3.773	4.183
428	2453105	2453285	17	18	FFTFFFFFF	FT	0.324	0.242	-0.105	0.052	4.391	5.857
428	2453765	2454035	17	18	FFTFFFFFF	FT	0.315	0.283	-0.008	0.06	5.513	7.192
428	2453435	2453735	18	19	FFTFFFFFF	FT	0.493	0.42	0	0.032	4.114	5.628
428	2453105	2453345	18	19	FFTFFFFFF	FT	0.49	0.373	-0.087	0.037	3.806	4.761
428	2453465	2454725	16	17	FFTFFFFFF	FT	0.248	0.251	0.003	0.052	6.876	5.967
428	2450675	2451545	18	19	FFTFFFFFF	FT	0.729	0.587	-0.135	0.075	3.443	3.402
428	2451575	2452235	18	19	FFTFFFFFF	FT	0.708	0.597	-0.13	0.1	4.125	5.142
428	2450675	2452985	19	20	FFTFFFFFF	FT	0.754	0.629	-0.112	0.145	3.913	3.723
428	2453765	2454725	18	19	FFTFFFFFF	FT	0.446	0.402	0.001	0.02	3.684	4.308
428	2450675	2453285	16	17	FFTFFFFFF	FT	0.368	0.312	-0.069	0.078	6.535	6.208
428	2450645	2452535	17	18	FFTFFFFFF	FT	0.604	0.54	-0.106	0.044	3.8	4.99
428	2453105	2454725	19	20	FFTFFFFFF	FT	0.589	0.505	-0.046	0.012	3.387	3.897
439	2452175	2452235	13	17	FFTFFFFFF	FT	0.635	0.746	-0.321	0.489	3.779	3.181
439	2452175	2452235	17	18	FFTFFFFFF	FT	0.743	0.826	-0.267	0.483	3.62	2.829
446	2452205	2453645	15	21	FFTFFFFFF	FT	0.539	0.512	0.007	-0.108	4.714	4.453
448	2452265	2454995	20	22	FFTFFFFFF	FT	0.52	0.509	0.026	-0.032	4.642	5.275
448	2452205	2454995	18	20	FFTFFFFFF	FT	0.404	0.526	0.007	-0.097	5.653	7.465
460	2452085	2454545	19	21	FFTFFFFFF	FT	0.607	0.583	0.048	-0.047	3.875	4.711
461	2453585	2454965	18	19	FFTFFFFFF	FT	0.222	0.216	0.022	0.041	9.873	7.296
461	2450795	2453525	18	19	FFTFFFFFF	FT	0.383	0.373	-0.017	0.037	7.528	8.854
461	2450795	2453525	19	20	FFTFFFFFF	FT	0.438	0.414	-0.001	0.053	5.45	6.115
461	2450795	2454965	17	22	FFTFFFFFF	FT	0.329	0.323	0.02	0.063	7.082	7.937
461	2450795	2453525	20	21	FFTFFFFFF	FT	0.467	0.416	0.015	0.075	4.292	4.704
461	2453585	2454965	19	20	FFTFFFFFF	FT	0.298	0.282	0.043	0.06	8.525	6.704

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
461	2453585	2454965	20	21	FFTFFFFFF	FT	0.34	0.353	0.057	0.076	4.673	5.504
493	2448935	2454935	19	20	FFTFFFFFF	FT	0.238	0.227	0.017	-0.003	10.29	11.609
493	2449475	2454935	20	22	FFTFFFFFF	FT	0.261	0.237	0.05	0.022	7.126	12.299
493	2449325	2454965	18	19	FFTFFFFFF	FT	0.338	0.292	0.034	-0.008	10.736	16.033
511	2444195	2448515	12	17	TFFFFFFFF	FT	1.254	1.201	-0.226	-0.389	2.516	2.519
540	2449295	2455055	17	20	FFTFFFFFF	FT	0.587	0.605	0.043	0.074	5.793	5.546
552	2449865	2453165	18	19	FFTFFFFFF	FT	0.71	0.765	-0.066	-0.067	4.394	3.392
557	2449145	2451365	17	18	FFTFFFFFF	FT	0.421	0.433	-0.017	-0.05	4.887	4.227
557	2449295	2451005	18	19	FFTFFFFFF	FT	0.51	0.476	-0.022	-0.048	4.75	4.665
557	2451335	2454995	18	19	FFTFFFFFF	FT	0.412	0.42	-0.028	0.039	5.667	4.722
557	2451005	2451335	18	19	FFTFFFFFF	FT	0.454	0.479	-0.046	-0.084	4.16	3.675
557	2451365	2452085	17	18	FFTFFFFFF	FT	0.352	0.377	-0.046	0.066	5.588	4.78
557	2451275	2451725	19	20	FFTFFFFFF	FT	0.502	0.512	-0.027	0.115	4.506	3.839
557	2449325	2451275	19	20	FFTFFFFFF	FT	0.535	0.539	-0.015	-0.093	4.788	3.619
557	2451725	2454725	19	20	FFTFFFFFF	FT	0.525	0.508	0.024	0.024	4.304	4.046
557	2452085	2454965	17	18	FFTFFFFFF	FT	0.27	0.272	-0.003	-0.039	7.099	8.12
557	2448995	2454995	15	16	FFTFFFFFF	FT	0.211	0.208	-0.004	0.033	13.545	14.345
557	2449325	2451545	16	17	FFTFFFFFF	FT	0.354	0.371	0.015	-0.004	4.583	4.178
557	2451575	2453135	16	17	FFTFFFFFF	FT	0.234	0.284	-0.041	-0.013	13.866	10.854
557	2453255	2454995	16	17	FFTFFFFFF	FT	0.158	0.165	0.018	0.027	9.506	6.404
557	2449685	2454125	20	21	FFTFFFFFF	FT	0.556	0.576	0.005	0.019	4.329	4.241
561	2450795	2455085	15	21	FFTFFFFFF	FT	0.543	0.525	0.025	0.115	4.72	4.845
566	2450885	2451245	17	18	FFTFFFFFF	FT	0.618	0.726	-0.143	-0.325	3.95	3.931
566	2450765	2450885	16	17	FFTFFFFFF	FT	0.571	0.768	-0.052	-0.294	4.076	4.087
566	2450885	2451245	16	17	FFTFFFFFF	FT	0.63	0.775	-0.137	-0.354	3.983	3.788
566	2449955	2451245	15	16	FFTFFFFFF	FT	0.588	0.724	-0.064	-0.158	4.925	4.478

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
566	2450855	2450885	17	18	FFTFFFFFF	FT	0.508	0.818	-0.027	-0.475	3.465	3.735
566	2450855	2450885	18	19	FFTFFFFFF	FT	0.545	0.808	-0.031	-0.458	3.617	3.784
566	2449955	2451245	14	15	FFTFFFFFF	FT	0.602	0.705	-0.118	-0.154	4.148	4.156
566	2450915	2451065	18	19	FFTFFFFFF	FT	0.662	0.725	-0.115	-0.274	3.863	4.116
566	2450525	2450765	17	18	FFTFFFFFF	FT	0.579	0.6	-0.208	0.204	4.175	4.526
566	2449955	2450495	16	17	FFTFFFFFF	FT	0.659	0.709	-0.044	-0.031	4.423	4.044
566	2450765	2450825	17	18	FFTFFFFFF	FT	0.651	0.778	0.005	-0.129	3.455	4.42
566	2450045	2450195	17	18	FFTFFFFFF	FT	0.711	0.738	0.046	-0.102	4.328	3.961
566	2450525	2450765	16	17	FFTFFFFFF	FT	0.577	0.573	-0.218	0.23	3.845	4.235
566	2450825	2450855	17	18	FFTFFFFFF	FT	0.468	0.72	-0.076	-0.341	3.969	4.442
566	2450765	2450825	18	19	FFTFFFFFF	FT	0.692	0.764	-0.03	-0.149	3.662	4.115
566	2450825	2450855	18	19	FFTFFFFFF	FT	0.487	0.709	-0.033	-0.343	4.028	3.843
566	2450195	2450285	17	18	FFTFFFFFF	FT	0.6	0.757	-0.144	0.036	4.336	4.176
566	2450045	2450285	18	19	FFTFFFFFF	FT	0.679	0.743	0.001	-0.047	4.178	4.423
566	2450285	2450495	17	18	FFTFFFFFF	FT	0.545	0.48	-0.209	-0.039	3.32	4.992
566	2451125	2452535	18	19	FFTFFFFFF	FT	0.624	0.795	-0.166	-0.419	3.644	3.847
566	2450915	2451065	19	20	FFTFFFFFF	FT	0.741	0.709	-0.128	-0.27	4.135	3.98
566	2450465	2450495	19	20	FFTFFFFFF	FT	0.649	0.63	-0.136	-0.359	4.131	4.284
566	2450285	2450315	19	20	FFTFFFFFF	FT	0.597	0.551	-0.223	-0.206	3.823	3.605
566	2450855	2450885	19	20	FFTFFFFFF	FT	0.586	0.839	-0.02	-0.492	3.356	3.633
566	2450825	2450855	19	20	FFTFFFFFF	FT	0.519	0.783	-0.022	-0.396	3.973	3.852
566	2450285	2450315	18	19	FFTFFFFFF	FT	0.581	0.553	-0.232	-0.113	3.926	4.998
566	2450885	2450915	18	19	FFTFFFFFF	FT	0.593	0.819	-0.157	-0.462	3.821	3.859
566	2450315	2450345	19	20	FFTFFFFFF	FT	0.712	0.557	-0.387	-0.104	3.103	3.143
566	2450315	2450375	18	19	FFTFFFFFF	FT	0.584	0.451	-0.305	-0.087	3.301	3.483
566	2450705	2450825	19	20	FFTFFFFFF	FT	0.668	0.737	-0.111	-0.063	3.464	4.523

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
566	2450525	2450735	18	19	FFTFFFFFF	FT	0.641	0.625	-0.196	0.194	3.773	4.03
566	2450885	2450915	19	20	FFTFFFFFF	FT	0.63	0.847	-0.081	-0.492	4.068	3.437
566	2451125	2452565	19	20	FFTFFFFFF	FT	0.661	0.765	-0.195	-0.353	3.863	3.834
566	2450045	2450285	19	20	FFTFFFFFF	FT	0.687	0.693	-0.172	-0.072	4.36	4.485
566	2450735	2450765	18	19	FFTFFFFFF	FT	0.52	0.471	-0.199	0.037	3.812	5.128
566	2450405	2450465	19	20	FFTFFFFFF	FT	0.597	0.451	-0.089	-0.208	4.01	3.182
566	2450375	2450495	18	19	FFTFFFFFF	FT	0.558	0.515	-0.145	-0.228	4.278	4.541
566	2450345	2450405	19	20	FFTFFFFFF	FT	0.665	0.442	-0.174	-0.116	4.01	3.718
566	2450525	2450705	19	20	FFTFFFFFF	FT	0.745	0.57	-0.228	-0.115	3.438	3.049
566	2450075	2452535	20	21	FFTFFFFFF	FT	0.794	0.71	-0.104	-0.25	3.699	4.251
568	2453855	2454785	17	18	FFTFFFFFF	FT	0.257	0.326	0.013	-0.002	5.956	12.375
568	2453855	2455025	18	19	FFTFFFFFF	FT	0.293	0.312	0.003	-0.017	8.605	9.535
568	2453555	2453825	20	21	FFTFFFFFF	FT	0.3	0.3	0.023	-0.013	8.628	7.497
568	2449925	2453765	21	22	FFTFFFFFF	FT	0.278	0.299	0.036	0.009	11.912	11.426
568	2453855	2454995	19	20	FFTFFFFFF	FT	0.285	0.3	0.002	-0.001	10.997	11.956
568	2453555	2453825	19	20	FFTFFFFFF	FT	0.319	0.338	0.025	-0.024	5.964	7.425
568	2453855	2454095	20	21	FFTFFFFFF	FT	0.3	0.253	-0.012	0.032	11.84	11.979
568	2448875	2453525	20	21	FFTFFFFFF	FT	0.35	0.414	0.04	0.016	7.719	5.373
568	2453315	2453795	18	19	FFTFFFFFF	FT	0.315	0.372	-0.022	-0.027	7.511	4.444
568	2454095	2455025	20	21	FFTFFFFFF	FT	0.328	0.48	0.081	-0.145	3.931	4.627
568	2449295	2453285	18	19	FFTFFFFFF	FT	0.427	0.459	0.052	-0.012	6.737	5.144
568	2449175	2453285	19	20	FFTFFFFFF	FT	0.447	0.486	0.08	0.036	7.712	5.431
568	2450105	2455055	22	23	FFTFFFFFF	FT	0.26	0.261	0.029	0.023	10.058	8.383
568	2453855	2454785	21	22	FFTFFFFFF	FT	0.265	0.338	0.053	-0.012	8.429	6.352
568	2449295	2453795	17	18	FFTFFFFFF	FT	0.403	0.426	0.012	0.037	9.179	5.397
568	2453315	2453525	19	20	FFTFFFFFF	FT	0.258	0.372	0	-0.018	5.425	3.996

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
573	2450345	2450375	11	12	FFTFFFFFF	FT	0.266	0.334	-0.004	0.026	2.135	2.38
573	2450135	2450225	14	15	FFTFFFFFF	FT	0.435	0.429	0.131	-0.201	2.46	2.638
573	2446355	2447075	13	14	TFFFFFFFF	FT	1.429	0.998	-0.126	-0.644	1.98	2.21
573	2446265	2446775	11	12	TFFFFFFFF	FT	1.072	0.684	-0.291	-0.22	1.867	1.623
573	2450165	2450345	13	14	FFTFFFFFF	FT	0.67	0.306	0.307	0.199	1.958	1.929
573	2450345	2450375	13	14	FFTFFFFFF	FT	0.717	0.381	0.434	-0.168	2.218	3.112
573	2447015	2447615	12	13	TFFFFFFFF	FT	0.711	1.221	-0.14	0.125	1.878	2.02
573	2447465	2448365	13	14	TFFFFFFFF	FT	1.085	0.856	0.739	-0.419	2.988	2.17
573	2449985	2450045	13	14	FFTFFFFFF	FT	0.565	0.393	0.509	0.089	1.572	2.335
573	2449955	2450345	12	13	FFTFFFFFF	FT	0.264	0.358	0.066	-0.049	3.924	1.824
573	2448155	2448515	11	12	TFFFFFFFF	FT	0.729	0.601	0.133	-0.095	2.215	2.6
573	2446985	2447075	11	12	TFFFFFFFF	FT	0.847	1.341	-0.285	0.544	3.652	2.577
573	2446055	2446865	12	13	TFFFFFFFF	FT	1.044	1.682	-0.435	-1.045	2.918	1.94
573	2446745	2448275	10	11	TFFFFFFFF	FT	1.318	0.495	-1.053	-0.237	2.323	3.966
573	2450285	2450345	14	15	FFTFFFFFF	FT	0.639	0.652	0.453	-0.169	2.507	2.055
573	2449445	2449865	12	13	TFFFFFFFF	FT	0.977	1.373	0.475	-1.053	1.57	1.932
573	2448515	2448635	12	13	TFFFFFFFF	FT	1.079	0.491	0.622	0.186	2.222	2.504
573	2446805	2446925	11	12	TFFFFFFFF	FT	0.893	2.05	-0.635	-1.859	2.017	1.524
573	2447795	2448515	12	13	TFFFFFFFF	FT	1.098	0.96	-0.191	-0.032	2.005	1.796
573	2447375	2447975	11	12	TFFFFFFFF	FT	1.099	1.213	0.578	0.823	1.806	1.928
573	2448815	2449235	12	13	TFFFFFFFF	FT	0.885	1.41	0.436	-1.037	1.62	1.994
573	2448575	2449685	11	12	TFFFFFFFF	FT	0.887	1.056	-0.221	0.317	1.585	2.794
573	2449925	2449985	14	15	FFTFFFFFF	FT	1.327	0.59	1.144	-0.175	2.243	4.091
573	2448545	2449865	13	14	TFFFFFFFF	FT	1.114	1.388	0.583	-0.938	2.341	2.709
573	2449985	2450045	14	15	FFTFFFFFF	FT	0.77	0.473	0.621	-0.225	1.878	3.659
573	2450345	2450375	14	15	FFTFFFFFF	FT	0.942	0.396	0.762	-0.113	2.129	1.781

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
573	2449925	2450195	15	16	FFTFFFFFF	FT	1.029	1.033	0.468	-0.654	4.365	2.214
587	2449175	2455085	17	18	FFTFFFFFF	FT	0.629	0.669	-0.066	-0.056	4.564	3.966
587	2449085	2455085	18	19	FFTFFFFFF	FT	0.647	0.689	-0.076	-0.086	4.225	3.906
589	2448905	2453435	17	18	FFTFFFFFF	FT	0.647	0.642	-0.063	-0.034	4.145	4.353
589	2449025	2453435	18	19	FFTFFFFFF	FT	0.694	0.736	-0.029	-0.119	3.899	3.489
595	2449055	2453615	17	18	FFTFFFFFF	FT	0.696	0.638	-0.1	-0.028	3.958	3.607
595	2449145	2454365	18	19	FFTFFFFFF	FT	0.712	0.708	-0.08	-0.062	3.854	3.402
596	2448545	2452565	16	17	FFTFFFFFF	FT	0.753	0.869	-0.015	-0.062	4.08	3.766
596	2448935	2452295	17	18	FFTFFFFFF	FT	0.806	0.858	-0.13	-0.042	3.875	3.811
599	2453285	2453345	18	19	FFTFFFFFF	FT	0.292	0.292	0.007	-0.008	7.123	9.283
599	2452595	2452775	17	18	FFTFFFFFF	FT	0.289	0.304	-0.058	0.019	9.893	10.873
599	2450225	2452565	19	20	FFTFFFFFF	FT	0.42	0.423	0.015	0.015	6.203	7.37
599	2452535	2452565	18	19	FFTFFFFFF	FT	0.252	0.272	0.054	-0.068	7.242	9.372
599	2450225	2452985	16	17	FFTFFFFFF	FT	0.25	0.302	-0.009	0.023	15.493	17.137
599	2453285	2453465	17	18	FFTFFFFFF	FT	0.214	0.234	0.003	-0.019	12.39	15.234
599	2453345	2453465	18	19	FFTFFFFFF	FT	0.226	0.238	0.011	-0.023	14.512	17.043
599	2450195	2452535	18	19	FFTFFFFFF	FT	0.402	0.463	-0.006	0.033	8.203	9.351
599	2453255	2453345	19	20	FFTFFFFFF	FT	0.424	0.422	0.017	0.007	5.526	6.499
599	2452595	2452775	18	19	FFTFFFFFF	FT	0.318	0.325	-0.043	0.017	8.341	9.713
599	2453195	2453285	18	19	FFTFFFFFF	FT	0.287	0.29	0.03	0.004	8.256	10.77
599	2453465	2453855	17	18	FFTFFFFFF	FT	0.273	0.256	0.098	0.048	8.455	19.945
599	2453165	2453195	18	19	FFTFFFFFF	FT	0.777	0.406	-0.337	0.16	3.487	5.043
599	2450225	2452565	17	18	FFTFFFFFF	FT	0.345	0.377	0.034	0.015	10.869	12.725
599	2453135	2453165	18	19	FFTFFFFFF	FT	0.27	0.269	-0.029	0.055	9.098	11.528
599	2452865	2452895	18	19	FFTFFFFFF	FT	0.267	0.278	-0.002	-0.031	7.502	10.645
599	2453195	2453285	17	18	FFTFFFFFF	FT	0.214	0.248	0.026	0.022	12.707	15.059

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
599	2453465	2453855	18	19	FFTFFFFFF	FT	0.326	0.286	0.104	0.045	7.572	11.239
599	2453345	2453375	19	20	FFTFFFFFF	FT	0.292	0.295	0.019	-0.013	6.718	10.386
599	2453015	2453165	19	20	FFTFFFFFF	FT	0.319	0.33	-0.038	0.054	5.879	8.219
599	2453015	2453195	17	18	FFTFFFFFF	FT	0.484	0.315	-0.15	0.114	8.782	9.618
599	2453375	2453465	19	20	FFTFFFFFF	FT	0.29	0.279	0.044	0.043	8.166	7.868
599	2452805	2452985	17	18	FFTFFFFFF	FT	0.238	0.255	0.006	0.009	11.755	11.243
599	2452595	2452775	19	20	FFTFFFFFF	FT	0.401	0.414	0.013	0.016	5.978	7.674
599	2453465	2453855	19	20	FFTFFFFFF	FT	0.374	0.331	0.124	0.058	4.489	7.54
599	2452895	2452985	18	19	FFTFFFFFF	FT	0.261	0.279	0.028	-0.035	9.564	8.383
599	2452805	2452895	19	20	FFTFFFFFF	FT	0.394	0.358	0	0.016	6.208	6.308
599	2453015	2453135	18	19	FFTFFFFFF	FT	0.271	0.263	-0.111	0.021	7.536	10.493
599	2450225	2453705	15	16	FFTFFFFFF	FT	0.252	0.268	-0.023	0.056	18.497	27.13
599	2453165	2453225	19	20	FFTFFFFFF	FT	0.718	0.421	-0.229	0.127	3.844	4.859
599	2452805	2452865	18	19	FFTFFFFFF	FT	0.327	0.345	-0.015	0.043	6.965	7.513
599	2453225	2453255	19	20	FFTFFFFFF	FT	0.348	0.338	0.034	0.017	7.174	8.539
599	2453015	2453855	16	17	FFTFFFFFF	FT	0.297	0.226	-0.009	0.04	15.586	12.04
599	2453255	2453855	20	21	FFTFFFFFF	FT	0.428	0.399	0.068	0.029	5.138	6.738
599	2452895	2452985	19	20	FFTFFFFFF	FT	0.33	0.335	0.029	-0.028	6.897	7.457
599	2450225	2452985	20	21	FFTFFFFFF	FT	0.508	0.503	0.016	0.01	5.466	6.694
599	2453015	2453255	20	21	FFTFFFFFF	FT	0.487	0.416	-0.015	0.09	5.141	4.955
599	2450375	2453705	13	21	FFTFFFFFF	TF	0.329	0.371	0.061	-0.001	7.205	11.186
608	2452745	2452775	16	17	FFTFFFFFF	FT	0.523	0.697	0.089	0.05	3.391	2.825
608	2452745	2452805	15	16	FFTFFFFFF	FT	0.506	0.687	0.078	0.116	3.104	2.932
608	2452205	2452235	17	18	FFTFFFFFF	FT	0.574	0.774	-0.184	0.242	2.844	3.395
608	2452175	2452235	16	17	FFTFFFFFF	FT	0.594	0.792	-0.233	0.313	2.597	3.436
608	2452265	2452385	15	16	FFTFFFFFF	FT	0.67	0.919	-0.026	0.476	3.239	3.097

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
608	2452325	2452355	16	17	FFTFFFFFF	FT	0.627	0.915	-0.118	0.447	2.805	3.057
608	2452685	2452715	15	16	FFTFFFFFF	FT	0.486	0.646	0.109	0.097	3.012	2.798
608	2452565	2452985	14	15	FFTFFFFFF	FT	0.525	0.71	-0.017	0.217	3.09	2.959
608	2452175	2452265	15	16	FFTFFFFFF	FT	0.593	0.807	-0.215	0.36	2.734	3.202
608	2452715	2452745	15	16	FFTFFFFFF	FT	0.484	0.675	0.067	0.086	3.098	2.734
608	2451935	2451995	16	17	FFTFFFFFF	FT	0.763	0.873	0.236	0.01	3.826	3.052
608	2451995	2452025	16	17	FFTFFFFFF	FT	0.675	0.705	0.401	0.156	3.488	3.287
608	2451965	2452025	15	16	FFTFFFFFF	FT	0.691	0.814	0.314	0.162	3.822	3.164
608	2452025	2452055	16	17	FFTFFFFFF	FT	0.755	0.782	0.19	0.253	3.843	3.328
608	2452415	2452475	16	17	FFTFFFFFF	FT	0.588	0.778	0.172	0.247	3.432	3.639
608	2452445	2452565	14	15	FFTFFFFFF	FT	0.775	0.852	-0.337	0.364	3.256	3.356
608	2452565	2452655	15	16	FFTFFFFFF	FT	0.561	0.784	-0.126	0.319	2.689	3.442
608	2452565	2452595	16	17	FFTFFFFFF	FT	0.591	0.879	-0.211	0.463	2.787	3.375
608	2452625	2452655	17	18	FFTFFFFFF	FT	0.546	0.676	0.024	0.011	3.332	2.665
608	2453045	2453075	16	17	FFTFFFFFF	FT	0.479	0.671	0.08	0.12	3.398	2.878
608	2452445	2452835	13	14	FFTFFFFFF	FT	0.589	0.79	-0.044	0.307	4.29	3.125
608	2452655	2452685	15	16	FFTFFFFFF	FT	0.536	0.718	0.069	0.113	3.788	2.811
608	2452955	2453015	16	17	FFTFFFFFF	FT	0.511	0.672	-0.068	0.123	2.67	2.83
608	2452145	2452445	14	15	FFTFFFFFF	FT	0.638	0.806	-0.036	0.36	3.409	3.376
608	2452025	2452115	15	16	FFTFFFFFF	FT	0.651	0.785	0.136	0.246	3.847	3.426
608	2451845	2452145	14	15	FFTFFFFFF	FT	0.71	0.877	0.114	0.322	3.585	3.198
608	2452115	2452175	15	16	FFTFFFFFF	FT	0.587	0.859	-0.11	0.306	3.395	3.253
608	2452385	2452475	15	16	FFTFFFFFF	FT	0.578	0.789	0.189	0.247	3.868	3.445
608	2453105	2453165	16	17	FFTFFFFFF	FT	0.474	0.647	0.091	0.086	3.094	3.007
608	2453345	2453405	16	17	FFTFFFFFF	FT	0.84	0.706	-0.373	0.187	2.38	2.91
608	2452985	2453075	15	16	FFTFFFFFF	FT	0.466	0.668	0.007	0.157	2.95	2.864

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
608	2452805	2452835	16	17	FFTFFFFFF	FT	0.524	0.702	0.007	0.127	3.136	2.914
608	2452265	2452295	16	17	FFTFFFFFF	FT	0.58	0.764	0.139	0.268	3.615	3.404
608	2452355	2452385	16	17	FFTFFFFFF	FT	1	0.988	-0.482	0.545	2.324	2.82
608	2452805	2452865	15	16	FFTFFFFFF	FT	0.537	0.702	0.019	0.122	3.392	2.839
608	2453075	2453165	15	16	FFTFFFFFF	FT	0.496	0.629	0.03	0.156	3.102	3.426
608	2453075	2453105	16	17	FFTFFFFFF	FT	0.512	0.642	0.114	0.102	2.992	3.012
608	2453435	2453555	15	16	FFTFFFFFF	FT	0.551	0.636	0.187	0.088	3.534	3.098
608	2452925	2452955	16	17	FFTFFFFFF	FT	0.498	0.632	-0.107	0.049	2.851	2.618
608	2453465	2453495	17	18	FFTFFFFFF	FT	0.565	0.658	0.201	-0.008	3.687	2.516
608	2449625	2451875	15	16	FFTFFFFFF	FT	0.699	0.802	-0.035	-0.019	3.881	4.17
608	2452985	2453165	14	15	FFTFFFFFF	FT	0.493	0.705	0.034	0.181	2.982	2.867
608	2453015	2453045	16	17	FFTFFFFFF	FT	0.5	0.701	0.023	0.154	2.879	3.036
608	2453255	2453405	15	16	FFTFFFFFF	FT	0.679	0.711	-0.232	0.223	3.021	2.949
608	2449595	2452175	13	14	FFTFFFFFF	FT	0.672	0.767	0.056	0.189	4.368	3.398
608	2452835	2453165	13	14	FFTFFFFFF	FT	0.517	0.711	-0.045	0.186	3.059	2.853
608	2451965	2451995	17	18	FFTFFFFFF	FT	0.73	0.835	0.27	-0.087	3.759	2.85
608	2453015	2453045	17	18	FFTFFFFFF	FT	0.491	0.641	0.043	0.067	3.06	2.83
608	2453435	2453495	16	17	FFTFFFFFF	FT	0.542	0.652	0.198	0.045	3.678	2.651
608	2452385	2452415	17	18	FFTFFFFFF	FT	0.716	0.72	0.414	0.157	3.969	3.162
608	2452295	2452325	16	17	FFTFFFFFF	FT	0.559	0.845	-0.039	0.394	3.557	3.248
608	2452175	2452445	13	14	FFTFFFFFF	FT	0.647	0.84	0.004	0.401	2.53	3.582
608	2452625	2454095	12	13	FFTFFFFFF	FT	0.569	0.723	0.004	0.193	3.11	2.806
608	2452085	2452115	17	18	FFTFFFFFF	FT	0.592	0.778	0.035	0.146	3.419	3.037
608	2453585	2453615	16	17	FFTFFFFFF	FT	0.523	0.633	-0.059	0.036	3.523	2.712
608	2453555	2454095	15	16	FFTFFFFFF	FT	0.626	0.829	0.008	0.003	3.405	2.743
608	2453585	2453615	17	18	FFTFFFFFF	FT	0.526	0.651	-0.068	-0.082	3.411	2.377

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
608	2453615	2453645	16	17	FFTFFFFFF	FT	0.484	0.645	-0.077	0.074	2.858	2.686
608	2452025	2452055	17	18	FFTFFFFFF	FT	0.818	0.756	0.205	0.162	3.588	3.331
608	2452025	2452055	18	19	FFTFFFFFF	FT	0.829	0.776	0.219	0.079	3.368	3.183
608	2453495	2453555	16	17	FFTFFFFFF	FT	0.545	0.689	0.146	0.106	3.419	2.844
608	2453555	2453585	16	17	FFTFFFFFF	FT	0.509	0.652	-0.024	0.095	3.545	2.889
608	2452055	2452085	16	17	FFTFFFFFF	FT	0.612	0.758	0.227	0.215	3.544	3.04
608	2452055	2452085	17	18	FFTFFFFFF	FT	0.639	0.734	0.265	0.132	3.607	3.085
608	2452295	2452325	17	18	FFTFFFFFF	FT	0.572	0.812	0.056	0.312	3.751	3.342
608	2452385	2452415	16	17	FFTFFFFFF	FT	0.642	0.77	0.335	0.212	4.031	3.389
608	2452385	2452415	18	19	FFTFFFFFF	FT	0.696	0.712	0.4	0.032	3.445	2.893
608	2452685	2452715	16	17	FFTFFFFFF	FT	0.502	0.685	0.106	0.079	3.657	2.867
608	2452865	2452895	15	16	FFTFFFFFF	FT	0.497	0.686	-0.091	0.164	2.957	2.869
608	2452715	2452745	16	17	FFTFFFFFF	FT	0.522	0.689	0.1	0.05	3.561	2.677
608	2452715	2452745	17	18	FFTFFFFFF	FT	0.542	0.713	0.142	0.002	3.514	2.608
608	2452625	2452655	16	17	FFTFFFFFF	FT	0.52	0.624	-0.013	0.055	3.775	2.704
608	2452265	2452295	17	18	FFTFFFFFF	FT	0.608	0.747	0.196	0.223	3.504	3.37
608	2453255	2453315	16	17	FFTFFFFFF	FT	0.509	0.634	-0.137	-0.014	2.934	2.719
608	2452475	2452535	15	16	FFTFFFFFF	FT	0.739	0.876	-0.333	0.431	2.78	3.317
608	2453255	2453525	14	15	FFTFFFFFF	FT	0.61	0.719	-0.079	0.25	3.404	2.766
608	2452565	2452595	17	18	FFTFFFFFF	FT	0.591	0.828	-0.193	0.346	2.967	3.28
608	2452565	2452595	18	19	FFTFFFFFF	FT	0.617	0.811	-0.18	0.217	2.963	3.25
608	2452595	2452625	18	19	FFTFFFFFF	FT	0.565	0.722	-0.022	-0.114	3.345	2.468
608	2452595	2452625	17	18	FFTFFFFFF	FT	0.531	0.682	-0.036	0.025	3.312	2.656
608	2452865	2452895	16	17	FFTFFFFFF	FT	0.532	0.659	-0.075	0.076	2.967	2.808
608	2452895	2452925	16	17	FFTFFFFFF	FT	0.54	0.654	-0.124	0.055	2.807	2.788
608	2452925	2452985	17	18	FFTFFFFFF	FT	0.506	0.658	-0.078	-0.066	3.191	2.548

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
608	2452925	2452985	15	16	FFTFFFFFF	FT	0.512	0.638	-0.129	0.141	2.707	2.68
608	2453525	2454095	14	15	FFTFFFFFF	FT	0.636	0.803	0.058	0.038	3.305	2.666
608	2449955	2452625	12	13	FFTFFFFFF	FT	0.661	0.829	-0.052	0.337	3.68	3.51
608	2451605	2451635	16	17	FFTFFFFFF	FT	0.501	0.669	0.161	-0.347	3.733	4.843
608	2452655	2452685	16	17	FFTFFFFFF	FT	0.514	0.668	0.068	0.066	3.427	2.72
608	2452655	2452685	17	18	FFTFFFFFF	FT	0.526	0.699	0.092	0	3.526	2.541
608	2453255	2454095	13	14	FFTFFFFFF	FT	0.641	0.773	-0.011	0.119	3.624	2.877
608	2452895	2452925	15	16	FFTFFFFFF	FT	0.527	0.703	-0.144	0.182	2.682	2.876
608	2453075	2453105	17	18	FFTFFFFFF	FT	0.519	0.632	0.137	-0.004	3.712	2.77
608	2452595	2452625	16	17	FFTFFFFFF	FT	0.555	0.681	-0.091	0.112	3.174	2.942
608	2453315	2453345	16	17	FFTFFFFFF	FT	0.482	0.641	-0.046	-0.046	3.363	2.449
608	2451995	2452025	17	18	FFTFFFFFF	FT	0.696	0.723	0.441	0.102	3.262	3.062
608	2452805	2452835	17	18	FFTFFFFFF	FT	0.529	0.677	0.021	0.026	3.264	2.712
608	2449595	2451845	14	15	FFTFFFFFF	FT	0.602	0.708	-0.029	-0.054	3.588	3.982
608	2452295	2452325	18	19	FFTFFFFFF	FT	0.586	0.786	0.084	0.216	3.514	3.162
608	2452835	2452865	16	17	FFTFFFFFF	FT	0.547	0.679	-0.021	0.076	3.297	3.32
608	2452745	2452775	17	18	FFTFFFFFF	FT	0.538	0.706	0.125	-0.016	3.597	2.482
608	2452775	2452805	16	17	FFTFFFFFF	FT	0.478	0.685	0.091	0.012	3.443	2.724
608	2452535	2452565	7	16	FFTFFFFFF	FT	0.915	0.856	-0.532	0.345	3.359	3.248
608	2453015	2453045	18	19	FFTFFFFFF	FT	0.517	0.643	0.071	-0.036	3.276	2.616
608	2453045	2453075	17	18	FFTFFFFFF	FT	0.492	0.656	0.122	0.059	3.712	2.683
608	2452475	2452505	16	17	FFTFFFFFF	FT	0.597	0.803	-0.062	0.32	4.36	3.479
608	2452775	2452805	17	18	FFTFFFFFF	FT	0.543	0.694	0.132	-0.038	3.683	2.721
608	2452775	2452805	18	19	FFTFFFFFF	FT	0.541	0.73	0.122	-0.125	3.64	2.604
608	2452235	2452265	16	17	FFTFFFFFF	FT	0.577	0.789	-0.211	0.292	2.658	3.245
608	2452055	2452085	18	19	FFTFFFFFF	FT	0.671	0.755	0.296	0.031	3.539	2.9

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
608	2452115	2452145	16	17	FFTFFFFFF	FT	0.582	0.792	-0.14	0.238	3.384	3.104
608	2452145	2452175	16	17	FFTFFFFFF	FT	0.53	0.771	-0.022	0.106	3.234	2.78
608	2452655	2452685	18	19	FFTFFFFFF	FT	0.547	0.722	0.126	-0.123	3.715	2.531
608	2453105	2453165	17	18	FFTFFFFFF	FT	0.504	0.627	0.107	0.005	3.637	2.86
608	2451635	2451695	17	18	FFTFFFFFF	FT	0.647	0.919	0.348	-0.483	3.91	3.549
608	2451635	2451755	16	17	FFTFFFFFF	FT	0.586	0.772	0.112	-0.305	3.386	4.085
608	2452265	2452295	18	19	FFTFFFFFF	FT	0.646	0.726	0.261	0.129	3.477	3.228
608	2451845	2451935	16	17	FFTFFFFFF	FT	0.877	0.965	0.093	0.323	3.707	3.466
608	2451605	2451635	17	18	FFTFFFFFF	FT	0.537	0.742	0.273	-0.406	3.452	4.229
608	2452985	2453015	18	19	FFTFFFFFF	FT	0.537	0.711	-0.024	-0.018	3.031	2.728
608	2452985	2453015	17	18	FFTFFFFFF	FT	0.507	0.685	-0.042	0.073	2.912	2.8
608	2452205	2452235	18	19	FFTFFFFFF	FT	0.581	0.741	-0.136	0.148	2.991	3.135
608	2452205	2452235	19	20	FFTFFFFFF	FT	0.605	0.739	-0.11	0.047	3.116	2.986
608	2452625	2452655	18	19	FFTFFFFFF	FT	0.549	0.689	-0.002	-0.113	3.248	2.57
608	2451995	2452025	18	19	FFTFFFFFF	FT	0.781	0.726	0.526	0.02	3.103	2.812
608	2452475	2452505	17	18	FFTFFFFFF	FT	0.59	0.768	-0.031	0.244	4.141	3.264
608	2452475	2452505	18	19	FFTFFFFFF	FT	0.631	0.778	0.002	0.099	4.031	3.143
608	2452025	2452055	19	20	FFTFFFFFF	FT	0.881	0.769	0.238	0.031	3.24	3.258
608	2453495	2453525	17	18	FFTFFFFFF	FT	0.556	0.688	0.171	-0.031	3.803	2.656
608	2453495	2453525	18	19	FFTFFFFFF	FT	0.557	0.714	0.169	-0.189	3.815	2.529
608	2452685	2452715	17	18	FFTFFFFFF	FT	0.55	0.724	0.156	-0.01	3.543	2.521
608	2453435	2453465	17	18	FFTFFFFFF	FT	0.607	0.646	0.268	-0.076	3.568	2.363
608	2452925	2452955	18	19	FFTFFFFFF	FT	0.519	0.732	0.003	-0.219	3.455	2.376
608	2452355	2452385	17	18	FFTFFFFFF	FT	1.008	0.977	-0.541	0.507	2.281	2.983
608	2453315	2453345	17	18	FFTFFFFFF	FT	0.493	0.762	0.03	-0.247	3.642	2.406
608	2452085	2452115	16	17	FFTFFFFFF	FT	0.546	0.778	-0.028	0.189	4.1	3.474

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
608	2452415	2452445	18	19	FFTFFFFFF	FT	0.652	0.731	0.254	0.09	3.722	3.04
608	2452415	2452445	17	18	FFTFFFFFF	FT	0.641	0.778	0.233	0.206	3.701	3.366
608	2452835	2452865	17	18	FFTFFFFFF	FT	0.554	0.666	0.023	-0.023	3.847	2.792
608	2452235	2452265	18	19	FFTFFFFFF	FT	0.597	0.767	-0.082	0.134	3.122	3.235
608	2451755	2451845	16	17	FFTFFFFFF	FT	0.963	0.94	-0.234	0.243	2.465	3.587
608	2453315	2453345	18	19	FFTFFFFFF	FT	0.539	0.831	0.156	-0.314	3.146	2.46
608	2453375	2453405	17	18	FFTFFFFFF	FT	0.603	0.657	-0.097	0.021	3.688	2.545
608	2452505	2452535	16	17	FFTFFFFFF	FT	0.763	0.836	-0.439	0.372	2.699	3.633
608	2449955	2454095	11	12	FFTFFFFFF	FT	0.662	0.838	-0.021	0.374	3.316	3.367
608	2451875	2451965	15	16	FFTFFFFFF	FT	0.838	0.998	0.066	0.264	3.191	3.037
608	2453345	2453375	17	18	FFTFFFFFF	FT	0.953	0.707	-0.474	0.131	2.045	2.783
608	2452745	2452775	18	19	FFTFFFFFF	FT	0.564	0.734	0.137	-0.127	3.536	2.403
608	2452235	2452265	19	20	FFTFFFFFF	FT	0.614	0.808	-0.007	0.087	3.571	2.97
608	2452865	2452895	17	18	FFTFFFFFF	FT	0.522	0.673	-0.048	-0.09	3.368	2.635
608	2451845	2451905	17	18	FFTFFFFFF	FT	0.902	0.915	0.081	0.32	3.549	3.349
608	2452325	2452355	17	18	FFTFFFFFF	FT	0.643	0.925	-0.086	0.401	3.329	3.066
608	2452175	2452205	17	18	FFTFFFFFF	FT	0.595	0.739	-0.206	0.208	2.689	3.248
608	2452655	2452685	19	20	FFTFFFFFF	FT	0.575	0.764	0.145	-0.216	3.604	2.471
608	2452955	2453015	19	20	FFTFFFFFF	FT	0.561	0.742	-0.011	-0.112	2.966	2.649
608	2451725	2451785	18	19	FFTFFFFFF	FT	1.075	0.758	-0.2	-0.239	2.106	2.866
608	2453525	2453555	17	18	FFTFFFFFF	FT	0.519	0.683	0.091	-0.001	3.695	2.612
608	2452685	2452715	18	19	FFTFFFFFF	FT	0.571	0.765	0.176	-0.116	3.712	2.439
608	2452505	2452535	17	18	FFTFFFFFF	FT	0.772	0.771	-0.44	0.255	2.539	3.613
608	2452505	2452535	18	19	FFTFFFFFF	FT	0.762	0.734	-0.424	0.131	2.568	3.534
608	2452535	2452565	16	17	FFTFFFFFF	FT	0.992	0.805	-0.552	0.25	3.461	3.243
608	2452535	2452565	17	18	FFTFFFFFF	FT	0.95	0.806	-0.484	0.155	3.485	3.07

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
608	2452565	2452595	19	20	FFTFFFFFF	FT	0.64	0.8	-0.152	0.072	3.101	3.001
608	2452235	2452265	17	18	FFTFFFFFF	FT	0.586	0.775	-0.12	0.243	2.889	3.321
608	2452265	2452295	19	20	FFTFFFFFF	FT	0.704	0.74	0.349	0.031	3.3	3.019
608	2452355	2452385	18	19	FFTFFFFFF	FT	0.99	0.964	-0.51	0.443	2.351	2.9
608	2453045	2453075	18	19	FFTFFFFFF	FT	0.514	0.63	0.13	-0.057	3.723	2.633
608	2451605	2451635	18	19	FFTFFFFFF	FT	0.617	0.838	0.295	-0.469	4.018	3.753
608	2453435	2453495	18	19	FFTFFFFFF	FT	0.598	0.694	0.204	-0.176	3.917	2.37
608	2451695	2451755	17	18	FFTFFFFFF	FT	0.631	0.634	-0.167	-0.201	3.051	3.453
608	2452445	2452475	17	18	FFTFFFFFF	FT	0.589	0.741	0.075	0.123	4.455	3.122
608	2452055	2452085	19	20	FFTFFFFFF	FT	0.686	0.783	0.292	-0.006	3.327	2.916
608	2453945	2454095	16	17	FFTFFFFFF	FT	0.833	1.182	0.291	-0.488	2.251	1.872
608	2452805	2452835	18	19	FFTFFFFFF	FT	0.531	0.717	0.1	-0.08	3.331	2.595
608	2452625	2452655	19	20	FFTFFFFFF	FT	0.563	0.734	-0.008	-0.211	3.181	2.376
608	2452115	2452145	17	18	FFTFFFFFF	FT	0.577	0.781	-0.101	0.188	3.315	3.008
608	2453015	2453045	19	20	FFTFFFFFF	FT	0.537	0.662	0.071	-0.145	3.26	2.471
608	2453105	2453135	18	19	FFTFFFFFF	FT	0.524	0.658	0.165	-0.152	3.635	2.544
608	2453045	2453075	19	20	FFTFFFFFF	FT	0.545	0.675	0.159	-0.17	3.708	2.461
608	2453075	2453105	18	19	FFTFFFFFF	FT	0.558	0.679	0.209	-0.13	3.637	2.402
608	2451935	2451965	17	18	FFTFFFFFF	FT	0.895	0.95	0.252	0.166	3.426	3.274
608	2451965	2451995	18	19	FFTFFFFFF	FT	0.725	0.846	0.285	-0.199	3.483	2.759
608	2452385	2452415	19	20	FFTFFFFFF	FT	0.716	0.748	0.408	-0.047	3.491	2.624
608	2451785	2451815	17	18	FFTFFFFFF	FT	0.902	1.008	-0.101	0.301	3.162	3.375
608	2453255	2453315	17	18	FFTFFFFFF	FT	0.496	0.722	-0.019	-0.198	3.184	2.702
608	2452295	2452325	19	20	FFTFFFFFF	FT	0.617	0.789	0.102	0.149	3.835	3.042
608	2453765	2453945	16	17	FFTFFFFFF	FT	0.851	1.12	0.262	-0.438	2.38	1.807
608	2453255	2453315	18	19	FFTFFFFFF	FT	0.544	0.803	0.093	-0.318	3.204	2.623

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
608	2453555	2453585	17	18	FFTFFFFFF	FT	0.51	0.69	-0.012	0.023	3.623	2.636
608	2452895	2452925	17	18	FFTFFFFFF	FT	0.54	0.641	-0.096	-0.07	3.082	2.52
608	2453765	2453975	17	18	FFTFFFFFF	FT	0.854	1.128	0.403	-0.555	2.198	1.917
608	2453585	2453615	18	19	FFTFFFFFF	FT	0.557	0.699	-0.058	-0.262	3.467	2.333
608	2452775	2452805	19	20	FFTFFFFFF	FT	0.543	0.756	0.118	-0.199	3.287	2.513
608	2452865	2452895	18	19	FFTFFFFFF	FT	0.535	0.732	0.009	-0.197	3.462	2.399
608	2451965	2451995	19	20	FFTFFFFFF	FT	0.744	0.894	0.324	-0.298	3.563	2.703
608	2452325	2452355	18	19	FFTFFFFFF	FT	0.664	0.873	-0.074	0.305	3.199	3.071
608	2451815	2451905	19	20	FFTFFFFFF	FT	0.92	0.929	0.025	0.132	3.304	3.34
608	2451845	2451905	18	19	FFTFFFFFF	FT	0.898	0.932	0.125	0.247	3.644	3.582
608	2452145	2452175	17	18	FFTFFFFFF	FT	0.53	0.755	-0.045	0.004	3.692	2.907
608	2453345	2453375	18	19	FFTFFFFFF	FT	1.017	0.73	-0.427	0.048	1.868	2.753
608	2452685	2452715	20	21	FFTFFFFFF	FT	0.669	0.867	0.207	-0.329	3.398	2.478
608	2452685	2452715	19	20	FFTFFFFFF	FT	0.612	0.809	0.193	-0.213	3.614	2.48
608	2451995	2452025	19	20	FFTFFFFFF	FT	0.843	0.754	0.567	-0.086	3.035	2.731
608	2453075	2453105	19	20	FFTFFFFFF	FT	0.594	0.73	0.239	-0.219	3.572	2.408
608	2452415	2452475	19	20	FFTFFFFFF	FT	0.682	0.75	0.24	0.016	3.543	3.057
608	2452355	2452385	19	20	FFTFFFFFF	FT	1.016	0.931	-0.537	0.351	2.291	2.963
608	2452715	2452745	18	19	FFTFFFFFF	FT	0.575	0.75	0.158	-0.103	3.636	2.495
608	2452715	2452745	19	20	FFTFFFFFF	FT	0.603	0.797	0.187	-0.228	3.441	2.661
608	2453555	2453585	18	19	FFTFFFFFF	FT	0.517	0.692	-0.066	-0.144	3.497	2.594
608	2452745	2452775	19	20	FFTFFFFFF	FT	0.586	0.781	0.161	-0.228	3.672	2.396
608	2452175	2452205	19	20	FFTFFFFFF	FT	0.632	0.708	-0.18	0.023	2.841	3.04
608	2452805	2452835	19	20	FFTFFFFFF	FT	0.579	0.781	0.15	-0.146	3.354	2.393
608	2452475	2452505	19	20	FFTFFFFFF	FT	0.636	0.785	0.046	-0.028	3.879	2.903
608	2452445	2452475	18	19	FFTFFFFFF	FT	0.599	0.738	0.07	0.055	3.365	3.289

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
608	2452595	2452625	19	20	FFTFFFFFF	FT	0.589	0.745	-0.021	-0.205	3.342	2.453
608	2452955	2452985	18	19	FFTFFFFFF	FT	0.524	0.749	-0.01	-0.23	3.244	2.86
608	2452835	2452865	18	19	FFTFFFFFF	FT	0.564	0.715	0.074	-0.18	3.767	2.48
608	2452865	2452895	19	20	FFTFFFFFF	FT	0.563	0.809	0.089	-0.277	3.353	2.336
608	2452175	2452205	18	19	FFTFFFFFF	FT	0.621	0.722	-0.188	0.109	2.751	3.14
608	2453615	2453645	17	18	FFTFFFFFF	FT	0.541	0.651	-0.058	-0.016	3.162	2.442
608	2451935	2451965	19	20	FFTFFFFFF	FT	0.913	0.901	0.308	0.032	3.738	3.37
608	2452745	2452805	20	21	FFTFFFFFF	FT	0.61	0.821	0.161	-0.29	3.474	2.44
608	2453975	2454095	17	18	FFTFFFFFF	FT	0.809	1.181	0.364	-0.528	2.356	1.807
608	2453015	2453045	20	21	FFTFFFFFF	FT	0.581	0.723	0.072	-0.211	3.083	2.48
608	2452625	2452685	20	21	FFTFFFFFF	FT	0.614	0.813	0.111	-0.306	3.341	2.525
608	2452295	2452325	20	21	FFTFFFFFF	FT	0.653	0.84	0.126	0.072	3.585	2.92
608	2452325	2452355	19	20	FFTFFFFFF	FT	0.677	0.866	-0.082	0.284	3.222	3.279
608	2451785	2451815	18	19	FFTFFFFFF	FT	0.899	0.956	-0.137	0.233	3.043	3.552
608	2451905	2451935	17	18	FFTFFFFFF	FT	0.874	0.932	0.173	0.116	3.847	3.487
608	2452595	2452625	20	21	FFTFFFFFF	FT	0.627	0.808	0.016	-0.298	3.354	2.54
608	2451755	2451785	17	18	FFTFFFFFF	FT	1.099	0.751	-0.36	-0.109	2.107	3.065
608	2452085	2452115	18	19	FFTFFFFFF	FT	0.594	0.741	0.035	0.048	3.795	3.002
608	2451905	2451935	18	19	FFTFFFFFF	FT	0.875	0.856	0.224	-0.008	4.097	3.191
608	2452835	2452865	19	20	FFTFFFFFF	FT	0.594	0.799	0.141	-0.267	3.336	2.292
608	2452925	2452955	19	20	FFTFFFFFF	FT	0.554	0.842	0.088	-0.32	3.52	2.329
608	2453375	2453405	18	19	FFTFFFFFF	FT	0.634	0.665	-0.107	-0.048	3.271	2.658
608	2453435	2453585	19	20	FFTFFFFFF	FT	0.646	0.77	0.134	-0.352	3.36	2.252
608	2452895	2452925	18	19	FFTFFFFFF	FT	0.527	0.715	-0.035	-0.219	3.198	2.337
608	2452355	2452475	20	21	FFTFFFFFF	FT	0.879	0.867	-0.178	0.124	2.803	3.186
608	2451815	2451845	17	18	FFTFFFFFF	FT	1.002	0.948	-0.423	0.077	2.384	3.237

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
608	2451665	2451725	18	19	FFTFFFFFF	FT	0.66	0.791	-0.122	-0.364	3.254	3.474
608	2449595	2451755	19	20	FFTFFFFFF	FT	0.686	0.819	-0.052	-0.29	3.57	3.262
608	2453615	2453645	18	19	FFTFFFFFF	FT	0.519	0.663	-0.098	-0.172	3.03	2.438
608	2453135	2453165	18	19	FFTFFFFFF	FT	0.52	0.665	0.18	-0.074	3.412	2.629
608	2453525	2453555	18	19	FFTFFFFFF	FT	0.578	0.743	0.058	-0.136	3.879	2.608
608	2451995	2452115	20	21	FFTFFFFFF	FT	0.773	0.8	0.299	-0.066	3.456	3.011
608	2451635	2451665	18	19	FFTFFFFFF	FT	0.651	0.883	0.339	-0.477	3.518	3.597
608	2451935	2451965	18	19	FFTFFFFFF	FT	0.902	0.939	0.3	0.152	3.51	3.295
608	2453255	2453405	19	20	FFTFFFFFF	FT	0.788	0.837	0.16	-0.224	2.727	2.453
608	2452235	2452295	20	21	FFTFFFFFF	FT	0.777	0.794	0.388	-0.051	3.103	3.07
608	2451815	2451845	18	19	FFTFFFFFF	FT	0.957	0.923	-0.273	-0.034	2.577	3.086
608	2453105	2453165	19	20	FFTFFFFFF	FT	0.593	0.717	0.244	-0.215	3.3	2.576
608	2452085	2452115	19	20	FFTFFFFFF	FT	0.601	0.782	0.073	-0.053	3.814	2.871
608	2452115	2452145	18	19	FFTFFFFFF	FT	0.594	0.756	-0.045	0.077	3.489	3.062
608	2452145	2452235	20	21	FFTFFFFFF	FT	0.636	0.744	-0.046	-0.08	3.234	2.939
608	2452535	2452565	18	19	FFTFFFFFF	FT	0.936	0.788	-0.439	0.056	3.584	2.998
608	2452805	2452895	20	21	FFTFFFFFF	FT	0.62	0.84	0.153	-0.281	3.086	2.335
608	2452115	2452145	19	20	FFTFFFFFF	FT	0.601	0.765	-0.016	-0.02	3.468	3.007
608	2453765	2453975	18	19	FFTFFFFFF	FT	0.884	1.175	0.477	-0.604	2.14	1.887
608	2453585	2454035	19	20	FFTFFFFFF	FT	0.683	0.916	0.115	-0.446	3.084	2.3
608	2452535	2452565	19	20	FFTFFFFFF	FT	0.979	0.804	-0.437	-0.061	3.375	2.874
608	2451905	2451935	19	20	FFTFFFFFF	FT	0.876	0.916	0.237	0.08	3.818	3.251
608	2452895	2452925	19	20	FFTFFFFFF	FT	0.55	0.819	0.027	-0.344	3.25	2.236
608	2452955	2453015	20	21	FFTFFFFFF	FT	0.597	0.779	0.002	-0.144	3.137	2.618
608	2452145	2452175	19	20	FFTFFFFFF	FT	0.568	0.765	-0.013	-0.145	3.346	3.053
608	2452145	2452175	18	19	FFTFFFFFF	FT	0.568	0.751	-0.046	-0.034	3.426	2.62

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
608	2452565	2452595	20	21	FFTFFFFFF	FT	0.691	0.82	-0.137	0	3.332	2.704
608	2452925	2452955	20	21	FFTFFFFFF	FT	0.602	0.921	0.155	-0.357	2.879	2.272
608	2452505	2452535	19	20	FFTFFFFFF	FT	0.746	0.744	-0.372	0.018	2.72	3.128
608	2451755	2451785	19	20	FFTFFFFFF	FT	1.17	0.8	0.135	-0.138	2.001	2.914
608	2452325	2452355	20	21	FFTFFFFFF	FT	0.743	0.867	-0.078	0.272	3.514	3.291
608	2452115	2452145	20	21	FFTFFFFFF	FT	0.631	0.804	0.067	-0.108	3.531	3.051
608	2452535	2452565	20	21	FFTFFFFFF	FT	0.956	0.887	-0.389	-0.127	3.264	2.727
608	2452715	2452745	20	21	FFTFFFFFF	FT	0.656	0.835	0.264	-0.318	3.183	2.55
608	2453975	2454035	18	19	FFTFFFFFF	FT	0.805	1.208	0.398	-0.597	2.329	1.786
608	2453045	2453075	20	21	FFTFFFFFF	FT	0.586	0.742	0.186	-0.274	3.461	2.437
608	2452895	2452925	20	21	FFTFFFFFF	FT	0.595	0.915	0.09	-0.44	3.144	2.258
608	2449565	2451995	20	21	FFTFFFFFF	FT	0.93	0.886	0.296	-0.123	3.291	3.043
608	2452475	2452535	20	21	FFTFFFFFF	FT	0.715	0.779	-0.203	-0.036	3.073	2.95
608	2449625	2450795	16	17	FFTFFFFFF	FT	0.615	0.655	-0.034	0.218	4.19	4.074
608	2451785	2451815	19	20	FFTFFFFFF	FT	0.898	0.977	-0.18	0.222	3.055	3.364
608	2453075	2454035	20	21	FFTFFFFFF	FT	0.665	0.789	0.213	-0.246	3.139	2.52
608	2449565	2450795	17	18	FFTFFFFFF	FT	0.656	0.642	-0.057	0.102	4.15	4.547
608	2449595	2451245	18	19	FFTFFFFFF	FT	0.676	0.673	-0.126	0.062	3.885	4.589
610	2450015	2452355	16	17	FFTFFFFFF	FT	0.796	0.738	0.159	0.149	3.828	3.926
610	2449985	2451755	13	16	FFTFFFFFF	FT	0.748	0.688	0.129	0.085	4.155	3.866
610	2450075	2452355	17	18	FFTFFFFFF	FT	0.794	0.739	0.124	0.101	3.899	4.026
610	2451815	2452955	15	16	FFTFFFFFF	FT	0.453	0.553	-0.049	0.066	7.804	4.328
611	2450285	2454995	18	20	FFTFFFFFF	FT	0.623	0.599	0.036	0.043	4.761	4.756
620	2450315	2454695	17	18	FFTFFFFFF	FT	0.761	0.702	-0.118	0.054	4.289	4.847
621	2452985	2454395	18	19	FFTFFFFFF	FT	0.305	0.295	0.017	-0.03	6.534	7.379
621	2452595	2453885	17	18	FFTFFFFFF	FT	0.297	0.262	-0.004	-0.008	5.852	7.581

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
621	2452985	2453705	19	20	FFTFFFFFF	FT	0.425	0.423	0.036	0.013	4.526	5.056
621	2454425	2455085	18	19	FFTFFFFFF	FT	0.263	0.246	0.05	-0.026	8.325	11.284
621	2450315	2452955	18	19	FFTFFFFFF	FT	0.385	0.365	-0.003	0.04	4.997	5.878
621	2452535	2452955	19	20	FFTFFFFFF	FT	0.5	0.446	0.01	0.002	4.109	4.198
621	2453045	2455085	20	21	FFTFFFFFF	FT	0.428	0.422	0.078	0.056	4.563	5.274
621	2454635	2455085	19	20	FFTFFFFFF	FT	0.328	0.316	0.088	0.022	7.462	6.935
621	2453915	2455085	17	18	FFTFFFFFF	FT	0.19	0.191	0.018	-0.025	10.796	6.566
621	2450555	2455085	16	17	FFTFFFFFF	FT	0.237	0.235	-0.014	0.008	9.116	5.641
621	2453735	2454605	19	20	FFTFFFFFF	FT	0.321	0.312	0.049	-0.012	6.161	7.827
621	2450075	2452505	19	20	FFTFFFFFF	FT	0.455	0.413	-0.001	0.079	5.308	5.52
621	2450165	2452565	17	18	FFTFFFFFF	FT	0.339	0.34	-0.002	0.026	5.954	5.516
621	2450135	2452955	20	21	FFTFFFFFF	FT	0.581	0.518	0.015	0.041	4.269	4.626
636	2451995	2452955	18	19	FFTFFFFFF	FT	0.493	0.537	-0.028	-0.011	4.43	4.625
644	2452235	2452295	14	15	FFTFFFFFF	FT	0.304	0.564	-0.033	0.375	5.969	3.082
644	2452295	2452325	14	15	FFTFFFFFF	FT	0.389	0.549	0.225	0.356	9.294	4.185
644	2453705	2453855	15	16	FFTFFFFFF	FT	0.195	0.139	-0.059	-0.01	11.212	14.208
644	2453795	2453825	16	17	FFTFFFFFF	FT	0.193	0.155	-0.037	0.006	9.883	16.525
644	2451995	2454215	11	12	FFTFFFFFF	FT	0.526	0.542	0.099	0.259	6.383	4.746
644	2453585	2453615	16	17	FFTFFFFFF	FT	0.174	0.179	-0.022	0.066	11.882	15.167
644	2451335	2452415	12	13	FFTFFFFFF	FT	0.438	0.635	0.027	0.392	4.88	3.76
644	2452625	2452685	14	15	FFTFFFFFF	FT	0.224	0.407	0.008	0.125	10.934	5.201
644	2452685	2452745	14	15	FFTFFFFFF	FT	0.268	0.462	0.102	0.195	6.474	4.298
644	2454125	2454215	15	16	FFTFFFFFF	FT	0.17	0.146	-0.034	-0.022	10.529	22.013
644	2452235	2452475	13	14	FFTFFFFFF	FT	0.399	0.561	0.179	0.363	6.937	3.791
644	2452415	2452445	15	16	FFTFFFFFF	FT	0.381	0.585	0.077	0.327	7.998	3.826
644	2452475	2452505	15	16	FFTFFFFFF	FT	0.323	0.582	-0.077	0.39	12.162	3.454

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
644	2452475	2452505	14	15	FFTFFFFFF	FT	0.304	0.605	-0.057	0.416	11.217	3.072
644	2452475	2452595	13	14	FFTFFFFFF	FT	0.321	0.591	-0.164	0.421	5.547	3.042
644	2452925	2453075	14	15	FFTFFFFFF	FT	0.195	0.182	-0.045	0.042	5.945	7.706
644	2453345	2453525	15	16	FFTFFFFFF	FT	0.249	0.214	-0.064	0.022	5.488	8.339
644	2453915	2454065	14	15	FFTFFFFFF	FT	0.254	0.163	0.018	0.091	16.868	9.494
644	2454065	2454095	15	16	FFTFFFFFF	FT	0.198	0.151	-0.074	0.014	8.612	23.001
644	2454065	2454095	16	17	FFTFFFFFF	FT	0.185	0.155	-0.043	0.017	7.083	14.332
644	2451995	2452235	13	14	FFTFFFFFF	FT	0.472	0.736	-0.129	0.413	5.891	3.125
644	2453765	2454215	13	14	FFTFFFFFF	FT	0.531	0.161	0.231	0.024	5.813	19.906
644	2454065	2454095	17	18	FFTFFFFFF	FT	0.19	0.172	0.015	0.024	7.245	10.324
644	2452115	2452175	14	15	FFTFFFFFF	FT	0.524	0.716	-0.208	0.365	4.911	3.875
644	2453525	2453555	14	15	FFTFFFFFF	FT	0.21	0.222	-0.053	0.072	14.728	18.715
644	2453585	2453615	15	16	FFTFFFFFF	FT	0.189	0.187	-0.032	0.075	13.747	15.927
644	2453615	2453645	15	16	FFTFFFFFF	FT	0.167	0.171	-0.041	0.065	7.595	27.936
644	2453975	2454005	15	16	FFTFFFFFF	FT	0.185	0.177	-0.019	0.112	22.912	11.323
644	2452325	2452355	15	16	FFTFFFFFF	FT	0.383	0.553	0.279	0.369	3.353	3.42
644	2452325	2452355	14	15	FFTFFFFFF	FT	0.402	0.569	0.286	0.37	4.656	3.211
644	2453855	2453885	15	16	FFTFFFFFF	FT	0.184	0.152	-0.004	0.049	14.443	29.804
644	2452415	2452745	12	13	FFTFFFFFF	FT	0.3	0.567	-0.035	0.333	8.323	3.795
644	2452505	2452535	14	15	FFTFFFFFF	FT	0.376	0.6	-0.214	0.421	6.296	2.754
644	2452295	2452325	15	16	FFTFFFFFF	FT	0.367	0.544	0.219	0.346	5.286	3.623
644	2452175	2452205	14	15	FFTFFFFFF	FT	0.479	0.754	-0.173	0.455	5.008	2.718
644	2452565	2452595	14	15	FFTFFFFFF	FT	0.304	0.61	-0.152	0.464	5.756	2.663
644	2452595	2452745	13	14	FFTFFFFFF	FT	0.251	0.435	0.001	0.204	9.333	4.817
644	2452685	2452715	15	16	FFTFFFFFF	FT	0.281	0.485	0.12	0.263	7.113	4.078
644	2454035	2454065	15	16	FFTFFFFFF	FT	0.167	0.143	-0.044	0.046	8.225	7.933

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
644	2452355	2452385	14	15	FFTFFFFFF	FT	0.437	0.579	0.342	0.393	4.504	3.389
644	2452385	2452415	15	16	FFTFFFFFF	FT	0.451	0.563	0.323	0.371	3.24	3.407
644	2452715	2452745	15	16	FFTFFFFFF	FT	0.24	0.412	0.051	0.143	9.208	4.933
644	2452595	2452625	15	16	FFTFFFFFF	FT	0.284	0.502	-0.105	0.267	6.879	3.744
644	2452655	2452685	15	16	FFTFFFFFF	FT	0.235	0.422	0.016	0.135	9.247	5.017
644	2453105	2453165	15	16	FFTFFFFFF	FT	0.222	0.201	-0.021	0.076	7.645	6.846
644	2453645	2453675	15	16	FFTFFFFFF	FT	0.186	0.155	-0.079	0.047	5.804	12.386
644	2453585	2453735	14	15	FFTFFFFFF	FT	0.198	0.164	-0.058	0.065	13.397	14.163
644	2454065	2454125	14	15	FFTFFFFFF	FT	0.237	0.16	-0.063	-0.002	12.628	33.333
644	2452355	2452385	15	16	FFTFFFFFF	FT	0.428	0.591	0.344	0.411	3	3.612
644	2452385	2452415	14	15	FFTFFFFFF	FT	0.442	0.559	0.317	0.352	2.967	3.821
644	2453735	2453915	14	15	FFTFFFFFF	FT	0.252	0.157	0.022	0.009	14.939	32.902
644	2453375	2453525	14	15	FFTFFFFFF	FT	0.24	0.199	-0.064	0.023	6.597	11.522
644	2452415	2452445	14	15	FFTFFFFFF	FT	0.364	0.586	0.057	0.327	6.029	3.659
644	2453885	2453945	15	16	FFTFFFFFF	FT	0.181	0.173	-0.005	0.087	13.043	12.404
644	2452655	2452685	16	17	FFTFFFFFF	FT	0.245	0.42	0.012	0.13	8.555	4.883
644	2452175	2452205	15	16	FFTFFFFFF	FT	0.494	0.734	-0.194	0.444	5.092	3.15
644	2452625	2452655	15	16	FFTFFFFFF	FT	0.236	0.404	0.029	0.125	6.275	4.292
644	2453555	2453585	14	15	FFTFFFFFF	FT	0.217	0.185	-0.055	0.083	13.385	17.715
644	2454095	2454125	15	16	FFTFFFFFF	FT	0.199	0.152	-0.074	-0.01	8.924	18.675
644	2454125	2454155	16	17	FFTFFFFFF	FT	0.163	0.144	-0.029	-0.015	11.143	21.267
644	2453945	2453975	15	16	FFTFFFFFF	FT	0.185	0.167	-0.022	0.099	10.865	9.423
644	2453675	2453705	15	16	FFTFFFFFF	FT	0.23	0.138	-0.068	0.038	15.173	5.517
644	2454125	2454215	14	15	FFTFFFFFF	FT	0.223	0.124	0.006	-0.044	16.02	10.381
644	2453825	2453855	16	17	FFTFFFFFF	FT	0.164	0.145	-0.001	0.036	6.169	15.191
644	2453885	2453915	16	17	FFTFFFFFF	FT	0.176	0.181	-0.001	0.095	11.666	11.566

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
644	2452385	2452415	16	17	FFTFFFFFF	FT	0.459	0.579	0.329	0.377	3.505	3.552
644	2453855	2453885	16	17	FFTFFFFFF	FT	0.164	0.167	-0.001	0.072	9.03	21.659
644	2452295	2452325	16	17	FFTFFFFFF	FT	0.391	0.563	0.251	0.378	4.302	3.433
644	2453615	2453645	16	17	FFTFFFFFF	FT	0.172	0.155	-0.034	0.059	10.222	11.565
644	2452205	2452235	14	15	FFTFFFFFF	FT	0.337	0.663	-0.153	0.511	4.051	2.713
644	2454035	2454065	16	17	FFTFFFFFF	FT	0.164	0.146	-0.022	0.046	11.531	15.078
644	2452445	2452475	14	15	FFTFFFFFF	FT	0.376	0.582	-0.029	0.352	10.978	3.232
644	2452445	2452475	15	16	FFTFFFFFF	FT	0.335	0.596	-0.025	0.361	8.316	4.061
644	2454125	2454155	17	18	FFTFFFFFF	FT	0.162	0.142	-0.005	-0.008	11.46	14.393
644	2454155	2454185	17	18	FFTFFFFFF	FT	0.171	0.147	-0.004	0.007	7.49	12.503
644	2452145	2452175	15	16	FFTFFFFFF	FT	0.518	0.706	-0.164	0.405	5.574	3.468
644	2452205	2452235	16	17	FFTFFFFFF	FT	0.36	0.641	-0.117	0.464	4.93	2.9
644	2452595	2452625	14	15	FFTFFFFFF	FT	0.266	0.516	-0.103	0.276	7.759	3.651
644	2452595	2452625	16	17	FFTFFFFFF	FT	0.282	0.523	-0.075	0.272	6.987	4.004
644	2452805	2453375	12	13	FFTFFFFFF	FT	0.318	0.197	0.055	0.087	10.489	12.438
644	2452505	2452535	16	17	FFTFFFFFF	FT	0.364	0.574	-0.211	0.379	5.095	3.357
644	2453015	2453045	16	17	FFTFFFFFF	FT	0.204	0.192	-0.035	0.026	8.093	6.87
644	2453765	2453795	16	17	FFTFFFFFF	FT	0.172	0.147	-0.013	0.021	11.255	27.761
644	2454155	2454185	16	17	FFTFFFFFF	FT	0.167	0.148	-0.039	-0.017	6.764	19.647
644	2452355	2452385	16	17	FFTFFFFFF	FT	0.445	0.584	0.354	0.411	3.222	3.459
644	2453645	2453675	16	17	FFTFFFFFF	FT	0.186	0.159	-0.052	0.04	10.87	11.469
644	2453765	2453795	17	18	FFTFFFFFF	FT	0.179	0.158	-0.01	0.028	7.746	9.08
644	2454035	2454065	17	18	FFTFFFFFF	FT	0.166	0.157	0.001	0.038	8.509	10.555
644	2454095	2454125	16	17	FFTFFFFFF	FT	0.189	0.16	-0.039	0.004	9.594	12.652
644	2452805	2453165	13	14	FFTFFFFFF	FT	0.214	0.201	-0.015	0.071	6.998	10.153
644	2453345	2453765	13	14	FFTFFFFFF	FT	0.316	0.174	0.007	0.03	12.051	20.49

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
644	2453075	2453195	14	15	FFTFFFFFF	FT	0.21	0.192	-0.049	0.052	8.698	7.98
644	2453195	2453375	14	15	FFTFFFFFF	FT	0.229	0.225	-0.055	0.1	7.805	12.592
644	2453165	2453345	13	14	FFTFFFFFF	FT	0.231	0.218	-0.036	0.116	10.614	6.23
644	2453825	2453855	17	18	FFTFFFFFF	FT	0.189	0.167	0.011	0.06	6.227	8.876
644	2454185	2454215	17	18	FFTFFFFFF	FT	0.173	0.164	0.02	0.059	7.092	13.97
644	2453945	2453975	16	17	FFTFFFFFF	FT	0.181	0.177	-0.022	0.1	18.385	9.655
644	2451335	2452115	14	15	FFTFFFFFF	FT	0.497	0.727	-0.067	0.253	4.94	3.791
644	2452505	2452535	15	16	FFTFFFFFF	FT	0.357	0.583	-0.216	0.369	4.637	3.445
644	2452895	2452925	15	16	FFTFFFFFF	FT	0.215	0.191	-0.082	0.059	5.706	6.958
644	2452265	2452295	15	16	FFTFFFFFF	FT	0.304	0.59	0.026	0.397	5.978	3.421
644	2452265	2452295	16	17	FFTFFFFFF	FT	0.312	0.565	0.058	0.379	5.989	3.471
644	2453915	2453945	16	17	FFTFFFFFF	FT	0.202	0.198	-0.018	0.1	18.876	11.451
644	2453975	2454005	16	17	FFTFFFFFF	FT	0.173	0.164	-0.03	0.091	10.798	5.977
644	2452145	2452175	17	18	FFTFFFFFF	FT	0.514	0.723	-0.158	0.397	4.813	3.427
644	2452235	2452265	15	16	FFTFFFFFF	FT	0.301	0.584	-0.041	0.392	7.869	3.189
644	2453075	2453105	15	16	FFTFFFFFF	FT	0.208	0.174	-0.055	0.024	8.463	13.571
644	2453165	2453195	15	16	FFTFFFFFF	FT	0.227	0.211	-0.035	0.098	6.675	3.529
644	2452565	2452595	15	16	FFTFFFFFF	FT	0.317	0.593	-0.165	0.422	7.246	3.052
644	2454005	2454035	15	16	FFTFFFFFF	FT	0.167	0.148	-0.055	0.076	6.669	14.042
644	2453045	2453075	15	16	FFTFFFFFF	FT	0.202	0.182	-0.052	0.015	6.059	5.419
644	2453045	2453075	16	17	FFTFFFFFF	FT	0.222	0.196	-0.041	0.026	6.108	7.199
644	2454185	2454215	16	17	FFTFFFFFF	FT	0.181	0.138	-0.011	0.034	13.586	12.889
644	2452685	2452715	16	17	FFTFFFFFF	FT	0.293	0.48	0.122	0.244	4.983	3.693
644	2452685	2452715	17	18	FFTFFFFFF	FT	0.322	0.503	0.152	0.277	4.791	3.736
644	2454095	2454125	17	18	FFTFFFFFF	FT	0.188	0.171	0.012	0.012	6.319	9.446
644	2453465	2453495	16	17	FFTFFFFFF	FT	0.286	0.232	-0.089	-0.024	3.063	4.218

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
644	2453945	2453975	17	18	FFTFFFFFF	FT	0.177	0.182	-0.022	0.091	12.185	9.947
644	2454005	2454035	16	17	FFTFFFFFF	FT	0.164	0.144	-0.043	0.052	8.233	14.923
644	2453315	2453345	15	16	FFTFFFFFF	FT	0.237	0.204	-0.032	0.045	5.843	5.782
644	2452325	2452355	17	18	FFTFFFFFF	FT	0.447	0.59	0.342	0.416	2.902	3.148
644	2452325	2452355	16	17	FFTFFFFFF	FT	0.41	0.572	0.307	0.398	3.305	3.396
644	2453705	2453735	16	17	FFTFFFFFF	FT	0.177	0.151	-0.044	-0.009	9.836	16.438
644	2452265	2452295	17	18	FFTFFFFFF	FT	0.333	0.591	0.1	0.396	6.718	3.25
644	2452295	2452325	17	18	FFTFFFFFF	FT	0.404	0.576	0.268	0.385	3.496	3.392
644	2453675	2453705	16	17	FFTFFFFFF	FT	0.191	0.165	-0.042	0.039	16.101	18.289
644	2452805	2452895	14	15	FFTFFFFFF	FT	0.246	0.26	-0.053	0.121	5.405	10.102
644	2452145	2452175	16	17	FFTFFFFFF	FT	0.513	0.695	-0.175	0.393	4.994	3.368
644	2452535	2452565	14	15	FFTFFFFFF	FT	0.408	0.566	-0.264	0.402	4.126	3.383
644	2453855	2453885	18	19	FFTFFFFFF	FT	0.2	0.207	0.02	0.112	6.224	6.466
644	2453075	2453105	16	17	FFTFFFFFF	FT	0.221	0.19	-0.044	0.026	7.696	6.406
644	2453195	2453225	15	16	FFTFFFFFF	FT	0.225	0.207	-0.064	0.088	6.491	5.176
644	2453375	2454215	12	13	FFTFFFFFF	FT	0.764	0.172	0.448	0.031	3.745	27.008
644	2454155	2454185	18	19	FFTFFFFFF	FT	0.191	0.175	0.046	0.039	6.328	9.542
644	2453675	2453705	18	19	FFTFFFFFF	FT	0.208	0.202	0.048	0.06	6.22	5.557
644	2453105	2453135	16	17	FFTFFFFFF	FT	0.209	0.209	-0.013	0.082	6.479	5.543
644	2452445	2452475	16	17	FFTFFFFFF	FT	0.344	0.579	-0.022	0.339	7.803	3.737
644	2452235	2452265	16	17	FFTFFFFFF	FT	0.313	0.57	-0.017	0.388	5.931	3.343
644	2452475	2452505	16	17	FFTFFFFFF	FT	0.294	0.594	-0.083	0.394	9.304	3.525
644	2452895	2452925	14	15	FFTFFFFFF	FT	0.205	0.201	-0.076	0.105	4	4.232
644	2453165	2453195	16	17	FFTFFFFFF	FT	0.243	0.242	-0.029	0.117	6.838	4.861
644	2454065	2454095	18	19	FFTFFFFFF	FT	0.215	0.196	0.071	0.046	4.942	6.991
644	2454095	2454125	18	19	FFTFFFFFF	FT	0.213	0.2	0.066	0.036	4.334	6.622

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
644	2452415	2452445	16	17	FFTFFFFFF	FT	0.383	0.573	0.11	0.331	6.549	3.72
644	2452205	2452235	15	16	FFTFFFFFF	FT	0.359	0.657	-0.142	0.491	5.676	2.796
644	2453555	2453585	15	16	FFTFFFFFF	FT	0.199	0.191	-0.051	0.086	9.883	10.768
644	2452955	2452985	15	16	FFTFFFFFF	FT	0.198	0.179	-0.034	0.026	4.578	6.446
644	2452985	2453015	15	16	FFTFFFFFF	FT	0.194	0.188	-0.025	0.007	4.173	5.806
644	2453855	2453885	17	18	FFTFFFFFF	FT	0.183	0.185	0.007	0.094	7.801	10.899
644	2451335	2452055	16	17	FFTFFFFFF	FT	0.535	0.71	0.225	0.313	4.82	3.71
644	2453615	2453645	18	19	FFTFFFFFF	FT	0.194	0.189	0.006	0.065	7.523	4.914
644	2453705	2453735	17	18	FFTFFFFFF	FT	0.168	0.165	0.004	0.015	6.79	15.364
644	2452115	2452145	16	17	FFTFFFFFF	FT	0.535	0.706	-0.204	0.252	4.826	3.825
644	2452175	2452205	17	18	FFTFFFFFF	FT	0.475	0.71	-0.172	0.422	4.239	3.069
644	2453645	2453675	17	18	FFTFFFFFF	FT	0.183	0.178	-0.012	0.037	10.01	8.35
644	2452175	2452205	16	17	FFTFFFFFF	FT	0.484	0.708	-0.184	0.418	4.744	2.97
644	2452415	2452445	17	18	FFTFFFFFF	FT	0.382	0.573	0.137	0.324	4.579	3.511
644	2454185	2454215	18	19	FFTFFFFFF	FT	0.212	0.194	0.054	0.076	4.404	4.772
644	2453015	2453045	15	16	FFTFFFFFF	FT	0.192	0.177	-0.049	0.015	7.457	9.566
644	2453285	2453315	15	16	FFTFFFFFF	FT	0.227	0.215	-0.036	0.073	8.561	5.079
644	2452355	2452385	17	18	FFTFFFFFF	FT	0.48	0.595	0.39	0.425	2.734	3.154
644	2451335	2452085	15	16	FFTFFFFFF	FT	0.497	0.725	0.041	0.214	4.02	4.885
644	2453885	2453915	17	18	FFTFFFFFF	FT	0.193	0.208	0.01	0.115	8.095	7.523
644	2453225	2453255	15	16	FFTFFFFFF	FT	0.256	0.224	-0.056	0.093	7.711	9.466
644	2453675	2453705	17	18	FFTFFFFFF	FT	0.19	0.179	-0.001	0.05	9.111	8.906
644	2453735	2453765	17	18	FFTFFFFFF	FT	0.186	0.175	0.013	0.013	6.914	9.991
644	2453735	2453765	16	17	FFTFFFFFF	FT	0.194	0.175	-0.038	-0.012	9.25	15.085
644	2451335	2452055	17	18	FFTFFFFFF	FT	0.55	0.755	0.199	0.275	3.815	3.633
644	2452085	2452115	15	16	FFTFFFFFF	FT	0.523	0.753	-0.14	0.19	4.667	4.284

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
644	2452115	2452145	15	16	FFTFFFFFF	FT	0.504	0.734	-0.174	0.264	4.386	4.226
644	2452205	2452235	17	18	FFTFFFFFF	FT	0.373	0.657	-0.11	0.474	4.403	2.944
644	2452235	2452265	17	18	FFTFFFFFF	FT	0.335	0.595	0.005	0.41	6.591	3.235
644	2452235	2452265	18	19	FFTFFFFFF	FT	0.365	0.637	0.042	0.444	5.931	2.967
644	2453435	2453465	17	18	FFTFFFFFF	FT	0.315	0.25	0.017	0.047	5.128	4.154
644	2453495	2453525	18	19	FFTFFFFFF	FT	0.25	0.276	0.077	0.133	3.689	3.884
644	2452385	2452415	17	18	FFTFFFFFF	FT	0.471	0.596	0.338	0.4	2.735	3.291
644	2452865	2452895	16	17	FFTFFFFFF	FT	0.241	0.227	-0.096	0.076	4.306	5.161
644	2452895	2452925	16	17	FFTFFFFFF	FT	0.218	0.195	-0.07	0.042	5.861	4.718
644	2453435	2453465	16	17	FFTFFFFFF	FT	0.308	0.233	-0.031	0.029	4.141	5.361
644	2453885	2453915	18	19	FFTFFFFFF	FT	0.218	0.23	0.02	0.129	6.443	4.482
644	2453915	2453945	17	18	FFTFFFFFF	FT	0.187	0.202	-0.021	0.118	7.818	7.898
644	2453915	2453945	18	19	FFTFFFFFF	FT	0.21	0.218	-0.017	0.119	6.003	4.787
644	2453285	2453315	16	17	FFTFFFFFF	FT	0.24	0.228	-0.034	0.061	7.596	6.426
644	2453585	2453615	17	18	FFTFFFFFF	FT	0.18	0.184	-0.002	0.076	9.96	8.955
644	2452535	2452565	16	17	FFTFFFFFF	FT	0.416	0.556	-0.271	0.365	3.674	3.619
644	2452805	2452835	15	16	FFTFFFFFF	FT	0.252	0.282	-0.014	0.148	5.267	6.887
644	2451335	2454095	10	11	FFTFFFFFF	FT	0.592	0.589	0.087	0.316	5.748	3.564
644	2452595	2452625	17	18	FFTFFFFFF	FT	0.292	0.518	-0.049	0.269	6.274	3.824
644	2452595	2452625	18	19	FFTFFFFFF	FT	0.317	0.552	-0.016	0.3	4.432	3.416
644	2454005	2454035	17	18	FFTFFFFFF	FT	0.159	0.152	-0.013	0.043	9.604	14.771
644	2452535	2452565	17	18	FFTFFFFFF	FT	0.406	0.567	-0.25	0.37	3.22	3.334
644	2453105	2453135	17	18	FFTFFFFFF	FT	0.233	0.233	0.022	0.102	5.402	4.413
644	2453165	2453195	17	18	FFTFFFFFF	FT	0.243	0.263	-0.009	0.137	5.546	3.842
644	2453045	2453075	17	18	FFTFFFFFF	FT	0.24	0.226	-0.021	0.046	7.196	5.592
644	2453495	2453525	16	17	FFTFFFFFF	FT	0.226	0.225	-0.014	0.075	6.487	7.243

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
644	2453525	2453555	15	16	FFTFFFFFF	FT	0.196	0.201	-0.019	0.09	10.324	11.853
644	2452565	2452595	16	17	FFTFFFFFF	FT	0.323	0.596	-0.129	0.406	7.656	3.287
644	2452715	2452745	16	17	FFTFFFFFF	FT	0.253	0.424	0.049	0.167	8.789	4.471
644	2452925	2452955	15	16	FFTFFFFFF	FT	0.195	0.189	-0.067	0.035	4.478	5.283
644	2452985	2453015	17	18	FFTFFFFFF	FT	0.243	0.232	0.001	0.034	5.011	6
644	2453345	2453405	17	18	FFTFFFFFF	FT	0.298	0.257	0.088	0.074	6.617	4.774
644	2453855	2453885	19	20	FFTFFFFFF	FT	0.25	0.248	0.049	0.134	4.144	3.45
644	2453975	2454005	20	21	FFTFFFFFF	FT	0.305	0.291	0.038	0.116	3.28	3.431
644	2453975	2454005	19	20	FFTFFFFFF	FT	0.237	0.225	0.014	0.088	4.024	3.839
644	2453225	2453255	17	18	FFTFFFFFF	FT	0.277	0.253	-0.016	0.098	7.179	4.397
644	2452325	2452355	18	19	FFTFFFFFF	FT	0.499	0.628	0.388	0.442	2.595	2.983
644	2452565	2452595	17	18	FFTFFFFFF	FT	0.325	0.63	-0.083	0.438	6.02	3.044
644	2454155	2454185	19	20	FFTFFFFFF	FT	0.231	0.218	0.092	0.085	3.636	4.183
644	2452055	2452085	18	19	FFTFFFFFF	FT	0.544	0.831	0.019	0.21	4.119	3.743
644	2452055	2452085	17	18	FFTFFFFFF	FT	0.538	0.846	-0.031	0.131	4.03	3.748
644	2452535	2452565	15	16	FFTFFFFFF	FT	0.413	0.573	-0.271	0.406	4.047	2.965
644	2452655	2452685	17	18	FFTFFFFFF	FT	0.255	0.429	0.026	0.146	5.351	4.699
644	2452655	2452685	18	19	FFTFFFFFF	FT	0.291	0.447	0.058	0.16	4.571	4.188
644	2453075	2453105	17	18	FFTFFFFFF	FT	0.237	0.211	-0.009	0.048	7.814	4.506
644	2454035	2454065	18	19	FFTFFFFFF	FT	0.181	0.175	0.034	0.044	5.628	7.744
644	2453615	2453645	17	18	FFTFFFFFF	FT	0.181	0.172	-0.011	0.057	9.735	10.428
644	2452835	2452865	15	16	FFTFFFFFF	FT	0.237	0.208	-0.111	0.08	4.416	5.043
644	2452055	2452085	16	17	FFTFFFFFF	FT	0.567	0.818	-0.029	0.201	4.969	4.055
644	2452955	2452985	16	17	FFTFFFFFF	FT	0.213	0.195	-0.025	0.007	6.458	6.045
644	2452985	2453015	16	17	FFTFFFFFF	FT	0.222	0.207	-0.021	0.025	5.958	5.908
644	2453795	2453825	17	18	FFTFFFFFF	FT	0.182	0.169	0.027	0.054	4.796	8.08

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
644	2453405	2453435	16	17	FFTFFFFFF	FT	0.249	0.212	0.039	0.052	6.773	5.022
644	2453495	2453525	17	18	FFTFFFFFF	FT	0.233	0.239	0.033	0.094	4.709	4.67
644	2453225	2453255	16	17	FFTFFFFFF	FT	0.255	0.235	-0.05	0.091	6.777	5.973
644	2453975	2454005	17	18	FFTFFFFFF	FT	0.175	0.173	-0.011	0.08	7.039	6.776
644	2452355	2452385	18	19	FFTFFFFFF	FT	0.536	0.63	0.436	0.456	2.358	2.947
644	2454005	2454035	18	19	FFTFFFFFF	FT	0.176	0.171	0.018	0.054	4.891	7.099
644	2452265	2452295	18	19	FFTFFFFFF	FT	0.358	0.612	0.144	0.417	3.814	3.072
644	2453135	2453165	16	17	FFTFFFFFF	FT	0.233	0.242	0.002	0.125	6.467	4.696
644	2452625	2452655	16	17	FFTFFFFFF	FT	0.278	0.416	0.039	0.148	5.337	4.632
644	2452385	2452415	18	19	FFTFFFFFF	FT	0.501	0.631	0.361	0.429	2.561	3.084
644	2452385	2452415	19	20	FFTFFFFFF	FT	0.545	0.68	0.372	0.447	2.769	3.021
644	2453795	2453825	19	20	FFTFFFFFF	FT	0.272	0.254	0.148	0.137	3.527	3.153
644	2453255	2453285	15	16	FFTFFFFFF	FT	0.226	0.216	-0.037	0.069	8.175	7.591
644	2453255	2453285	16	17	FFTFFFFFF	FT	0.245	0.214	-0.043	0.052	7.832	5.784
644	2453195	2453225	17	18	FFTFFFFFF	FT	0.252	0.23	-0.013	0.085	5.944	4.418
644	2453525	2453555	16	17	FFTFFFFFF	FT	0.187	0.215	0.014	0.119	7.947	6.548
644	2452445	2452475	18	19	FFTFFFFFF	FT	0.336	0.577	-0.022	0.311	4.717	3.478
644	2452265	2452295	19	20	FFTFFFFFF	FT	0.424	0.662	0.21	0.46	3.988	2.81
644	2452805	2452835	16	17	FFTFFFFFF	FT	0.275	0.302	-0.003	0.154	4.5	4.889
644	2452865	2452895	15	16	FFTFFFFFF	FT	0.209	0.224	-0.083	0.095	3.549	5.911
644	2452115	2452145	18	19	FFTFFFFFF	FT	0.51	0.724	-0.15	0.275	4.31	4.003
644	2452115	2452145	19	20	FFTFFFFFF	FT	0.506	0.723	-0.131	0.294	4.17	3.472
644	2452295	2452325	18	19	FFTFFFFFF	FT	0.451	0.623	0.301	0.424	3.211	3.152
644	2453825	2453855	18	19	FFTFFFFFF	FT	0.212	0.201	0.048	0.088	5.32	5.788
644	2452085	2452115	16	17	FFTFFFFFF	FT	0.522	0.729	-0.159	0.206	4.997	4.356
644	2454035	2454065	19	20	FFTFFFFFF	FT	0.219	0.213	0.061	0.075	5.089	4.32

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
644	2452505	2452535	17	18	FFTFFFFFF	FT	0.356	0.573	-0.196	0.38	4.008	3.276
644	2452445	2452475	17	18	FFTFFFFFF	FT	0.338	0.575	-0.017	0.329	6.021	3.558
644	2453195	2453225	16	17	FFTFFFFFF	FT	0.25	0.222	-0.044	0.081	7.626	6.507
644	2452625	2452685	19	20	FFTFFFFFF	FT	0.349	0.503	0.109	0.209	4.214	3.852
644	2452325	2452355	19	20	FFTFFFFFF	FT	0.577	0.688	0.444	0.484	2.526	2.844
644	2452805	2452835	17	18	FFTFFFFFF	FT	0.312	0.333	0.022	0.189	3.922	3.978
644	2454185	2454215	19	20	FFTFFFFFF	FT	0.265	0.254	0.087	0.1	3.491	3.983
644	2454185	2454215	20	21	FFTFFFFFF	FT	0.355	0.333	0.127	0.128	3.237	3.372
644	2453795	2453825	18	19	FFTFFFFFF	FT	0.222	0.204	0.094	0.088	4.381	3.971
644	2453945	2453975	18	19	FFTFFFFFF	FT	0.187	0.2	-0.013	0.104	6.49	6.678
644	2452235	2452265	19	20	FFTFFFFFF	FT	0.42	0.682	0.056	0.47	7.024	2.93
644	2453765	2453795	18	19	FFTFFFFFF	FT	0.2	0.185	0.015	0.046	5.787	8.329
644	2452685	2452715	19	20	FFTFFFFFF	FT	0.448	0.582	0.277	0.347	3.405	3.148
644	2452685	2452715	18	19	FFTFFFFFF	FT	0.379	0.532	0.21	0.317	3.733	3.538
644	2452295	2452325	19	20	FFTFFFFFF	FT	0.521	0.69	0.336	0.474	3.331	3.009
644	2453015	2453045	17	18	FFTFFFFFF	FT	0.222	0.21	-0.014	0.045	6.952	5.092
644	2453735	2453765	18	19	FFTFFFFFF	FT	0.208	0.202	0.071	0.039	4.363	7.605
644	2453555	2453585	16	17	FFTFFFFFF	FT	0.189	0.195	-0.012	0.091	9.527	9.056
644	2453705	2453735	18	19	FFTFFFFFF	FT	0.195	0.19	0.06	0.027	6.532	7.556
644	2454125	2454155	18	19	FFTFFFFFF	FT	0.178	0.162	0.038	0.019	5.884	9.912
644	2453285	2453315	17	18	FFTFFFFFF	FT	0.269	0.244	-0.019	0.051	7.937	5.734
644	2454095	2454125	19	20	FFTFFFFFF	FT	0.258	0.239	0.118	0.073	3.657	4.627
644	2452475	2452505	17	18	FFTFFFFFF	FT	0.302	0.579	-0.07	0.378	7.781	3.268
644	2453135	2453165	17	18	FFTFFFFFF	FT	0.246	0.259	0.028	0.137	5.417	3.969
644	2454155	2454185	20	21	FFTFFFFFF	FT	0.306	0.294	0.145	0.136	3.312	3.309
644	2452145	2452175	19	20	FFTFFFFFF	FT	0.522	0.736	-0.136	0.412	4.65	3.296

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
644	2452925	2452955	16	17	FFTFFFFFF	FT	0.213	0.189	-0.067	0.014	5.566	7.212
644	2452955	2452985	17	18	FFTFFFFFF	FT	0.233	0.213	-0.018	0.008	5.021	6.068
644	2453285	2453315	18	19	FFTFFFFFF	FT	0.297	0.291	0.011	0.084	6.241	5.421
644	2453705	2453735	19	20	FFTFFFFFF	FT	0.225	0.219	0.089	0.054	3.705	4.155
644	2453315	2453375	16	17	FFTFFFFFF	FT	0.249	0.237	-0.018	0.042	6.84	6.925
644	2453315	2453345	17	18	FFTFFFFFF	FT	0.272	0.253	0.01	0.051	6.288	5.199
644	2453825	2453855	19	20	FFTFFFFFF	FT	0.261	0.259	0.087	0.129	3.69	3.514
644	2453975	2454005	18	19	FFTFFFFFF	FT	0.196	0.189	-0.003	0.077	4.992	5.7
644	2452895	2452925	17	18	FFTFFFFFF	FT	0.232	0.212	-0.058	0.035	5.239	4.92
644	2452925	2452955	17	18	FFTFFFFFF	FT	0.221	0.197	-0.05	0.017	5.166	4.546
644	2452865	2452895	17	18	FFTFFFFFF	FT	0.259	0.24	-0.105	0.075	6.005	5.551
644	2452205	2452235	18	19	FFTFFFFFF	FT	0.417	0.696	-0.116	0.497	4.045	2.874
644	2452175	2452205	18	19	FFTFFFFFF	FT	0.485	0.713	-0.169	0.436	4.142	3.017
644	2451335	2452055	18	19	FFTFFFFFF	FT	0.604	0.841	0.26	0.265	3.62	3.107
644	2452415	2452445	18	19	FFTFFFFFF	FT	0.413	0.598	0.171	0.347	3.5	3.194
644	2452445	2452475	19	20	FFTFFFFFF	FT	0.348	0.56	-0.021	0.254	5.025	3.952
644	2452145	2452175	18	19	FFTFFFFFF	FT	0.513	0.731	-0.156	0.405	4.678	3.426
644	2452835	2452865	16	17	FFTFFFFFF	FT	0.256	0.218	-0.115	0.089	4.662	5.642
644	2453735	2453765	19	20	FFTFFFFFF	FT	0.26	0.231	0.117	0.069	3.881	4.604
644	2452355	2452385	19	20	FFTFFFFFF	FT	0.605	0.687	0.481	0.494	2.326	2.786
644	2453675	2453705	20	21	FFTFFFFFF	FT	0.303	0.299	0.096	0.115	3.795	3.762
644	2452625	2452655	17	18	FFTFFFFFF	FT	0.308	0.434	0.07	0.164	5.675	4.173
644	2452115	2452145	17	18	FFTFFFFFF	FT	0.508	0.715	-0.174	0.26	4.58	4.188
644	2452715	2452745	17	18	FFTFFFFFF	FT	0.263	0.43	0.07	0.169	6.642	4.291
644	2452715	2452745	18	19	FFTFFFFFF	FT	0.297	0.45	0.122	0.208	4.029	3.902
644	2453645	2453675	19	20	FFTFFFFFF	FT	0.225	0.225	0.081	0.089	3.884	3.965

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
644	2453645	2453675	18	19	FFTFFFFFF	FT	0.192	0.191	0.041	0.056	5.646	5.743
644	2452175	2452205	19	20	FFTFFFFFF	FT	0.51	0.733	-0.159	0.463	3.882	2.915
644	2453915	2453975	20	21	FFTFFFFFF	FT	0.273	0.294	0.009	0.169	4.115	3.006
644	2454005	2454035	19	20	FFTFFFFFF	FT	0.218	0.218	0.053	0.089	4.164	3.947
644	2452535	2452565	18	19	FFTFFFFFF	FT	0.41	0.609	-0.23	0.412	3.188	3.177
644	2453075	2453105	18	19	FFTFFFFFF	FT	0.261	0.247	0.035	0.092	6.031	4.473
644	2453525	2453555	17	18	FFTFFFFFF	FT	0.217	0.245	0.061	0.144	5.881	4.457
644	2453555	2453585	17	18	FFTFFFFFF	FT	0.187	0.212	0.016	0.11	6.527	6.724
644	2453465	2453495	17	18	FFTFFFFFF	FT	0.28	0.238	-0.037	0.011	4.051	4.855
644	2453045	2453075	18	19	FFTFFFFFF	FT	0.267	0.259	0.026	0.085	5.954	4.568
644	2453465	2453495	18	19	FFTFFFFFF	FT	0.292	0.258	0.013	0.036	4.768	4.302
644	2452505	2452535	18	19	FFTFFFFFF	FT	0.362	0.601	-0.173	0.397	3.581	3.017
644	2451335	2452085	19	20	FFTFFFFFF	FT	0.605	0.877	0.133	0.348	3.889	2.984
644	2452565	2452595	18	19	FFTFFFFFF	FT	0.36	0.672	-0.029	0.464	4.883	2.918
644	2452595	2452625	19	20	FFTFFFFFF	FT	0.376	0.589	0.03	0.319	4.578	3.259
644	2453405	2453435	17	18	FFTFFFFFF	FT	0.292	0.241	0.114	0.089	4.788	5.784
644	2452085	2452115	17	18	FFTFFFFFF	FT	0.498	0.743	-0.142	0.203	4.616	4.873
644	2453675	2453705	19	20	FFTFFFFFF	FT	0.25	0.241	0.077	0.086	4.045	4.478
644	2454125	2454155	19	20	FFTFFFFFF	FT	0.225	0.215	0.08	0.061	3.919	4.629
644	2453495	2453525	19	20	FFTFFFFFF	FT	0.298	0.329	0.106	0.17	3.485	3.713
644	2452835	2452865	17	18	FFTFFFFFF	FT	0.267	0.239	-0.098	0.095	5.123	4.966
644	2453255	2453285	17	18	FFTFFFFFF	FT	0.267	0.237	-0.024	0.045	7.49	6.532
644	2452415	2452445	19	20	FFTFFFFFF	FT	0.458	0.64	0.218	0.367	3.468	3.205
644	2452145	2454155	16	21	FFTFFFFFF	TF	0.334	0.494	0.005	0.223	8.144	6.182
644	2452475	2452505	18	19	FFTFFFFFF	FT	0.302	0.582	-0.053	0.372	4.344	3.144
644	2453435	2453465	18	19	FFTFFFFFF	FT	0.362	0.299	0.116	0.11	4.767	4.007

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
644	2453585	2453615	18	19	FFTFFFFFF	FT	0.207	0.215	0.017	0.105	5.481	4.84
644	2452625	2452655	18	19	FFTFFFFFF	FT	0.351	0.466	0.115	0.181	4.951	3.942
644	2453165	2453195	18	19	FFTFFFFFF	FT	0.289	0.281	0.01	0.149	5.875	3.955
644	2454065	2454095	19	20	FFTFFFFFF	FT	0.252	0.236	0.105	0.078	3.743	4.245
644	2452085	2452115	18	19	FFTFFFFFF	FT	0.482	0.733	-0.121	0.241	4.46	4.274
644	2453105	2453255	19	20	FFTFFFFFF	FT	0.338	0.328	0.099	0.174	4.945	3.231
644	2452355	2452475	20	21	FFTFFFFFF	FT	0.556	0.67	0.281	0.36	3.313	3.39
644	2453885	2453915	19	20	FFTFFFFFF	FT	0.269	0.268	0.037	0.142	4.377	3.237
644	2453945	2453975	19	20	FFTFFFFFF	FT	0.218	0.235	0.007	0.128	4.646	3.548
644	2452475	2452505	19	20	FFTFFFFFF	FT	0.326	0.561	-0.026	0.296	4.471	3.437
644	2452475	2452505	20	21	FFTFFFFFF	FT	0.341	0.416	0.013	0.088	4.077	5.001
644	2452505	2452535	19	20	FFTFFFFFF	FT	0.373	0.603	-0.127	0.335	3.871	3.355
644	2452865	2452895	18	19	FFTFFFFFF	FT	0.275	0.291	-0.09	0.129	4.609	5.038
644	2452535	2452565	19	20	FFTFFFFFF	FT	0.436	0.666	-0.202	0.441	3.423	3.083
644	2453015	2453045	18	19	FFTFFFFFF	FT	0.248	0.24	0.01	0.073	7.17	4.406
644	2453765	2453795	19	20	FFTFFFFFF	FT	0.238	0.228	0.048	0.068	4.068	4.819
644	2453915	2453945	19	20	FFTFFFFFF	FT	0.249	0.249	0.005	0.13	4.454	3.294
644	2452715	2452745	19	20	FFTFFFFFF	FT	0.36	0.486	0.175	0.222	3.627	3.477
644	2453615	2453645	19	20	FFTFFFFFF	FT	0.219	0.224	0.018	0.089	3.676	3.724
644	2453195	2453225	18	19	FFTFFFFFF	FT	0.301	0.266	0.008	0.12	6.047	3.82
644	2453375	2453405	16	17	FFTFFFFFF	FT	0.268	0.232	0.021	0.045	8.594	7.566
644	2452205	2452235	19	20	FFTFFFFFF	FT	0.476	0.747	-0.132	0.524	3.683	2.836
644	2453105	2453135	18	19	FFTFFFFFF	FT	0.266	0.27	0.06	0.141	4.953	3.911
644	2453525	2453555	18	19	FFTFFFFFF	FT	0.246	0.272	0.087	0.164	3.944	3.291
644	2452265	2452325	20	21	FFTFFFFFF	FT	0.537	0.724	0.289	0.444	3.629	3.225
644	2452805	2452835	18	26	FFTFFFFFF	FT	0.36	0.384	0.076	0.219	3.418	5.264

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
644	2453345	2453405	18	19	FFTFFFFFF	FT	0.369	0.315	0.183	0.101	4.859	3.982
644	2453405	2453435	18	19	FFTFFFFFF	FT	0.341	0.279	0.159	0.126	4.384	3.545
644	2452565	2452595	19	20	FFTFFFFFF	FT	0.437	0.737	0.03	0.486	4.707	2.809
644	2453135	2453165	18	19	FFTFFFFFF	FT	0.272	0.3	0.071	0.166	4.088	3.145
644	2452685	2452745	20	21	FFTFFFFFF	FT	0.454	0.587	0.244	0.273	3.545	3.516
644	2453315	2453345	18	19	FFTFFFFFF	FT	0.292	0.285	0.027	0.1	5.985	5.233
644	2452145	2452625	17	18	FFTFFFFFF	TF	0.325	0.526	0.04	0.254	7.079	5.409
644	2452985	2453015	18	19	FFTFFFFFF	FT	0.257	0.272	0.01	0.049	4.091	5.106
644	2454005	2454035	20	21	FFTFFFFFF	FT	0.275	0.291	0.08	0.138	3.404	3.372
644	2453045	2453075	19	20	FFTFFFFFF	FT	0.303	0.314	0.07	0.14	5.926	4.117
644	2453795	2453855	20	21	FFTFFFFFF	FT	0.333	0.326	0.155	0.17	3.614	3.211
644	2453225	2453255	18	19	FFTFFFFFF	FT	0.299	0.286	0.004	0.133	7.143	4.003
644	2453555	2453585	18	19	FFTFFFFFF	FT	0.216	0.247	0.033	0.149	5.192	3.487
644	2453555	2453585	19	20	FFTFFFFFF	FT	0.249	0.28	0.034	0.177	4.321	2.998
644	2453255	2453285	18	19	FFTFFFFFF	FT	0.296	0.269	-0.002	0.071	6.384	5.302
644	2452835	2452865	18	19	FFTFFFFFF	FT	0.288	0.29	-0.083	0.13	4.243	4.345
644	2452535	2452565	20	21	FFTFFFFFF	FT	0.443	0.618	-0.149	0.318	4.274	3.717
644	2454125	2454155	20	21	FFTFFFFFF	FT	0.299	0.297	0.124	0.113	3.703	3.532
644	2452895	2452925	18	19	FFTFFFFFF	FT	0.247	0.239	-0.023	0.07	4.521	4.65
644	2452925	2452955	18	19	FFTFFFFFF	FT	0.239	0.223	-0.028	0.036	4.414	4.495
644	2454065	2454095	20	21	FFTFFFFFF	FT	0.302	0.296	0.125	0.116	3.704	3.668
644	2452145	2452655	18	19	FFTFFFFFF	TF	0.349	0.593	0.061	0.346	5.768	4.054
644	2454035	2454065	20	21	FFTFFFFFF	FT	0.272	0.275	0.092	0.117	3.894	3.629
644	2452955	2452985	18	19	FFTFFFFFF	FT	0.254	0.25	-0.002	0.035	4.523	5.323
644	2453585	2453615	19	20	FFTFFFFFF	FT	0.245	0.256	0.027	0.13	4.698	3.831
644	2452805	2452925	19	20	FFTFFFFFF	FT	0.298	0.331	-0.023	0.165	4.17	4.164

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
644	2454095	2454125	20	21	FFTFFFFFF	FT	0.307	0.292	0.175	0.123	3.103	3.72
644	2453855	2453885	20	21	FFTFFFFFF	FT	0.319	0.308	0.075	0.149	4.077	3.377
644	2453465	2453495	19	20	FFTFFFFFF	FT	0.31	0.287	0.042	0.033	5.109	3.76
644	2452325	2452355	20	21	FFTFFFFFF	FT	0.647	0.709	0.443	0.444	2.776	3.247
644	2453885	2453915	20	21	FFTFFFFFF	FT	0.315	0.321	0.07	0.161	3.438	3.188
644	2452655	2452685	20	21	FFTFFFFFF	FT	0.423	0.563	0.13	0.201	3.844	3.552
644	2452925	2452955	19	20	FFTFFFFFF	FT	0.257	0.264	0.004	0.108	3.229	3.311
644	2453735	2453795	20	21	FFTFFFFFF	FT	0.296	0.282	0.075	0.082	4.143	3.728
644	2452085	2452115	19	20	FFTFFFFFF	FT	0.517	0.731	-0.12	0.287	4.544	3.974
644	2452985	2453045	19	20	FFTFFFFFF	FT	0.279	0.288	0.04	0.116	4.286	4.127
644	2453345	2453465	19	20	FFTFFFFFF	FT	0.409	0.344	0.199	0.134	3.597	4.02
644	2453705	2453735	20	21	FFTFFFFFF	FT	0.268	0.275	0.12	0.092	3.753	4.169
644	2453615	2453645	20	21	FFTFFFFFF	FT	0.274	0.286	0.026	0.134	3.661	3.353
644	2452205	2452265	20	21	FFTFFFFFF	FT	0.498	0.755	-0.023	0.493	5.803	2.854
644	2453645	2453675	20	21	FFTFFFFFF	FT	0.271	0.279	0.102	0.128	3.123	3.228
644	2452595	2452655	20	21	FFTFFFFFF	FT	0.399	0.514	0.062	0.177	4.26	3.486
644	2453585	2454215	21	22	FFTFFFFFF	FT	0.357	0.344	0.089	0.151	4.036	3.563
644	2453075	2453105	19	20	FFTFFFFFF	FT	0.31	0.278	0.096	0.137	5.967	3.041
644	2452955	2452985	19	20	FFTFFFFFF	FT	0.296	0.294	0.007	0.088	4.504	3.866
644	2452565	2452595	20	21	FFTFFFFFF	FT	0.492	0.629	0.012	0.267	4.501	4.02
644	2451335	2452205	20	21	FFTFFFFFF	FT	0.532	0.738	-0.103	0.381	3.842	3.227
644	2453525	2453555	19	20	FFTFFFFFF	FT	0.286	0.319	0.103	0.187	3.387	2.994
644	2452145	2454125	13	16	FFTFFFFFF	TF	0.331	0.54	-0.009	0.235	9.455	4.062
644	2453255	2453345	19	20	FFTFFFFFF	FT	0.369	0.337	0.029	0.133	6.218	4.888
644	2452505	2452535	20	21	FFTFFFFFF	FT	0.362	0.424	-0.067	0.089	4.184	5.179
644	2452805	2453615	20	21	FFTFFFFFF	FT	0.304	0.318	0.022	0.157	4.651	3.346

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
644	2452985	2454155	17	18	FFTFFFFFF	TF	0.342	0.222	-0.168	0.033	4.428	7.294
644	2452055	2453165	21	22	FFTFFFFFF	FT	0.467	0.467	0.007	0.065	4.363	4.25
644	2452145	2452655	19	20	FFTFFFFFF	TF	0.347	0.624	0.056	0.376	6.446	3.487
644	2452985	2454155	18	19	FFTFFFFFF	TF	0.286	0.233	-0.081	0.058	5.701	9.494
644	2452985	2454155	19	20	FFTFFFFFF	TF	0.28	0.255	0.02	0.081	5.972	4.02
645	2451635	2451695	20	21	FFTFFFFFF	FT	0.191	0.165	0.02	0.071	6.472	3.31
645	2452265	2452325	20	21	FFTFFFFFF	FT	0.169	0.144	0.03	-0.004	5.924	3.506
645	2452415	2452835	17	18	FFTFFFFFF	FT	0.114	0.097	-0.033	-0.019	7.888	3.532
645	2451065	2451275	18	19	FFTFFFFFF	FT	0.186	0.14	-0.04	-0.001	7.375	5.572
645	2452235	2452265	19	20	FFTFFFFFF	FT	0.134	0.147	-0.017	-0.044	3.464	4.435
645	2452625	2452715	19	20	FFTFFFFFF	FT	0.139	0.133	-0.003	-0.036	4.198	3.994
645	2452625	2452715	20	21	FFTFFFFFF	FT	0.173	0.148	0.065	0.037	3.457	5.259
645	2451635	2451695	19	20	FFTFFFFFF	FT	0.179	0.141	-0.026	0.04	5.462	6.702
645	2452235	2452445	18	19	FFTFFFFFF	FT	0.122	0.12	-0.047	-0.055	5.375	3.186
645	2452145	2452355	17	18	FFTFFFFFF	FT	0.111	0.107	-0.026	-0.038	3.292	5.759
645	2452685	2452835	18	19	FFTFFFFFF	FT	0.127	0.103	-0.059	0.003	3.445	3.302
645	2452625	2452685	18	19	FFTFFFFFF	FT	0.109	0.115	-0.039	-0.048	3.456	4.528
645	2451785	2451905	18	19	FFTFFFFFF	FT	0.143	0.121	-0.06	-0.036	3.858	4.139
645	2452925	2452955	18	19	FFTFFFFFF	FT	0.122	0.1	-0.059	-0.018	2.961	2.948
645	2452715	2452835	20	21	FFTFFFFFF	FT	0.184	0.153	0.073	0.054	3.82	3.505
645	2453015	2453195	18	19	FFTFFFFFF	FT	0.088	0.095	-0.003	-0.032	4.61	3.767
645	2451065	2451695	17	18	FFTFFFFFF	FT	0.161	0.106	-0.01	-0.009	4.103	3.332
645	2452865	2453165	17	18	FFTFFFFFF	FT	0.106	0.097	-0.042	-0.005	3.773	6.372
645	2451935	2451965	19	20	FFTFFFFFF	FT	0.159	0.136	0.001	0.003	4.07	3.762
645	2452565	2452625	18	19	FFTFFFFFF	FT	0.121	0.119	-0.015	-0.044	3.418	3.494
645	2451455	2451485	19	20	FFTFFFFFF	FT	0.174	0.138	-0.047	-0.024	2.85	3.864

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
645	2451575	2451635	19	20	FFTFFFFFF	FT	0.271	0.16	0.161	-0.042	3.464	6.508
645	2452865	2452925	18	19	FFTFFFFFF	FT	0.119	0.105	-0.036	-0.015	3.275	3.101
645	2452145	2452205	18	19	FFTFFFFFF	FT	0.144	0.118	-0.027	-0.047	26.365	3.339
645	2452205	2452235	18	19	FFTFFFFFF	FT	0.124	0.118	0.009	-0.059	5.723	3.361
645	2453045	2453195	19	20	FFTFFFFFF	FT	0.104	0.105	0.016	-0.011	5.471	4.537
645	2451845	2451905	19	20	FFTFFFFFF	FT	0.152	0.13	-0.028	-0.02	4.76	4.389
645	2451605	2451695	18	19	FFTFFFFFF	FT	0.187	0.127	0.011	-0.017	3.627	3.913
645	2452505	2452565	18	19	FFTFFFFFF	FT	0.141	0.133	-0.002	-0.036	5.754	3.977
645	2452145	2452205	20	21	FFTFFFFFF	FT	0.189	0.155	-0.032	0.018	3.794	3.216
645	2452565	2452595	19	20	FFTFFFFFF	FT	0.141	0.136	-0.004	-0.036	3.371	3.828
645	2451935	2452085	18	19	FFTFFFFFF	FT	0.138	0.113	-0.046	-0.012	5.005	4.079
645	2452925	2452955	19	20	FFTFFFFFF	FT	0.136	0.122	-0.056	-0.013	5.139	3.209
645	2452955	2453015	18	19	FFTFFFFFF	FT	0.102	0.098	-0.029	-0.023	3.097	4.637
645	2451455	2451605	18	19	FFTFFFFFF	FT	0.161	0.113	-0.042	-0.032	3.35	3.526
645	2453075	2453195	20	21	FFTFFFFFF	FT	0.118	0.115	0.036	0.006	5.131	5.498
645	2451815	2451845	19	20	FFTFFFFFF	FT	0.183	0.15	-0.047	-0.023	4.328	3.499
645	2452955	2452985	19	20	FFTFFFFFF	FT	0.139	0.124	-0.042	0	3.91	5.805
645	2451245	2451275	19	20	FFTFFFFFF	FT	0.189	0.141	-0.03	0.037	3.359	3.653
645	2452595	2452625	19	20	FFTFFFFFF	FT	0.121	0.117	-0.008	-0.017	4.183	5.249
645	2452415	2453195	16	17	FFTFFFFFF	FT	0.102	0.097	-0.039	0.004	2.982	3.501
645	2451845	2451905	20	21	FFTFFFFFF	FT	0.167	0.14	-0.008	0.03	5.756	4.118
645	2452145	2452175	19	20	FFTFFFFFF	FT	0.181	0.143	-0.04	-0.032	4.368	3.398
645	2452265	2452325	19	20	FFTFFFFFF	FT	0.137	0.14	-0.002	-0.042	3.642	3.582
645	2452415	2452565	20	21	FFTFFFFFF	FT	0.167	0.145	-0.002	0.026	5.912	3
645	2451785	2452085	17	18	FFTFFFFFF	FT	0.122	0.099	-0.057	-0.014	4.37	3.353
645	2452175	2452205	19	20	FFTFFFFFF	FT	0.153	0.134	-0.01	-0.04	6.881	3.921

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
645	2452325	2452445	19	20	FFTFFFFFF	FT	0.162	0.134	-0.043	-0.04	3.935	3.476
645	2452715	2452835	19	20	FFTFFFFFF	FT	0.16	0.13	-0.013	0.015	4.248	6.546
645	2451065	2451095	19	20	FFTFFFFFF	FT	0.239	0.169	0.055	-0.042	6.104	3.845
645	2451935	2452085	20	21	FFTFFFFFF	FT	0.199	0.152	0.063	0.05	4.791	3.457
645	2452985	2453045	19	20	FFTFFFFFF	FT	0.149	0.116	0.024	-0.021	25.916	4.775
645	2451785	2451815	19	20	FFTFFFFFF	FT	0.193	0.15	-0.07	-0.008	3.127	4.579
645	2452595	2452625	20	21	FFTFFFFFF	FT	0.138	0.129	0.008	0.011	6.89	4.53
645	2452895	2452925	19	20	FFTFFFFFF	FT	0.134	0.117	-0.045	-0.014	3.406	3.556
645	2452505	2452565	19	20	FFTFFFFFF	FT	0.154	0.148	-0.001	-0.041	3.351	2.817
645	2451965	2452085	19	20	FFTFFFFFF	FT	0.191	0.137	-0.001	0.023	4.34	3.332
645	2452865	2452925	20	21	FFTFFFFFF	FT	0.145	0.144	-0.038	0.047	4.212	4.133
645	2452235	2452265	20	21	FFTFFFFFF	FT	0.157	0.142	-0.007	-0.002	3.849	3.833
645	2451455	2451635	20	21	FFTFFFFFF	FT	0.271	0.16	0.119	0.01	3.422	4.572
645	2451065	2452355	16	17	FFTFFFFFF	FT	0.132	0.1	-0.025	-0.007	5.023	3.481
645	2451065	2451275	20	21	FFTFFFFFF	FT	0.199	0.145	0.044	0.05	5.366	3.637
645	2452205	2452235	19	20	FFTFFFFFF	FT	0.146	0.136	-0.001	-0.049	3.254	3.88
645	2452865	2453195	21	22	FFTFFFFFF	FT	0.144	0.135	0.029	0.035	5.233	5.398
645	2452565	2452595	20	21	FFTFFFFFF	FT	0.148	0.145	-0.008	0.004	4.215	3.735
645	2452325	2452355	20	21	FFTFFFFFF	FT	0.176	0.144	0.026	0.028	3.408	3.428
645	2452925	2453075	20	21	FFTFFFFFF	FT	0.147	0.139	-0.002	0.037	9.841	4.499
645	2452205	2452235	20	21	FFTFFFFFF	FT	0.141	0.134	-0.033	0.005	3.47	3.485
645	2452505	2452835	21	22	FFTFFFFFF	FT	0.171	0.163	0.051	0.054	4.185	4.977
645	2451785	2451845	20	21	FFTFFFFFF	FT	0.209	0.157	-0.056	0.037	3.765	3.491
645	2452145	2452445	21	22	FFTFFFFFF	FT	0.18	0.15	0.028	0.019	5.043	3.596
645	2451065	2452085	21	22	FFTFFFFFF	FT	0.205	0.155	0.066	0.05	4.108	3.868
649	2451335	2454275	19	20	FFTFFFFFF	FT	0.548	0.501	0.013	-0.035	7.629	6.004

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
658	2448635	2452565	19	20	FFTFFFFFF	FT	0.625	0.541	-0.171	-0.02	3.631	5.025
658	2448665	2452385	18	19	FFTFFFFFF	FT	0.673	0.529	-0.3	-0.095	4.026	4.802
673	2450405	2455085	13	14	FFTFFFFFF	FT	0.117	0.095	0.012	0.028	17.554	7.41
673	2450585	2455085	12	13	FFTFFFFFF	FT	0.15	0.121	0.008	0.032	60.486	55.536
673	2450555	2455085	11	12	FFTFFFFFF	FT	0.236	0.12	0.021	0.024	32.601	124.333
673	2450555	2455085	10	11	FFTFFFFFF	FT	0.222	0.097	0.036	0.03	26.287	16.228
673	2450615	2455085	14	15	FFTFFFFFF	FT	0.12	0.091	0.009	0.013	11.009	15.436
673	2450585	2455085	15	17	FFTFFFFFF	FT	0.21	0.195	-0.005	0.018	20.117	50.734
673	2450345	2454875	19	20	FFTFFFFFF	FT	0.437	0.408	0.038	0.074	6.336	8.683
673	2450345	2454875	20	22	FFTFFFFFF	FT	0.535	0.475	-0.027	0.066	6.365	9.191
675	2447885	2448245	15	16	TFFFFFFFF	FT	0.821	1.135	-0.067	-0.614	3.598	2.608
675	2448245	2449895	16	17	TFFFFFFFF	FT	0.906	1.196	-0.009	-0.654	3.203	2.438
675	2437175	2438645	16	17	TFFFFFFFF	FT	0.364	0.355	0.065	-0.193	6.079	4.661
675	2448245	2449895	15	16	TFFFFFFFF	FT	0.923	1.132	-0.01	-0.493	3.175	2.511
675	2448245	2448605	15	16	TFFFFFFFF	FT	0.621	0.915	-0.128	-0.381	4.491	2.763
675	2448005	2448245	16	17	TFFFFFFFF	FT	0.895	1.266	-0.063	-0.76	95.901	6.11
675	2441105	2449715	14	15	TFFFFFFFF	FT	0.577	0.816	-0.068	-0.017	4.923	3.049
675	2448455	2448515	16	17	TFFFFFFFF	FT	0.666	0.989	-0.08	-0.634	4.326	2.588
675	2437205	2438645	17	18	TFFFFFFFF	FT	0.391	0.424	0.067	-0.217	4.797	4.192
675	2449055	2449325	16	17	TFFFFFFFF	FT	0.703	0.874	-0.094	-0.143	4.165	3.044
675	2448635	2449025	15	16	TFFFFFFFF	FT	0.668	0.888	-0.129	-0.238	4.201	3.242
675	2449325	2450195	15	16	TFFFFFFFF	FT	0.673	0.882	-0.13	-0.27	5.304	2.734
675	2441105	2447525	16	17	TFFFFFFFF	FT	0.776	0.929	-0.065	-0.126	3.595	3.234
675	2448515	2448635	16	17	TFFFFFFFF	FT	0.7	1.025	-0.005	-0.579	3.993	2.496
675	2437175	2437205	17	18	TFFFFFFFF	FT	0.38	0.371	0.093	-0.188	4.455	4.715
675	2449325	2449625	16	17	TFFFFFFFF	FT	0.761	1	-0.162	-0.384	4.975	2.702

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
675	2447885	2448425	17	18	TFFFFFFFF	FT	0.849	0.937	-0.185	-0.19	3.298	2.876
675	2448065	2448425	16	17	TFFFFFFFF	FT	0.731	0.869	-0.227	-0.176	4.087	2.749
675	2443475	2449805	13	14	TFFFFFFFF	FT	0.565	0.786	-0.053	0.145	6.031	2.924
675	2449295	2449505	17	18	TFFFFFFFF	FT	0.842	1.142	-0.121	-0.641	3.91	2.502
675	2449625	2450765	16	17	TFFFFFFFF	FT	0.682	0.956	-0.061	-0.362	3.955	2.992
675	2446265	2448425	17	18	TFFFFFFFF	FT	0.938	1.268	-0.129	-0.685	3.254	2.343
675	2433065	2441165	17	18	TFFFFFFFF	FT	1.078	1.098	-0.249	-0.454	2.681	2.655
675	2443145	2443925	17	18	TFFFFFFFF	FT	1.011	1.146	0.007	-0.453	2.792	2.664
675	2448635	2448875	16	17	TFFFFFFFF	FT	0.725	0.949	-0.144	-0.429	4.147	2.896
675	2441915	2441975	19	20	TFFFFFFFF	FT	1.137	1.282	0.192	-0.581	2.554	2.328
675	2437205	2437235	18	19	TFFFFFFFF	FT	0.466	0.48	0.066	-0.222	4.318	3.803
675	2433215	2437205	18	19	TFFFFFFFF	FT	0.483	0.481	0.086	-0.199	5.998	5.138
675	2433905	2441105	18	19	TFFFFFFFF	FT	1.097	1.173	-0.254	-0.519	2.608	2.539
675	2448455	2448635	17	18	TFFFFFFFF	FT	0.79	1.056	-0.099	-0.539	3.571	2.574
675	2449055	2449295	17	18	TFFFFFFFF	FT	0.827	0.911	-0.106	-0.196	3.423	3.053
675	2448425	2449895	17	18	TFFFFFFFF	FT	0.937	1.244	-0.004	-0.652	3.093	2.354
675	2433095	2442005	16	17	TFFFFFFFF	FT	1.002	1.183	-0.019	-0.496	2.724	2.54
675	2442245	2444045	16	17	TFFFFFFFF	FT	0.942	1.039	-0.045	-0.32	3.037	2.902
675	2449055	2449325	15	16	TFFFFFFFF	FT	0.653	0.802	-0.065	0.047	4.364	3.201
675	2448875	2449025	16	17	TFFFFFFFF	FT	0.654	0.882	-0.081	-0.315	4.078	2.908
675	2447525	2448065	16	17	TFFFFFFFF	FT	0.721	0.831	-0.067	-0.031	3.962	3.439
675	2433215	2438645	15	16	TFFFFFFFF	FT	0.747	0.62	-0.092	-0.062	4.537	5.338
675	2441375	2442845	17	18	TFFFFFFFF	FT	1.023	1.254	0.147	-0.578	2.769	2.377
675	2441105	2448215	15	16	TFFFFFFFF	FT	0.693	0.859	-0.048	-0.037	4.039	3.151
675	2449505	2450945	17	18	TFFFFFFFF	FT	0.812	0.975	-0.089	-0.137	3.542	3.158
675	2446205	2447885	17	18	TFFFFFFFF	FT	0.85	1.008	-0.057	-0.208	3.223	2.792

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
675	2444075	2447885	15	16	TFFFFFFFF	FT	1.015	1.146	-0.157	-0.327	3.031	2.616
675	2441375	2442305	18	19	TFFFFFFFF	FT	1.105	1.275	0.2	-0.591	2.591	2.359
675	2447525	2448005	16	17	TFFFFFFFF	FT	0.954	1.324	-0.2	-0.871	3.048	2.254
675	2441015	2449895	14	15	TFFFFFFFF	FT	0.873	1.051	-0.047	-0.379	3.452	2.889
675	2448635	2449025	17	18	TFFFFFFFF	FT	0.838	1.006	-0.107	-0.292	3.398	2.773
675	2433215	2437205	19	20	TFFFFFFFF	FT	0.515	0.498	0.098	-0.197	4.248	3.54
675	2437205	2437235	19	20	TFFFFFFFF	FT	0.517	0.534	0.073	-0.204	3.665	3.505
675	2445575	2447525	16	17	TFFFFFFFF	FT	1.054	1.138	-0.181	-0.161	3.003	2.717
675	2442665	2443445	18	19	TFFFFFFFF	FT	1.034	1.221	0.129	-0.508	2.705	2.432
675	2433215	2436425	16	17	TFFFFFFFF	FT	0.891	0.699	-0.066	-0.047	4.267	4.316
675	2444075	2445515	16	17	TFFFFFFFF	FT	1.021	0.895	-0.066	-0.069	3.015	3.313
675	2442665	2449625	19	20	TFFFFFFFF	FT	1.074	1.162	0.04	-0.397	2.662	2.598
675	2441015	2449685	12	14	TFFFFFFFF	FT	0.908	0.969	-0.009	-0.249	3.776	3.01
675	2441105	2445845	17	18	TFFFFFFFF	FT	0.804	0.57	-0.127	-0.104	3.961	4.149
675	2433215	2436425	17	18	TFFFFFFFF	FT	1.014	0.763	-0.056	-0.1	3.686	3.875
675	2437175	2437235	20	22	TFFFFFFFF	FT	0.579	0.579	0.108	-0.19	3.415	3.486
675	2448455	2450855	18	19	TFFFFFFFF	FT	0.972	1.06	-0.133	-0.294	2.86	2.735
675	2444075	2446205	17	18	TFFFFFFFF	FT	1.132	0.866	-0.212	0.025	2.835	3.315
675	2443535	2449685	18	19	TFFFFFFFF	FT	1.18	0.961	-0.293	-0.1	2.552	3.019
675	2437175	2441105	19	20	TFFFFFFFF	FT	1.051	1.204	-0.244	-0.6	2.708	2.505
675	2433215	2443985	15	16	TFFFFFFFF	FT	0.983	1.086	-0.112	-0.285	2.872	2.805
675	2441105	2448395	18	19	TFFFFFFFF	FT	0.932	0.871	-0.104	-0.171	3.174	3.442
678	2452895	2453375	17	18	FFTFFFFFF	FT	0.606	0.623	0.032	0.082	3.273	3.343
678	2452895	2453375	18	19	FFTFFFFFF	FT	0.643	0.651	0.044	0.088	3.07	3.04
678	2451215	2451935	16	17	FFTFFFFFF	FT	0.816	0.678	-0.28	0.033	3.08	3.911
678	2451185	2452685	17	18	FFTFFFFFF	FT	0.92	0.812	-0.259	0.005	3.055	3.434

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
678	2450975	2453375	14	16	FFTFFFFFF	FT	0.639	0.548	-0.07	0.083	3.464	4.308
678	2452145	2453375	16	17	FFTFFFFFF	FT	0.726	0.674	-0.075	0.114	3.602	3.664
678	2451185	2452685	18	19	FFTFFFFFF	FT	0.892	0.872	-0.097	-0.016	3.021	3.325
683	2454305	2454635	16	17	FFTFFFFFF	FT	0.43	0.743	-0.003	0.082	4.749	2.815
683	2452925	2453015	18	19	FFTFFFFFF	FT	0.568	0.831	-0.043	0.11	5.233	3.083
683	2453525	2454245	15	16	FFTFFFFFF	FT	0.708	0.649	-0.011	0.145	3.131	3.028
683	2452685	2452715	18	19	FFTFFFFFF	FT	0.914	0.829	0.162	0.379	3.218	3.535
683	2453735	2453915	18	19	FFTFFFFFF	FT	0.74	0.695	-0.004	0.065	2.987	2.889
683	2454905	2455085	18	19	FFTFFFFFF	FT	0.659	0.888	-0.031	0.022	3.246	2.422
683	2453555	2453705	16	17	FFTFFFFFF	FT	0.695	0.7	0.035	0.139	3.28	2.91
683	2452895	2453045	17	18	FFTFFFFFF	FT	0.662	0.774	-0.027	0.099	5.104	3.239
683	2454485	2454635	17	18	FFTFFFFFF	FT	0.425	0.753	-0.014	0.047	4.852	2.703
683	2452715	2452835	18	19	FFTFFFFFF	FT	0.83	0.808	0.035	0.201	3.173	3.512
683	2454365	2454395	17	18	FFTFFFFFF	FT	0.468	0.745	-0.007	0.037	4.428	2.699
683	2452895	2453165	16	17	FFTFFFFFF	FT	0.592	0.821	0.118	0.122	5.234	2.862
683	2453045	2453195	17	18	FFTFFFFFF	FT	0.562	0.894	0.243	0.095	4.883	2.689
683	2453285	2453435	17	18	FFTFFFFFF	FT	0.511	0.974	-0.036	0.252	6.286	2.836
683	2453105	2453225	18	19	FFTFFFFFF	FT	0.691	0.997	0.27	0.107	3.845	2.687
683	2453195	2453285	17	18	FFTFFFFFF	FT	0.465	1.03	-0.104	0.232	5.527	2.563
683	2453705	2453915	16	17	FFTFFFFFF	FT	0.715	0.639	-0.021	0.161	3.053	3.233
683	2453735	2453855	17	18	FFTFFFFFF	FT	0.734	0.615	-0.039	0.042	2.928	3.113
683	2450375	2453525	15	16	FFTFFFFFF	FT	0.642	0.849	0.038	0.184	5.315	3.068
683	2454755	2454875	17	18	FFTFFFFFF	FT	0.485	0.77	0.023	0.03	4.193	2.723
683	2454755	2454785	18	19	FFTFFFFFF	FT	0.523	0.768	0.051	0.008	3.915	2.86
683	2453015	2453075	18	19	FFTFFFFFF	FT	0.618	0.935	0.272	0.15	3.772	2.664
683	2453015	2453075	20	21	FFTFFFFFF	FT	0.917	1.076	0.289	0.219	3.131	2.507

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
683	2453045	2453075	19	20	FFTFFFFFF	FT	0.727	1.015	0.306	0.15	3.57	2.686
683	2454395	2454485	17	18	FFTFFFFFF	FT	0.448	0.745	0.045	0.067	4.759	2.841
683	2454035	2454275	17	18	FFTFFFFFF	FT	0.695	0.706	0.039	0.099	3.09	2.85
683	2453645	2453675	18	19	FFTFFFFFF	FT	0.74	0.758	0.045	0.098	2.952	2.776
683	2452655	2452835	17	18	FFTFFFFFF	FT	0.86	0.738	0.095	0.269	3.296	3.632
683	2453915	2454245	16	17	FFTFFFFFF	FT	0.694	0.662	0.063	0.162	3.099	2.846
683	2454035	2454125	19	20	FFTFFFFFF	FT	0.815	0.813	0.081	0.102	2.731	2.681
683	2454665	2455085	16	17	FFTFFFFFF	FT	0.445	0.748	-0.008	0.077	4.308	2.751
683	2453165	2453555	16	17	FFTFFFFFF	FT	0.435	1	-0.06	0.273	7.354	2.556
683	2454785	2454875	18	19	FFTFFFFFF	FT	0.623	0.829	-0.021	0.029	3.361	2.678
683	2452895	2452925	20	21	FFTFFFFFF	FT	1.115	0.955	0.075	0.12	2.625	2.88
683	2454665	2454755	17	18	FFTFFFFFF	FT	0.434	0.733	0.043	0.058	4.699	2.796
683	2453075	2453105	18	19	FFTFFFFFF	FT	0.578	0.918	0.234	0.127	4.579	2.616
683	2453465	2453495	18	19	FFTFFFFFF	FT	0.62	1.05	0.1	0.176	4.099	2.434
683	2454365	2454395	18	19	FFTFFFFFF	FT	0.545	0.783	0.019	0.044	3.576	2.756
683	2454905	2455085	19	20	FFTFFFFFF	FT	0.749	0.938	-0.013	0.049	2.866	2.361
683	2450375	2452175	19	20	FFTFFFFFF	FT	0.976	1.047	-0.214	0.187	3.088	2.8
683	2453855	2454035	17	18	FFTFFFFFF	FT	0.704	0.665	0.055	0.164	2.992	3.028
683	2453405	2453465	18	19	FFTFFFFFF	FT	0.518	0.928	0.037	0.072	4.377	2.471
683	2453375	2453465	19	20	FFTFFFFFF	FT	0.687	0.952	0.04	0.083	3.132	2.374
683	2450375	2455085	14	15	FFTFFFFFF	FT	0.59	0.719	0.002	0.098	5.267	3.492
683	2453525	2453675	17	18	FFTFFFFFF	FT	0.71	0.754	0.052	0.097	3.315	2.946
683	2453225	2453285	18	19	FFTFFFFFF	FT	0.549	1.098	-0.112	0.225	5.271	2.525
683	2454515	2454545	18	19	FFTFFFFFF	FT	0.508	0.774	-0.002	-0.01	4.238	2.78
683	2454515	2454545	19	20	FFTFFFFFF	FT	0.655	0.805	0.023	-0.033	3.435	2.728
683	2454545	2454635	18	19	FFTFFFFFF	FT	0.5	0.795	-0.012	0.028	3.805	2.787

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
683	2454425	2454515	18	19	FFTFFFFFF	FT	0.569	0.752	0.017	0.039	3.898	2.717
683	2454485	2454515	19	20	FFTFFFFFF	FT	0.684	0.828	0.056	-0.021	3.325	2.673
683	2452715	2452835	20	21	FFTFFFFFF	FT	0.957	0.942	0.175	0.224	2.712	3.118
683	2452715	2452835	19	20	FFTFFFFFF	FT	0.904	0.857	0.134	0.182	2.903	3.275
683	2453315	2453405	18	19	FFTFFFFFF	FT	0.615	1.035	-0.024	0.125	4.321	2.785
683	2452985	2453045	19	20	FFTFFFFFF	FT	0.758	0.999	0.206	0.13	3.55	2.706
683	2453105	2453195	20	21	FFTFFFFFF	FT	0.982	1.142	0.332	0.124	2.854	2.534
683	2453345	2453375	19	20	FFTFFFFFF	FT	0.773	1.116	0.024	0.123	3.47	2.604
683	2453315	2453435	20	21	FFTFFFFFF	FT	0.893	1.116	0.005	0.141	3.145	2.532
683	2453435	2453525	17	18	FFTFFFFFF	FT	0.47	1.023	0.024	0.245	4.82	2.487
683	2453465	2453555	19	20	FFTFFFFFF	FT	0.739	1.084	0.094	0.206	3.259	2.322
683	2453675	2453705	17	18	FFTFFFFFF	FT	0.713	0.809	0.02	0.228	3.042	2.658
683	2453675	2453705	18	19	FFTFFFFFF	FT	0.768	0.866	0.025	0.175	2.805	2.504
683	2452415	2452565	18	19	FFTFFFFFF	FT	0.957	0.957	-0.025	0.331	2.954	3.415
683	2452415	2452835	16	17	FFTFFFFFF	FT	0.824	0.736	0.013	0.308	3.446	4.244
683	2453705	2453735	17	18	FFTFFFFFF	FT	0.728	0.85	-0.029	0.315	2.881	2.521
683	2450405	2452175	18	19	FFTFFFFFF	FT	0.885	0.911	-0.2	0.147	3.107	3.445
683	2452175	2452205	18	19	FFTFFFFFF	FT	0.896	0.911	-0.176	0.033	2.644	2.519
683	2450375	2452355	17	18	FFTFFFFFF	FT	0.862	0.85	-0.032	0.121	3.057	3.096
683	2452925	2452955	19	20	FFTFFFFFF	FT	0.67	0.872	-0.09	0.115	4.369	3.136
683	2452895	2452925	18	19	FFTFFFFFF	FT	0.944	0.748	-0.005	0.15	2.981	3.946
683	2454125	2454275	18	19	FFTFFFFFF	FT	0.728	0.74	0.099	0.027	2.852	2.85
683	2452925	2452955	20	21	FFTFFFFFF	FT	0.791	0.919	-0.078	0.088	3.46	3.015
683	2452955	2452985	19	20	FFTFFFFFF	FT	0.643	0.902	-0.024	0.034	4.419	2.803
683	2450405	2452355	16	17	FFTFFFFFF	FT	0.906	0.811	0.037	0.113	2.857	3.398
683	2454065	2454125	18	19	FFTFFFFFF	FT	0.776	0.788	0.054	0.055	3.019	2.802

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
683	2453285	2453315	18	19	FFTFFFFFF	FT	0.532	1.08	-0.096	0.213	6.012	2.547
683	2453285	2453315	19	20	FFTFFFFFF	FT	0.685	1.103	-0.077	0.195	4.106	2.539
683	2454035	2454065	18	19	FFTFFFFFF	FT	0.735	0.739	0.061	0.104	2.913	2.705
683	2454305	2454365	17	18	FFTFFFFFF	FT	0.522	0.76	0.044	0.079	4.661	2.73
683	2454215	2454365	20	21	FFTFFFFFF	FT	0.755	0.924	0.003	0.014	2.874	2.444
683	2454305	2454365	18	19	FFTFFFFFF	FT	0.598	0.793	0.054	0.064	3.851	2.768
683	2454905	2455085	17	18	FFTFFFFFF	FT	0.581	0.867	-0.058	0.077	3.802	2.555
683	2452415	2452655	17	18	FFTFFFFFF	FT	0.887	0.811	-0.012	0.325	3.144	3.832
683	2452955	2453015	20	21	FFTFFFFFF	FT	0.875	0.99	0.064	0.107	3.371	2.717
683	2453255	2453285	9	20	FFTFFFFFF	FT	0.648	1.142	-0.088	0.23	3.975	2.438
683	2452565	2452685	18	19	FFTFFFFFF	FT	0.912	0.756	0.061	0.331	3.188	3.666
683	2453795	2453915	19	20	FFTFFFFFF	FT	0.767	0.81	0.072	0.081	2.661	2.683
683	2453705	2453735	18	19	FFTFFFFFF	FT	0.785	0.864	-0.011	0.25	2.699	2.504
683	2454545	2454635	19	20	FFTFFFFFF	FT	0.651	0.835	0.005	0.028	3.295	2.616
683	2454545	2454635	20	21	FFTFFFFFF	FT	0.821	0.896	0.031	0.034	2.722	2.446
683	2454215	2454365	19	20	FFTFFFFFF	FT	0.664	0.836	0.062	0.053	2.982	2.675
683	2454815	2454875	19	20	FFTFFFFFF	FT	0.754	0.89	-0.013	0.046	2.928	2.46
683	2452895	2453045	21	22	FFTFFFFFF	FT	1.089	1.062	0.009	0.144	2.753	2.737
683	2453735	2453765	19	20	FFTFFFFFF	FT	0.782	0.791	-0.007	0.108	2.769	2.701
683	2454785	2454815	19	20	FFTFFFFFF	FT	0.721	0.838	-0.016	0.025	2.751	2.589
683	2453435	2453465	20	21	FFTFFFFFF	FT	0.803	0.979	0.086	0.102	2.688	2.216
683	2453105	2453225	19	20	FFTFFFFFF	FT	0.824	1.074	0.291	0.107	3.216	2.433
683	2454785	2454875	20	21	FFTFFFFFF	FT	0.852	0.922	-0.021	0.055	2.428	2.314
683	2453285	2453315	20	21	FFTFFFFFF	FT	0.857	1.165	-0.088	0.2	3.29	2.491
683	2453075	2453105	19	20	FFTFFFFFF	FT	0.701	1.006	0.286	0.128	3.467	2.589
683	2452535	2452685	19	20	FFTFFFFFF	FT	0.998	0.838	0.048	0.33	2.901	3.535

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
683	2453225	2453255	19	20	FFTFFFFFFF	FT	0.719	1.155	-0.124	0.148	3.47	2.349
683	2454395	2454425	18	19	FFTFFFFFFF	FT	0.498	0.777	0.056	0.012	4.047	2.775
683	2453525	2453645	18	19	FFTFFFFFFF	FT	0.729	0.871	0.054	0.131	2.875	2.56
683	2454755	2454785	19	20	FFTFFFFFFF	FT	0.652	0.807	0.058	0.009	3.249	2.665
683	2454305	2455085	15	16	FFTFFFFFFF	FT	0.407	0.745	-0.014	0.105	4.517	2.892
683	2454005	2454035	18	19	FFTFFFFFFF	FT	0.725	0.741	0.073	0.096	3.129	2.933
683	2453645	2453675	19	20	FFTFFFFFFF	FT	0.773	0.829	0.043	0.061	2.698	2.585
683	2453315	2453345	19	20	FFTFFFFFFF	FT	0.729	1.15	-0.064	0.166	4.517	2.572
683	2454425	2454485	19	20	FFTFFFFFFF	FT	0.725	0.833	0.064	-0.002	3.2	2.678
683	2454425	2454545	20	21	FFTFFFFFFF	FT	0.822	0.882	0.039	-0.019	2.769	2.436
683	2453765	2453795	19	20	FFTFFFFFFF	FT	0.773	0.766	-0.051	0.092	2.715	2.655
683	2454005	2454035	19	20	FFTFFFFFFF	FT	0.781	0.823	0.029	0.111	2.722	2.634
683	2453915	2454005	18	19	FFTFFFFFFF	FT	0.687	0.772	0.051	0.169	3.122	2.732
683	2453555	2453645	19	20	FFTFFFFFFF	FT	0.773	0.88	0.094	0.085	2.733	2.533
683	2453075	2453105	20	21	FFTFFFFFFF	FT	0.925	1.078	0.314	0.171	3.039	2.596
683	2453045	2453195	21	22	FFTFFFFFFF	FT	1.1	1.162	0.279	0.211	2.629	2.433
683	2452175	2452355	19	20	FFTFFFFFFF	FT	0.955	1	-0.037	0.1	2.63	2.519
683	2452685	2452715	19	20	FFTFFFFFFF	FT	0.97	0.919	0.197	0.362	2.966	3.292
683	2454395	2454425	19	20	FFTFFFFFFF	FT	0.617	0.817	0.076	-0.028	3.421	2.696
683	2452205	2452355	18	19	FFTFFFFFFF	FT	0.956	0.939	0.006	0.121	2.539	2.611
683	2452895	2452925	19	20	FFTFFFFFFF	FT	1.016	0.862	0.032	0.084	2.819	3.174
683	2453675	2453705	19	20	FFTFFFFFFF	FT	0.795	0.843	0.064	0.136	2.696	2.51
683	2454365	2454395	19	20	FFTFFFFFFF	FT	0.677	0.833	-0.003	-0.024	3.175	2.627
683	2454665	2454755	18	19	FFTFFFFFFF	FT	0.486	0.746	0.074	0.051	4.062	2.909
683	2454725	2454755	19	20	FFTFFFFFFF	FT	0.617	0.805	0.087	0.027	3.244	2.755
683	2453645	2453735	20	21	FFTFFFFFFF	FT	0.846	0.927	0.069	0.119	2.45	2.344

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
683	2453255	2453285	20	21	FFTFFFFFF	FT	0.838	1.207	-0.06	0.181	3.225	2.409
683	2454035	2454125	20	21	FFTFFFFFF	FT	0.87	0.881	0.073	0.143	2.449	2.464
683	2452415	2452535	19	20	FFTFFFFFF	FT	0.996	1.033	-0.059	0.25	3.055	2.995
683	2453705	2453735	19	20	FFTFFFFFF	FT	0.825	0.914	0.04	0.218	2.547	2.31
683	2454125	2454185	19	20	FFTFFFFFF	FT	0.79	0.822	0.118	0.007	2.753	2.573
683	2454365	2454395	20	21	FFTFFFFFF	FT	0.797	0.886	0.044	0.007	2.763	2.471
683	2453915	2454005	19	20	FFTFFFFFF	FT	0.756	0.837	0.087	0.098	2.716	2.563
683	2454665	2454725	19	20	FFTFFFFFF	FT	0.644	0.818	0.066	-0.004	3.402	2.716
683	2453735	2453945	20	21	FFTFFFFFF	FT	0.864	0.861	0.044	0.125	2.488	2.478
683	2450405	2452715	20	21	FFTFFFFFF	FT	1.061	1.021	0.081	0.3	2.728	2.933
683	2453555	2453645	20	21	FFTFFFFFF	FT	0.839	0.938	0.087	0.09	2.611	2.338
683	2453495	2453525	18	19	FFTFFFFFF	FT	0.669	1.11	0.044	0.309	3.197	2.052
683	2454755	2454785	20	21	FFTFFFFFF	FT	0.809	0.888	0.075	0.007	2.735	2.466
683	2454005	2454035	20	25	FFTFFFFFF	FT	0.857	0.886	0.085	0.138	2.448	2.433
683	2454665	2454755	20	21	FFTFFFFFF	FT	0.784	0.903	0.073	0.044	2.805	2.434
683	2454125	2454185	20	21	FFTFFFFFF	FT	0.889	0.875	0.112	0.043	2.456	2.46
683	2454395	2454425	20	21	FFTFFFFFF	FT	0.798	0.905	0.056	0.022	2.71	2.371
683	2453465	2453555	20	21	FFTFFFFFF	FT	0.852	0.993	0.078	0.118	2.611	2.292
683	2453225	2453255	20	21	FFTFFFFFF	FT	0.853	1.216	-0.083	0.247	3.386	2.32
683	2453945	2454005	20	21	FFTFFFFFF	FT	0.837	0.925	0.107	0.134	2.497	2.355
683	2450465	2452835	21	22	FFTFFFFFF	FT	1.107	1.045	0.178	0.284	2.679	2.781
683	2453285	2453435	21	22	FFTFFFFFF	FT	1.029	1.181	-0.058	0.18	2.774	2.464
683	2454905	2455085	20	21	FFTFFFFFF	FT	0.827	0.96	-0.008	0.056	2.591	2.255
683	2453435	2453555	21	22	FFTFFFFFF	FT	0.896	0.985	0.107	0.103	2.337	2.136
683	2453225	2453285	21	22	FFTFFFFFF	FT	1.002	1.26	-0.041	0.231	2.929	2.362
683	2451995	2455085	13	14	FFTFFFFFF	FT	0.59	0.715	-0.006	0.109	5.298	3.708

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
683	2454215	2455085	21	22	FFTFFFFFF	FT	0.901	0.937	0.052	0.011	2.478	2.34
683	2453585	2454185	21	22	FFTFFFFFF	FT	0.906	0.976	0.069	0.201	2.33	2.195
683	2452025	2454785	22	23	FFTFFFFFF	FT	1.144	1.184	0.053	0.118	2.656	2.467
684	2450105	2450825	17	18	FFTFFFFFF	FT	0.491	0.479	-0.046	0.029	4.71	4.538
684	2450075	2450765	18	19	FFTFFFFFF	FT	0.521	0.514	-0.103	-0.098	4.044	4.672
684	2450825	2452205	17	18	FFTFFFFFF	FT	0.464	0.482	-0.108	-0.04	3.584	5.681
684	2450765	2452925	18	19	FFTFFFFFF	FT	0.503	0.509	-0.118	-0.081	3.893	4.439
684	2450075	2452925	16	20	FFTFFFFFF	FT	0.571	0.57	-0.066	-0.072	4.264	4.134
688	2441645	2447405	13	14	TFFFFFFFF	FT	1.003	1.496	0.405	-0.928	27.972	3.347
688	2441975	2448395	14	15	TFFFFFFFF	FT	1.022	1.538	0.477	-1.055	12.384	1.956
688	2441825	2445155	15	16	TFFFFFFFF	FT	1.101	1.76	0.481	-1.468	10.538	1.599
688	2445155	2445515	15	16	TFFFFFFFF	FT	1.007	1.66	0.469	-1.369	2.733	1.673
688	2445905	2446385	15	16	TFFFFFFFF	FT	1.091	1.287	0.438	-0.64	2.617	2.336
688	2445515	2445875	15	16	TFFFFFFFF	FT	1.046	1.606	0.412	-1.252	2.67	1.747
688	2445185	2445875	16	17	TFFFFFFFF	FT	1.139	1.607	0.366	-1.218	2.487	1.764
688	2441375	2445185	16	17	TFFFFFFFF	FT	1.114	1.677	0.357	-1.341	2.409	1.654
688	2445935	2448785	16	17	TFFFFFFFF	FT	1.208	1.153	0.313	-0.256	2.458	2.685
688	2446415	2448395	15	16	TFFFFFFFF	FT	1.081	1.029	0.338	-0.068	2.828	3.033
688	2442455	2447885	12	13	TFFFFFFFF	FT	1.122	1.473	0.429	-0.867	40.969	10.54
688	2448395	2455085	18	19	FFTFFFFFF	FT	0.483	0.443	0.089	0.174	5.942	4.423
688	2449295	2455025	15	17	FFTFFFFFF	FT	0.288	0.3	-0.005	0.027	12.99	8.373
688	2449475	2455085	17	18	FFTFFFFFF	FT	0.37	0.377	0.036	0.125	5.568	5.699
688	2448605	2455085	19	20	FFTFFFFFF	FT	0.459	0.451	0.113	0.217	4.902	4.518
689	2448335	2451065	13	14	FFTFFFFFF	FT	0.268	0.225	-0.07	-0.004	18.18	12.271
689	2451575	2452085	12	13	FFTFFFFFF	FT	0.168	0.145	-0.03	-0.003	18.143	13.972
689	2451755	2452115	13	14	FFTFFFFFF	FT	0.152	0.156	-0.016	-0.01	12.187	8.1

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
689	2451845	2451965	14	15	FFTFFFFFF	FT	0.154	0.163	-0.023	-0.027	10.309	6.127
689	2452205	2452265	14	15	FFTFFFFFF	FT	0.155	0.182	0.025	-0.008	14.092	42.422
689	2452235	2452535	13	14	FFTFFFFFF	FT	0.148	0.165	-0.023	-0.03	7.178	11.439
689	2452685	2452895	13	14	FFTFFFFFF	FT	0.142	0.17	-0.016	-0.007	6.329	6.69
689	2452205	2452595	12	13	FFTFFFFFF	FT	0.131	0.143	-0.016	-0.015	9.843	16.365
689	2452595	2452895	12	13	FFTFFFFFF	FT	0.129	0.137	-0.018	0.006	14.603	23.993
689	2452985	2453315	13	14	FFTFFFFFF	FT	0.145	0.175	0	0.008	7.507	6.829
689	2452895	2452985	13	14	FFTFFFFFF	FT	0.131	0.143	0.017	0.038	5.955	5.872
689	2451215	2451515	15	16	FFTFFFFFF	FT	0.203	0.248	-0.036	0.003	6.726	7.442
689	2451665	2451845	14	15	FFTFFFFFF	FT	0.167	0.193	-0.021	0.018	7.454	11.206
689	2451785	2451875	15	16	FFTFFFFFF	FT	0.206	0.236	-0.01	0.023	15.93	8.689
689	2452235	2452475	15	16	FFTFFFFFF	FT	0.196	0.235	-0.026	-0.051	10.758	10.773
689	2452235	2452565	16	17	FFTFFFFFF	FT	0.216	0.271	-0.024	-0.054	5.88	5.198
689	2452565	2452895	15	16	FFTFFFFFF	FT	0.184	0.218	-0.006	-0.032	7.982	9.459
689	2452685	2452925	14	15	FFTFFFFFF	FT	0.149	0.177	-0.008	-0.008	7.012	10.818
689	2451065	2451275	14	15	FFTFFFFFF	FT	0.178	0.198	-0.04	-0.017	8.431	12.276
689	2451125	2451215	13	14	FFTFFFFFF	FT	0.192	0.147	-0.052	-0.01	5.14	6.555
689	2451215	2451395	13	14	FFTFFFFFF	FT	0.173	0.169	-0.073	-0.017	5.419	7.5
689	2451185	2451395	12	13	FFTFFFFFF	FT	0.189	0.159	-0.064	-0.014	8.282	8.328
689	2452115	2452235	13	14	FFTFFFFFF	FT	0.135	0.17	0.015	0.027	8.464	24.173
689	2452535	2452685	13	14	FFTFFFFFF	FT	0.143	0.149	0.014	0.002	26.306	11.468
689	2452985	2453255	14	15	FFTFFFFFF	FT	0.172	0.192	-0.011	-0.019	8.687	5.617
689	2453375	2453915	12	13	FFTFFFFFF	FT	0.172	0.149	0.007	-0.013	46.017	9.501
689	2451095	2451215	15	16	FFTFFFFFF	FT	0.206	0.279	-0.031	-0.023	7.04	12.671
689	2451485	2451605	14	15	FFTFFFFFF	FT	0.181	0.209	-0.039	-0.02	13.038	10.836
689	2451575	2451695	15	16	FFTFFFFFF	FT	0.229	0.273	-0.069	-0.029	8.328	10.362

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
689	2452085	2452205	12	13	FFTFFFFFF	FT	0.157	0.163	0.02	0.028	14.78	13.15
689	2451905	2452325	11	12	FFTFFFFFF	FT	0.178	0.13	-0.032	0.008	14.934	6.355
689	2453045	2453375	12	13	FFTFFFFFF	FT	0.135	0.158	0.013	0.018	12.491	17.309
689	2448365	2451095	15	16	FFTFFFFFF	FT	0.393	0.401	-0.051	-0.006	11.453	10.854
689	2451515	2451575	15	16	FFTFFFFFF	FT	0.217	0.296	-0.037	-0.026	12.933	8.83
689	2452415	2452625	14	15	FFTFFFFFF	FT	0.152	0.176	0.006	0.005	8.745	10.225
689	2451605	2451665	14	15	FFTFFFFFF	FT	0.193	0.225	-0.068	-0.045	6.498	10.63
689	2451545	2451755	13	14	FFTFFFFFF	FT	0.176	0.194	-0.056	-0.011	7.167	14.705
689	2451275	2451395	14	15	FFTFFFFFF	FT	0.19	0.195	-0.069	-0.019	6.057	5.757
689	2452625	2452685	14	15	FFTFFFFFF	FT	0.153	0.177	0	-0.037	9.886	7.074
689	2452955	2453225	15	16	FFTFFFFFF	FT	0.19	0.22	-0.002	-0.026	6.511	5.42
689	2448335	2451065	14	15	FFTFFFFFF	FT	0.291	0.301	-0.058	-0.004	15.881	16.276
689	2451695	2451785	15	16	FFTFFFFFF	FT	0.236	0.215	-0.019	0.005	10.404	6.942
689	2452055	2452175	14	15	FFTFFFFFF	FT	0.16	0.179	0.003	0.029	7.806	12.727
689	2452175	2452205	14	15	FFTFFFFFF	FT	0.163	0.176	0.025	0.03	18.628	18.219
689	2452265	2452415	14	15	FFTFFFFFF	FT	0.165	0.186	-0.042	-0.06	9.722	8.512
689	2454035	2454335	13	14	FFTFFFFFF	FT	0.188	0.223	0.007	-0.03	6.46	11.154
689	2452925	2452985	14	15	FFTFFFFFF	FT	0.154	0.183	0.022	0.036	5.293	5.99
689	2451065	2451125	13	14	FFTFFFFFF	FT	0.184	0.154	-0.051	0.014	9.606	9.159
689	2450975	2451185	12	13	FFTFFFFFF	FT	0.182	0.156	-0.035	0.008	10.564	9.199
689	2454335	2455085	13	14	FFTFFFFFF	FT	0.204	0.212	0.047	0.004	9.902	6.727
689	2453795	2454035	13	14	FFTFFFFFF	FT	0.172	0.2	0.006	-0.011	4.13	6.207
689	2453795	2454185	14	15	FFTFFFFFF	FT	0.204	0.218	0.006	-0.017	8.477	7.098
689	2449595	2450975	12	13	FFTFFFFFF	FT	0.351	0.264	-0.041	-0.012	14.079	11.657
689	2451395	2451545	13	14	FFTFFFFFF	FT	0.151	0.157	-0.014	0.019	8.401	9.051
689	2452895	2453045	12	13	FFTFFFFFF	FT	0.132	0.133	0.028	0.034	8.223	6.539

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
689	2452325	2452715	11	12	FFTFFFFFF	FT	0.124	0.138	0	0.015	7.178	12.481
689	2451395	2451485	14	15	FFTFFFFFF	FT	0.158	0.182	-0.014	0.043	5.555	7.249
689	2452895	2452955	15	16	FFTFFFFFF	FT	0.169	0.214	0.02	0.045	4.979	5.445
689	2452085	2452235	15	16	FFTFFFFFF	FT	0.172	0.196	0.023	0.014	10.112	10.16
689	2452565	2452865	16	17	FFTFFFFFF	FT	0.227	0.278	-0.007	-0.041	9.666	6.582
689	2453315	2453585	13	14	FFTFFFFFF	FT	0.161	0.171	0.008	-0.023	6.948	9.142
689	2453705	2453945	15	16	FFTFFFFFF	FT	0.201	0.243	-0.015	-0.055	4.524	5.278
689	2451485	2451905	11	12	FFTFFFFFF	FT	0.191	0.13	-0.007	0.013	66.591	7.249
689	2453465	2453855	11	12	FFTFFFFFF	FT	0.173	0.125	0.018	-0.005	72.256	7.857
689	2451395	2451575	12	13	FFTFFFFFF	FT	0.168	0.152	0	0.027	16.016	7.083
689	2451965	2452055	14	15	FFTFFFFFF	FT	0.146	0.158	-0.042	-0.035	5.028	5.822
689	2453255	2453525	14	15	FFTFFFFFF	FT	0.161	0.202	-0.001	-0.01	6.688	12.445
689	2453225	2453405	15	16	FFTFFFFFF	FT	0.196	0.21	-0.013	0.006	7.68	4.889
689	2453525	2453795	14	15	FFTFFFFFF	FT	0.166	0.203	0.004	-0.023	11.491	8.947
689	2453585	2453795	13	14	FFTFFFFFF	FT	0.147	0.171	0.026	-0.02	6.604	15.453
689	2454185	2454485	14	15	FFTFFFFFF	FT	0.208	0.229	0.042	0.001	5.728	5.215
689	2453915	2454335	12	13	FFTFFFFFF	FT	0.155	0.15	0.003	-0.01	6.931	5.141
689	2453555	2453705	15	16	FFTFFFFFF	FT	0.178	0.195	0.008	0.007	5.668	5.146
689	2451875	2452085	15	16	FFTFFFFFF	FT	0.179	0.199	-0.023	-0.025	7.776	5.52
689	2453945	2454335	15	16	FFTFFFFFF	FT	0.226	0.265	0.017	0.009	8.052	5.568
689	2451185	2451485	11	12	FFTFFFFFF	FT	0.261	0.157	-0.026	0.012	26.741	11.849
689	2450795	2451425	16	17	FFTFFFFFF	FT	0.269	0.35	-0.034	-0.027	6.858	8.04
689	2453405	2453555	15	16	FFTFFFFFF	FT	0.183	0.218	-0.004	-0.04	8.366	6.82
689	2454335	2455085	15	16	FFTFFFFFF	FT	0.236	0.272	0.032	0.014	5.295	6.218
689	2451425	2451785	16	17	FFTFFFFFF	FT	0.272	0.338	-0.028	-0.012	6.886	5.007
689	2453585	2455055	16	17	FFTFFFFFF	FT	0.245	0.304	0.023	-0.006	4.347	4.708

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
689	2454335	2455085	12	13	FFTFFFFFF	FT	0.194	0.195	0.04	0.008	9.797	10.298
689	2451785	2452085	16	17	FFTFFFFFF	FT	0.207	0.253	-0.014	-0.019	5.588	6.302
689	2449595	2451185	11	12	FFTFFFFFF	FT	0.317	0.221	0.015	0.023	15.257	14.314
689	2453045	2453465	11	12	FFTFFFFFF	FT	0.12	0.141	0.02	0.014	7.021	18.608
689	2454485	2454695	14	15	FFTFFFFFF	FT	0.213	0.229	0.034	-0.01	5.729	5.485
689	2454365	2455085	11	12	FFTFFFFFF	FT	0.201	0.175	0.062	0.007	6.682	10.765
689	2453855	2454365	11	12	FFTFFFFFF	FT	0.237	0.149	0.003	0.019	18.053	11.991
689	2452475	2452565	15	16	FFTFFFFFF	FT	0.18	0.197	0.018	0.018	9.543	7.662
689	2451695	2453405	14	15	FFTFFFFFF	TF	0.191	0.216	0.005	-0.012	10.263	14.697
689	2452715	2453045	11	12	FFTFFFFFF	FT	0.123	0.127	0.018	0.027	6.96	5.851
689	2452865	2453255	16	17	FFTFFFFFF	FT	0.218	0.276	0.006	-0.035	4.809	4.242
689	2454695	2455085	14	15	FFTFFFFFF	FT	0.218	0.245	0.051	0.02	8.977	5.034
689	2451455	2452505	10	11	FFTFFFFFF	FT	0.169	0.137	-0.01	0.012	7.481	32.623
689	2452505	2453945	10	11	FFTFFFFFF	FT	0.15	0.134	0.047	0.025	25.36	13.081
689	2452085	2452235	16	17	FFTFFFFFF	FT	0.248	0.251	0.019	-0.002	33.366	8.974
689	2451965	2452595	15	16	FFTFFFFFF	TF	0.226	0.244	-0.006	-0.004	7.403	8.823
689	2449385	2451965	15	16	FFTFFFFFF	TF	0.29	0.33	-0.036	-0.031	14.629	11.415
689	2449385	2451695	14	15	FFTFFFFFF	TF	0.257	0.258	-0.039	-0.024	23.853	12.494
689	2451365	2452535	13	14	FFTFFFFFF	TF	0.176	0.197	-0.021	-0.009	18.346	13.004
689	2452595	2453495	15	16	FFTFFFFFF	TF	0.231	0.251	0.016	-0.003	12.754	10.461
689	2452535	2453405	13	14	FFTFFFFFF	TF	0.169	0.191	0.017	0.016	22.184	12.841
689	2449385	2451365	13	14	FFTFFFFFF	TF	0.33	0.215	0.003	-0.018	33.9	30.329
689	2449685	2451455	10	11	FFTFFFFFF	FT	0.268	0.181	-0.014	0.033	14.162	18.337
689	2453405	2455055	13	14	FFTFFFFFF	TF	0.202	0.222	0.039	-0.014	10.863	8.12
689	2449745	2451995	12	13	FFTFFFFFF	TF	0.178	0.167	-0.032	-0.006	27.924	14.524
689	2453255	2453585	16	17	FFTFFFFFF	FT	0.211	0.262	0.002	-0.035	5.104	4.747

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
689	2451995	2453315	12	13	FFTFFFFFF	TF	0.141	0.176	0.006	-0.002	11.534	13.057
689	2453945	2455085	10	11	FFTFFFFFF	FT	0.204	0.15	0.077	0.031	9.282	6.369
689	2449925	2452445	9	10	FFTFFFFFF	FT	0.181	0.143	0.003	0.028	14.346	11.793
689	2452445	2455085	9	10	FFTFFFFFF	FT	0.206	0.139	0.059	0.021	6.802	17.853
689	2449745	2452325	11	12	FFTFFFFFF	TF	0.151	0.156	-0.037	0.008	7.493	15.264
689	2453315	2455085	12	13	FFTFFFFFF	TF	0.188	0.216	0.047	-0.009	19.033	11.303
689	2452325	2455055	11	12	FFTFFFFFF	TF	0.16	0.16	0.054	-0.003	15.063	9.399
689	2453405	2455055	14	15	FFTFFFFFF	TF	0.203	0.255	0.039	-0.017	7.415	11.434
689	2449625	2455025	8	9	FFTFFFFFF	FT	0.203	0.171	0.062	0.004	6.348	73.961
689	2452445	2454965	17	18	FFTFFFFFF	FT	0.265	0.337	0.02	-0.044	4.61	3.899
689	2449385	2455025	16	17	FFTFFFFFF	TF	0.328	0.366	0.001	-0.018	12.007	8.533
689	2449385	2452445	17	18	FFTFFFFFF	FT	0.44	0.484	-0.045	-0.025	8.508	6.346
689	2448485	2450795	16	17	FFTFFFFFF	FT	0.651	0.612	-0.082	-0.007	5.556	4.929
689	2453495	2455055	15	16	FFTFFFFFF	TF	0.241	0.268	0.009	-0.016	8.154	6.529
689	2449715	2454965	10	11	FFTFFFFFF	TF	0.163	0.168	0.036	0.017	8.031	19.003
691	2453645	2453675	16	17	FFTFFFFFF	FT	0.199	0.197	-0.015	-0.007	13.791	25.898
691	2454395	2454425	17	18	FFTFFFFFF	FT	0.263	0.215	-0.16	-0.029	9.392	21.804
691	2454485	2454515	16	17	FFTFFFFFF	FT	0.286	0.235	-0.174	-0.018	8.187	26.134
691	2453735	2453765	17	18	FFTFFFFFF	FT	0.254	0.249	-0.11	-0.049	10.578	20.592
691	2454785	2455085	15	16	FFTFFFFFF	FT	0.291	0.272	-0.129	0.052	10.357	16.188
691	2454905	2455025	16	17	FFTFFFFFF	FT	0.283	0.274	-0.149	0.075	9.904	18.772
691	2454725	2454755	16	17	FFTFFFFFF	FT	0.268	0.223	-0.167	0.073	9.566	20.952
691	2454305	2454455	15	16	FFTFFFFFF	FT	0.283	0.268	-0.15	0.099	10.624	15.316
691	2454035	2454125	16	17	FFTFFFFFF	FT	0.227	0.243	-0.029	-0.008	14.993	24.009
691	2453705	2453735	16	17	FFTFFFFFF	FT	0.214	0.262	-0.05	-0.032	14.196	18.405
691	2454365	2454395	17	18	FFTFFFFFF	FT	0.295	0.251	-0.174	0	8.61	16.762

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
691	2454425	2454485	16	17	FFTFFFFFF	FT	0.301	0.227	-0.148	-0.026	10.675	20.183
691	2454455	2454485	17	18	FFTFFFFFF	FT	0.299	0.268	-0.15	-0.057	9.349	16.026
691	2454755	2454785	17	18	FFTFFFFFF	FT	0.272	0.237	-0.14	-0.006	10.986	19.67
691	2454695	2454785	15	16	FFTFFFFFF	FT	0.266	0.247	-0.147	0.105	8.189	18.602
691	2453225	2453915	14	15	FFTFFFFFF	FT	0.23	0.252	-0.034	0.027	14.759	17.977
691	2454065	2454305	15	16	FFTFFFFFF	FT	0.324	0.241	-0.174	0.036	10.818	22.329
691	2453555	2453645	16	17	FFTFFFFFF	FT	0.227	0.226	0.003	0.032	20.101	23.757
691	2454515	2454545	16	17	FFTFFFFFF	FT	0.303	0.254	-0.192	0.032	8.206	19.551
691	2453645	2453675	17	18	FFTFFFFFF	FT	0.206	0.201	-0.006	-0.037	19.874	18.695
691	2454125	2454155	16	17	FFTFFFFFF	FT	0.276	0.172	-0.209	-0.01	4.934	36.522
691	2454275	2454365	16	17	FFTFFFFFF	FT	0.305	0.287	-0.195	0.091	7.358	13.386
691	2454395	2454425	16	17	FFTFFFFFF	FT	0.281	0.249	-0.164	0.033	9.913	24.515
691	2451875	2451965	17	18	FFTFFFFFF	FT	0.461	0.363	-0.128	-0.088	4.26	6.465
691	2452745	2452895	16	17	FFTFFFFFF	FT	0.431	0.632	-0.021	0.328	4.434	4.584
691	2453735	2453765	16	17	FFTFFFFFF	FT	0.26	0.249	-0.115	-0.049	17.043	18.907
691	2453705	2453915	15	16	FFTFFFFFF	FT	0.256	0.233	-0.089	-0.005	14.383	16.987
691	2454725	2454755	17	18	FFTFFFFFF	FT	0.283	0.203	-0.182	0.027	8.702	19.97
691	2454545	2454575	16	17	FFTFFFFFF	FT	0.296	0.268	-0.166	0.031	10.208	20.931
691	2453585	2453705	15	16	FFTFFFFFF	FT	0.209	0.21	-0.004	0.037	19.878	26.419
691	2452715	2453195	14	15	FFTFFFFFF	FT	0.298	0.363	-0.026	0.121	7.611	10.553
691	2452895	2452925	16	17	FFTFFFFFF	FT	0.186	0.18	-0.001	-0.008	19.441	26.069
691	2452925	2452955	16	17	FFTFFFFFF	FT	0.174	0.18	0.007	-0.022	12.957	32.719
691	2453945	2454065	15	16	FFTFFFFFF	FT	0.247	0.239	0.002	0.03	16.62	24.35
691	2452715	2453195	15	16	FFTFFFFFF	FT	0.31	0.362	-0.057	0.092	7.933	11.752
691	2454785	2455085	14	15	FFTFFFFFF	FT	0.313	0.272	-0.141	0.053	11.311	14.829
691	2454305	2454545	14	15	FFTFFFFFF	FT	0.268	0.261	-0.151	0.096	8.639	12.66

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2453105	2453135	16	17	FFTFFFFFF	FT	0.244	0.214	-0.147	0.024	10.412	19.972
691	2453495	2453555	16	17	FFTFFFFFF	FT	0.299	0.327	-0.037	0.079	14.167	15.617
691	2453525	2453555	17	18	FFTFFFFFF	FT	0.275	0.297	0.008	0.054	15.252	15.101
691	2454455	2454695	15	16	FFTFFFFFF	FT	0.294	0.27	-0.157	0.028	8.782	21.451
691	2452715	2452745	16	17	FFTFFFFFF	FT	0.472	0.58	-0.066	0.297	3.263	4.654
691	2454035	2454065	17	18	FFTFFFFFF	FT	0.207	0.219	0.019	-0.043	19.097	23.5
691	2454905	2454935	17	18	FFTFFFFFF	FT	0.301	0.237	-0.155	0.054	10.384	16.591
691	2453945	2454305	14	15	FFTFFFFFF	FT	0.269	0.216	-0.099	0.042	10.305	20.898
691	2454545	2454785	14	15	FFTFFFFFF	FT	0.291	0.28	-0.129	0.099	10.74	12.575
691	2454815	2454875	16	17	FFTFFFFFF	FT	0.295	0.273	-0.159	-0.029	9.665	19.705
691	2454635	2454725	16	17	FFTFFFFFF	FT	0.313	0.23	-0.196	0.095	7.804	13.709
691	2453015	2453105	16	17	FFTFFFFFF	FT	0.243	0.198	-0.136	-0.025	11.326	21.558
691	2454545	2454575	17	18	FFTFFFFFF	FT	0.319	0.279	-0.165	0.044	9.485	16.04
691	2454815	2454845	17	18	FFTFFFFFF	FT	0.308	0.283	-0.157	-0.044	9.728	15.295
691	2454785	2454815	16	17	FFTFFFFFF	FT	0.279	0.277	-0.137	-0.002	7.718	17.731
691	2453765	2453795	17	18	FFTFFFFFF	FT	0.269	0.217	-0.138	-0.031	9.83	21.731
691	2453765	2453915	16	17	FFTFFFFFF	FT	0.241	0.233	-0.096	0.017	10.406	23.082
691	2454005	2454035	17	18	FFTFFFFFF	FT	0.234	0.213	-0.04	-0.045	11.692	20.324
691	2454155	2454185	17	18	FFTFFFFFF	FT	0.293	0.198	-0.214	0.041	5.875	26.991
691	2454155	2454275	16	17	FFTFFFFFF	FT	0.3	0.244	-0.192	0.057	8.368	19.916
691	2454005	2454035	16	17	FFTFFFFFF	FT	0.22	0.2	-0.026	0.011	15.256	21.05
691	2454845	2454875	17	18	FFTFFFFFF	FT	0.296	0.237	-0.17	-0.037	9.418	21.414
691	2454845	2454875	18	19	FFTFFFFFF	FT	0.293	0.252	-0.164	-0.049	7.76	17.633
691	2454785	2454815	17	18	FFTFFFFFF	FT	0.295	0.279	-0.137	-0.019	9.642	17.228
691	2453045	2453075	17	18	FFTFFFFFF	FT	0.232	0.188	-0.115	-0.055	9.283	14.653
691	2454515	2454545	17	18	FFTFFFFFF	FT	0.307	0.239	-0.195	0.012	7.305	18.086

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2454875	2454905	17	18	FFTFFFFFF	FT	0.308	0.236	-0.186	0.01	8.599	19.827
691	2454875	2454905	16	17	FFTFFFFFF	FT	0.282	0.238	-0.173	0.009	6.392	23.537
691	2454875	2454905	18	19	FFTFFFFFF	FT	0.323	0.253	-0.193	-0.004	7.312	15.072
691	2448005	2452415	15	16	FFTFFFFFF	FT	0.464	0.439	-0.044	0.022	4.829	6.467
691	2453225	2453585	15	16	FFTFFFFFF	FT	0.227	0.214	-0.027	0.05	17.784	18.823
691	2454275	2454365	17	18	FFTFFFFFF	FT	0.329	0.254	-0.201	0.036	7.263	17.288
691	2454665	2454695	17	18	FFTFFFFFF	FT	0.324	0.221	-0.237	0.059	5.22	10.586
691	2452955	2452985	17	18	FFTFFFFFF	FT	0.214	0.214	-0.001	-0.055	24.283	22.177
691	2454365	2454395	16	17	FFTFFFFFF	FT	0.282	0.225	-0.165	0.057	10.672	16.773
691	2451755	2452145	16	17	FFTFFFFFF	FT	0.411	0.343	-0.088	-0.002	4.753	6.165
691	2454005	2454035	18	19	FFTFFFFFF	FT	0.238	0.225	-0.036	-0.072	10.958	15.618
691	2455025	2455085	16	17	FFTFFFFFF	FT	0.309	0.293	-0.177	0.155	8.227	13.382
691	2448335	2453915	13	14	FFTFFFFFF	FT	0.343	0.344	-0.056	0.083	10.737	11.429
691	2453945	2454005	16	17	FFTFFFFFF	FT	0.216	0.222	0.003	0.029	14.957	22.909
691	2448485	2448605	20	21	FFTFFFFFF	FT	0.618	0.575	-0.199	0.027	3.594	4.008
691	2448515	2448545	19	20	FFTFFFFFF	FT	0.662	0.554	-0.274	-0.058	3.624	4.253
691	2454065	2454095	18	19	FFTFFFFFF	FT	0.234	0.245	-0.035	-0.065	13.614	13.539
691	2454065	2454095	17	18	FFTFFFFFF	FT	0.246	0.251	-0.03	-0.05	16.772	18.456
691	2454395	2454425	18	19	FFTFFFFFF	FT	0.284	0.242	-0.163	-0.047	8.419	19.032
691	2453615	2453645	17	18	FFTFFFFFF	FT	0.2	0.199	-0.004	-0.023	17.869	26.574
691	2454755	2454785	16	17	FFTFFFFFF	FT	0.285	0.259	-0.135	0.03	13.11	17.383
691	2453855	2453885	17	18	FFTFFFFFF	FT	0.284	0.299	-0.038	0.047	13.82	15.873
691	2452865	2452925	17	18	FFTFFFFFF	FT	0.201	0.191	-0.009	-0.039	21.527	19.133
691	2452925	2452955	17	18	FFTFFFFFF	FT	0.192	0.198	0.011	-0.064	22.29	20.418
691	2453675	2453705	17	18	FFTFFFFFF	FT	0.244	0.249	-0.017	-0.033	18.843	20.555
691	2453405	2453465	17	18	FFTFFFFFF	FT	0.226	0.217	-0.092	0.005	14.074	22.807

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
691	2453945	2455085	13	14	FFTFFFFFF	FT	0.322	0.317	-0.133	0.107	8.971	11.888
691	2452025	2452055	18	19	FFTFFFFFF	FT	0.394	0.359	-0.121	-0.001	5.479	6.131
691	2453225	2453285	16	17	FFTFFFFFF	FT	0.213	0.199	-0.036	0.025	19.637	29.685
691	2453285	2453345	16	17	FFTFFFFFF	FT	0.195	0.192	-0.015	-0.003	20.774	28.752
691	2452145	2452415	16	17	FFTFFFFFF	FT	0.401	0.352	-0.045	-0.022	4.17	7.571
691	2454365	2454395	18	19	FFTFFFFFF	FT	0.312	0.265	-0.18	-0.033	7.832	14.863
691	2454305	2454335	18	19	FFTFFFFFF	FT	0.358	0.265	-0.249	0.002	5.781	15.475
691	2452715	2452745	17	18	FFTFFFFFF	FT	0.449	0.579	-0.06	0.297	3.02	4.382
691	2448185	2452385	14	15	FFTFFFFFF	FT	0.473	0.454	-0.05	0.038	4.199	6.4
691	2451665	2451695	20	21	FFTFFFFFF	FT	0.341	0.385	0.004	0.053	4.612	3.999
691	2453465	2453495	19	20	FFTFFFFFF	FT	0.222	0.215	-0.014	0.024	9.94	11.935
691	2453465	2453495	20	21	FFTFFFFFF	FT	0.237	0.239	0.031	0.025	5.582	6.784
691	2454905	2454935	20	21	FFTFFFFFF	FT	0.345	0.298	-0.134	0.06	4.893	6.049
691	2454905	2454935	19	20	FFTFFFFFF	FT	0.328	0.28	-0.15	0.042	6.118	9.659
691	2453855	2453885	18	19	FFTFFFFFF	FT	0.254	0.263	-0.026	0.037	14.632	17.606
691	2453885	2453915	18	19	FFTFFFFFF	FT	0.254	0.283	0.007	0.048	13.045	14.63
691	2453705	2453735	19	20	FFTFFFFFF	FT	0.225	0.241	-0.021	-0.049	12.108	11.889
691	2453705	2453735	18	19	FFTFFFFFF	FT	0.229	0.259	-0.036	-0.064	15.661	16.001
691	2454425	2454455	17	18	FFTFFFFFF	FT	0.326	0.283	-0.158	-0.027	10.339	18.478
691	2454815	2454845	18	19	FFTFFFFFF	FT	0.306	0.287	-0.167	-0.056	7.206	13.431
691	2452955	2453015	16	17	FFTFFFFFF	FT	0.197	0.219	-0.009	-0.021	19.493	19.951
691	2454125	2454155	17	18	FFTFFFFFF	FT	0.276	0.199	-0.195	-0.006	6.774	30.461
691	2453675	2453705	18	19	FFTFFFFFF	FT	0.233	0.238	-0.012	-0.052	16.994	16.81
691	2448875	2455085	12	13	FFTFFFFFF	FT	0.503	0.389	-0.009	0.164	5.548	7.48
691	2453075	2453105	17	18	FFTFFFFFF	FT	0.25	0.188	-0.17	-0.014	6.085	25.614
691	2454005	2454035	20	21	FFTFFFFFF	FT	0.277	0.243	-0.035	-0.031	5.036	6.954

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2454005	2454035	19	20	FFTFFFFFF	FT	0.253	0.223	-0.044	-0.063	7.905	8.986
691	2453165	2453195	17	18	FFTFFFFFF	FT	0.267	0.233	-0.045	0.044	17.349	17.107
691	2454185	2454215	17	18	FFTFFFFFF	FT	0.286	0.251	-0.172	0.076	10.054	20.403
691	2454215	2454245	17	18	FFTFFFFFF	FT	0.279	0.273	-0.151	0.074	9.685	18.593
691	2453705	2453735	17	18	FFTFFFFFF	FT	0.245	0.284	-0.038	-0.057	14.419	17.531
691	2453795	2453825	17	18	FFTFFFFFF	FT	0.265	0.225	-0.162	-0.013	7.76	28.89
691	2453825	2453855	17	18	FFTFFFFFF	FT	0.258	0.241	-0.09	0.034	17.445	24.153
691	2451965	2451995	18	19	FFTFFFFFF	FT	0.423	0.321	-0.202	0.023	4.602	5.151
691	2451965	2452025	17	18	FFTFFFFFF	FT	0.402	0.315	-0.184	0.004	4.785	6.091
691	2454605	2454635	17	18	FFTFFFFFF	FT	0.295	0.295	-0.14	0.056	10.101	16.589
691	2453345	2453435	16	17	FFTFFFFFF	FT	0.233	0.241	-0.063	-0.036	12.923	18.501
691	2454425	2454455	19	20	FFTFFFFFF	TF	0.328	0.335	-0.14	-0.04	6.48	9.415
691	2454425	2454515	17	18	FFTFFFFFF	TF	0.412	0.453	-0.164	-0.063	6.186	7.53
691	2454815	2454845	20	21	FFTFFFFFF	FT	0.332	0.287	-0.157	0.024	5.246	7.76
691	2454815	2454845	19	20	FFTFFFFFF	FT	0.319	0.282	-0.17	-0.033	6.356	12.168
691	2454875	2454905	19	20	FFTFFFFFF	FT	0.318	0.271	-0.158	0.009	6.48	11.253
691	2454245	2454275	17	18	FFTFFFFFF	FT	0.341	0.357	-0.14	0.087	9.277	12.097
691	2453975	2454005	20	21	FFTFFFFFF	FT	0.249	0.232	0.025	-0.015	8.343	7.52
691	2453975	2454005	18	19	FFTFFFFFF	FT	0.223	0.217	0.004	-0.044	15.286	18.199
691	2454095	2454125	17	18	FFTFFFFFF	FT	0.275	0.204	-0.183	-0.033	6.885	24.335
691	2455025	2455055	17	18	FFTFFFFFF	FT	0.295	0.274	-0.156	0.116	9.399	11.429
691	2454695	2454725	17	18	FFTFFFFFF	FT	0.296	0.23	-0.201	0.04	4.877	20.72
691	2454155	2454185	18	19	FFTFFFFFF	FT	0.292	0.217	-0.194	0.028	7.105	22.436
691	2454605	2454635	18	19	FFTFFFFFF	FT	0.313	0.292	-0.137	0.051	9.864	13.17
691	2452955	2452985	20	21	FFTFFFFFF	FT	0.228	0.225	-0.004	-0.078	7.849	6.457
691	2452955	2452985	21	22	FFTFFFFFF	FT	0.282	0.266	-0.009	-0.081	5.897	4.742

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2453015	2453045	18	19	FFTFFFFFF	FT	0.201	0.206	-0.072	-0.076	12.559	18.041
691	2453075	2453105	18	19	FFTFFFFFF	FT	0.248	0.188	-0.157	-0.026	6.531	18.92
691	2454515	2454545	18	19	FFTFFFFFF	FT	0.325	0.263	-0.197	0.009	6.655	15.481
691	2453435	2453495	16	17	FFTFFFFFF	FT	0.236	0.217	-0.089	0.035	16.702	27.451
691	2453495	2453525	17	18	FFTFFFFFF	FT	0.27	0.285	-0.044	0.055	16.283	15.723
691	2454725	2454755	18	19	FFTFFFFFF	FT	0.287	0.224	-0.175	-0.009	7.445	17.403
691	2454575	2454635	16	17	FFTFFFFFF	FT	0.319	0.308	-0.154	0.067	10.78	15.779
691	2454755	2454785	18	19	FFTFFFFFF	FT	0.276	0.236	-0.147	-0.032	9.583	16.277
691	2454935	2454965	18	19	FFTFFFFFF	FT	0.292	0.28	-0.127	0.034	9.48	16.054
691	2455025	2455055	19	20	FFTFFFFFF	FT	0.303	0.273	-0.129	0.078	8.94	9.767
691	2454725	2454755	19	20	FFTFFFFFF	FT	0.313	0.242	-0.188	0.001	5.877	11.043
691	2451365	2451545	16	17	FFTFFFFFF	FT	0.413	0.424	0.003	0.028	6.378	6.779
691	2454425	2454455	18	19	FFTFFFFFF	FT	0.318	0.3	-0.16	-0.033	8.552	15.049
691	2454545	2454575	18	19	FFTFFFFFF	FT	0.309	0.27	-0.164	0.032	8.324	15.48
691	2454215	2454245	18	19	FFTFFFFFF	FT	0.27	0.262	-0.131	0.058	9.636	17.77
691	2453975	2454005	17	18	FFTFFFFFF	FT	0.229	0.208	-0.005	-0.021	19.232	23.343
691	2451545	2451575	17	18	FFTFFFFFF	FT	0.357	0.389	-0.035	-0.072	5.195	6.341
691	2451545	2451755	16	17	FFTFFFFFF	FT	0.358	0.404	-0.057	-0.021	5.652	7.04
691	2453375	2453405	18	19	FFTFFFFFF	FT	0.213	0.222	-0.071	-0.089	11.811	17.371
691	2453375	2453405	17	18	FFTFFFFFF	FT	0.204	0.2	-0.082	-0.064	13.691	21.677
691	2454695	2455085	17	18	FFTFFFFFF	TF	0.362	0.415	-0.134	-0.087	8.072	8.941
691	2452295	2452415	17	18	FFTFFFFFF	FT	0.385	0.389	-0.156	-0.006	3.904	8.233
691	2452325	2452355	18	19	FFTFFFFFF	FT	0.393	0.345	-0.179	-0.023	4.141	6.735
691	2451485	2451515	17	18	FFTFFFFFF	FT	0.346	0.324	0.026	-0.015	5.128	5.695
691	2453675	2453795	17	18	FFTFFFFFF	TF	0.321	0.371	-0.03	-0.028	11.148	11.683
691	2453675	2453705	16	17	FFTFFFFFF	FT	0.21	0.23	-0.013	-0.018	21.909	21.232

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2452235	2452295	17	18	FFTFFFFFF	FT	0.474	0.435	-0.094	-0.061	4.211	7.183
691	2454485	2454515	17	18	FFTFFFFFF	FT	0.308	0.252	-0.172	-0.041	8.934	19.14
691	2451245	2451275	18	19	FFTFFFFFF	FT	0.598	0.504	-0.079	-0.049	3.535	4.184
691	2455055	2455085	17	18	FFTFFFFFF	FT	0.316	0.272	-0.192	0.111	5.915	14.52
691	2451125	2451155	18	19	FFTFFFFFF	FT	0.603	0.416	-0.15	-0.118	2.993	7.671
691	2451065	2451185	17	18	FFTFFFFFF	FT	0.641	0.458	-0.204	-0.037	3.516	7.701
691	2451035	2451215	17	18	FFFFFFFTF	FT	0.587	0.409	-0.231	-0.096	2.717	6.328
691	2453105	2453135	17	18	FFTFFFFFF	FT	0.244	0.202	-0.134	0.019	11.319	28.088
691	2451185	2451395	17	18	FFTFFFFFF	FT	0.573	0.535	-0.165	-0.014	3.749	6.698
691	2451245	2451275	19	20	FFTFFFFFF	FT	0.574	0.503	-0.011	-0.079	3.626	3.73
691	2453615	2453645	19	20	FFTFFFFFF	FT	0.211	0.21	0.007	-0.06	10.229	11.327
691	2453645	2453675	19	20	FFTFFFFFF	FT	0.218	0.224	0.005	-0.06	10.52	11.885
691	2453645	2453675	18	19	FFTFFFFFF	FT	0.211	0.223	-0.003	-0.066	16.24	19.878
691	2453405	2453435	18	19	FFTFFFFFF	FT	0.228	0.215	-0.094	-0.044	8.975	18.78
691	2453435	2453465	18	19	FFTFFFFFF	FT	0.222	0.201	-0.085	-0.002	12.355	16.194
691	2453885	2453915	17	18	FFTFFFFFF	FT	0.27	0.302	0.012	0.063	17.207	15.677
691	2453465	2453495	17	18	FFTFFFFFF	FT	0.251	0.236	-0.078	0.039	14.816	19.728
691	2454035	2454065	18	19	FFTFFFFFF	FT	0.213	0.226	0.019	-0.061	16.567	19.104
691	2454785	2454815	19	20	FFTFFFFFF	TF	0.343	0.361	-0.163	-0.076	5.89	9.003
691	2453495	2453525	18	19	FFTFFFFFF	FT	0.255	0.257	-0.038	0.045	14.251	14.019
691	2452055	2452145	18	19	FFTFFFFFF	FT	0.4	0.371	-0.131	-0.058	5.59	5.801
691	2454095	2454125	18	19	FFTFFFFFF	FT	0.281	0.216	-0.19	-0.033	6.921	20.162
691	2454095	2454125	19	20	FFTFFFFFF	FT	0.287	0.216	-0.181	-0.022	5.477	14.267
691	2452745	2452775	17	18	FFTFFFFFF	FT	0.441	0.658	-0.022	0.366	3.173	4.05
691	2453795	2453825	19	20	FFTFFFFFF	FT	0.252	0.231	-0.079	-0.001	9.002	12.473
691	2453825	2453855	18	19	FFTFFFFFF	FT	0.247	0.231	-0.075	0.02	12.421	18.517

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2455055	2455085	18	19	FFTFFFFFF	FT	0.307	0.246	-0.171	0.08	6.236	11.956
691	2452025	2452145	17	18	FFTFFFFFF	FT	0.373	0.385	-0.133	-0.029	6.279	5.974
691	2453945	2454065	18	19	FFTFFFFFF	TF	0.277	0.312	0.003	-0.072	12.513	12.164
691	2451575	2451605	17	18	FFTFFFFFF	FT	0.381	0.365	-0.083	-0.017	5.549	7.734
691	2454125	2454155	18	19	FFTFFFFFF	FT	0.274	0.208	-0.183	-0.013	6.602	23.641
691	2454665	2454695	18	19	FFTFFFFFF	FT	0.358	0.256	-0.24	0.04	5.4	12.942
691	2452745	2452775	18	19	FFTFFFFFF	FT	0.449	0.636	-0.015	0.335	3.108	4.251
691	2454125	2454155	19	20	FFTFFFFFF	FT	0.275	0.213	-0.159	0	6.623	15.457
691	2450705	2450765	18	19	FFFFFFFTF	FT	0.582	0.414	-0.322	-0.131	2.907	3.424
691	2450705	2450735	19	20	FFTFFFFFF	FT	0.545	0.428	-0.198	-0.087	3.283	4.951
691	2450705	2450765	18	19	FFTFFFFFF	FT	0.587	0.461	-0.171	-0.041	4.337	5.396
691	2451515	2451545	17	18	FFTFFFFFF	FT	0.361	0.399	-0.009	-0.046	5.007	5.043
691	2453585	2453615	17	18	FFTFFFFFF	FT	0.235	0.226	-0.022	-0.005	15.359	21.651
691	2454065	2454155	18	19	FFTFFFFFF	TF	0.304	0.33	-0.071	-0.061	9.382	12.297
691	2451605	2451755	17	18	FFTFFFFFF	FT	0.369	0.371	-0.071	0.017	5.393	5.392
691	2451605	2451635	18	19	FFTFFFFFF	FT	0.362	0.354	-0.069	-0.018	4.234	5.783
691	2454905	2454935	18	19	FFTFFFFFF	FT	0.317	0.256	-0.168	0.036	7.302	14.466
691	2453735	2453765	18	19	FFTFFFFFF	FT	0.259	0.242	-0.098	-0.057	11.664	14.412
691	2449835	2450285	17	18	FFFFFFFTF	FT	0.585	0.378	-0.16	-0.077	4.795	4.643
691	2450045	2450135	18	19	FFFFFFFTF	FT	0.417	0.32	-0.148	-0.128	5.829	4.122
691	2452955	2452985	19	20	FFTFFFFFF	FT	0.212	0.207	-0.001	-0.093	14.156	7.709
691	2452955	2452985	18	19	FFTFFFFFF	FT	0.208	0.2	-0.004	-0.079	18.759	14.858
691	2454695	2454725	18	19	FFTFFFFFF	FT	0.324	0.244	-0.211	-0.003	5.965	16.646
691	2455025	2455055	18	19	FFTFFFFFF	FT	0.302	0.256	-0.144	0.083	10.389	11.966
691	2452775	2452865	17	18	FFTFFFFFF	FT	0.409	0.59	0.013	0.299	5.112	5.527
691	2452775	2452805	18	19	FFTFFFFFF	FT	0.464	0.691	0.032	0.394	3.304	3.948

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2454185	2454215	18	19	FFTFFFFFF	FT	0.29	0.243	-0.158	0.056	9.29	20.043
691	2453135	2453195	16	17	FFTFFFFFF	FT	0.226	0.24	-0.062	0.061	12.943	17.935
691	2451095	2451365	16	17	FFTFFFFFF	FT	0.573	0.521	-0.12	-0.033	3.405	7.304
691	2453015	2453045	17	18	FFTFFFFFF	FT	0.219	0.207	-0.085	-0.06	17.06	24.974
691	2453945	2454065	17	18	FFTFFFFFF	TF	0.274	0.342	-0.003	-0.034	11.588	13.7
691	2454125	2454155	20	21	FFTFFFFFF	FT	0.264	0.235	-0.104	0.031	6.572	6.94
691	2454185	2454215	19	20	FFTFFFFFF	FT	0.255	0.23	-0.119	0.044	8.099	14.185
691	2454755	2454785	19	20	FFTFFFFFF	FT	0.292	0.246	-0.161	-0.021	6.536	12.923
691	2453705	2453735	18	19	FFTFFFFFF	TF	0.289	0.33	-0.033	-0.048	10.802	10.765
691	2453615	2453645	18	19	FFTFFFFFF	FT	0.211	0.203	0.008	-0.055	14.493	14.843
691	2453735	2453765	19	20	FFTFFFFFF	FT	0.247	0.247	-0.058	-0.046	9.239	12.147
691	2448545	2453405	17	18	FFTFFFFFF	TF	0.414	0.393	-0.071	-0.047	7.592	9.043
691	2454035	2454065	19	20	FFTFFFFFF	FT	0.218	0.223	0.013	-0.049	12.22	12.592
691	2453225	2453255	18	19	FFTFFFFFF	FT	0.176	0.186	-0.02	-0.046	16.044	20.274
691	2454065	2454095	21	22	FFTFFFFFF	FT	0.337	0.323	-0.088	-0.016	4.465	4.784
691	2448005	2448185	19	20	FFTFFFFFF	FT	0.503	0.477	-0.21	0.163	3.653	5.033
691	2451485	2451515	18	19	FFTFFFFFF	FT	0.32	0.321	0.01	-0.068	5.237	4.551
691	2451155	2451185	18	19	FFTFFFFFF	FT	0.657	0.48	-0.169	-0.13	3.029	6.14
691	2451155	2451185	19	20	FFTFFFFFF	FT	0.635	0.483	-0.168	-0.148	3.245	5.782
691	2451215	2451245	18	19	FFTFFFFFF	FT	0.569	0.493	-0.126	-0.182	3.38	7.387
691	2452715	2452745	18	19	FFTFFFFFF	FT	0.451	0.58	-0.042	0.296	2.877	4.355
691	2453105	2453135	18	19	FFTFFFFFF	FT	0.225	0.185	-0.125	-0.001	7.513	21.32
691	2453135	2453165	17	18	FFTFFFFFF	FT	0.214	0.197	-0.1	0.027	13.982	23.175
691	2453135	2453165	18	19	FFTFFFFFF	FT	0.208	0.184	-0.083	0.01	10.607	17.287
691	2449595	2449835	17	18	FFFFFFFTF	FT	0.487	0.41	-0.207	-0.148	5.093	5.308
691	2452985	2453015	17	18	FFTFFFFFF	FT	0.219	0.235	-0.024	-0.065	19.85	19.771

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2452985	2453015	18	19	FFTFFFFFF	FT	0.201	0.219	-0.018	-0.083	18.024	14.447
691	2454575	2454605	17	18	FFTFFFFFF	FT	0.311	0.285	-0.149	0.051	9.804	15.89
691	2454635	2454665	17	18	FFTFFFFFF	FT	0.293	0.277	-0.153	0.084	9.234	17.608
691	2452145	2452205	17	18	FFTFFFFFF	FT	0.355	0.31	-0.037	-0.04	5.928	6.396
691	2448605	2448665	19	20	FFTFFFFFF	FT	0.64	0.602	-0.183	-0.13	4.399	3.693
691	2453645	2453675	20	21	FFTFFFFFF	FT	0.238	0.243	-0.003	-0.031	5.602	6.578
691	2451935	2451965	18	19	FFTFFFFFF	FT	0.379	0.316	-0.095	-0.053	4.031	6.903
691	2453045	2453075	18	19	FFTFFFFFF	FT	0.229	0.197	-0.109	-0.061	15.628	18.606
691	2454065	2454095	19	20	FFTFFFFFF	FT	0.238	0.248	-0.042	-0.052	9.621	12.401
691	2454515	2454545	19	20	FFTFFFFFF	FT	0.332	0.277	-0.175	0.013	5.879	10.201
691	2451515	2451545	18	19	FFTFFFFFF	FT	0.381	0.418	-0.011	-0.069	4.933	5.129
691	2453075	2453105	19	20	FFTFFFFFF	FT	0.236	0.185	-0.127	-0.035	5.109	7.653
691	2453405	2453435	20	21	FFTFFFFFF	FT	0.254	0.256	-0.004	-0.041	5.824	5.71
691	2449595	2450285	16	17	FFFFFFFTF	FT	0.551	0.389	-0.132	-0.088	5.028	6.001
691	2453225	2453285	17	18	FFTFFFFFF	FT	0.194	0.186	-0.019	-0.029	17	23.313
691	2453765	2453795	18	19	FFTFFFFFF	FT	0.258	0.226	-0.117	-0.039	10.375	17.247
691	2453795	2453825	18	19	FFTFFFFFF	FT	0.259	0.215	-0.136	-0.012	9.532	15.958
691	2453975	2454005	19	20	FFTFFFFFF	FT	0.224	0.22	0.013	-0.043	11.149	14.202
691	2450855	2450885	19	20	FFTFFFFFF	FT	0.519	0.406	-0.084	-0.107	3.599	4.881
691	2454305	2454335	19	20	FFTFFFFFF	FT	0.33	0.283	-0.195	0.042	5.456	12.369
691	2454275	2454395	21	22	FFTFFFFFF	FT	0.373	0.3	-0.208	-0.007	4.43	5.904
691	2448485	2448545	18	19	FFTFFFFFF	FT	0.706	0.55	-0.331	-0.051	3.534	5
691	2448545	2448605	18	19	FFTFFFFFF	FT	0.673	0.546	-0.195	-0.045	4.13	4.764
691	2454035	2454065	20	21	FFTFFFFFF	FT	0.238	0.243	0.004	-0.007	6.077	7.869
691	2454155	2454185	19	20	FFTFFFFFF	FT	0.275	0.215	-0.155	0.028	6.333	15.05
691	2448335	2448365	20	21	FFTFFFFFF	FT	0.538	0.702	0.042	0.469	3.562	2.65

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2452925	2452955	18	19	FFTFFFFFF	FT	0.184	0.197	0.001	-0.093	15.605	12.076
691	2454485	2454515	18	19	FFTFFFFFF	FT	0.319	0.265	-0.19	-0.043	7.36	16.357
691	2454935	2454995	17	18	FFTFFFFFF	FT	0.316	0.283	-0.13	0.059	11.297	16.027
691	2454335	2454365	18	19	FFTFFFFFF	FT	0.344	0.277	-0.216	-0.024	6.967	13.494
691	2454575	2454605	18	19	FFTFFFFFF	FT	0.307	0.281	-0.142	0.036	10.34	14.367
691	2453435	2453465	19	20	FFTFFFFFF	FT	0.222	0.209	-0.044	0.007	9.361	11.703
691	2451635	2451665	18	19	FFTFFFFFF	FT	0.342	0.397	-0.05	0.045	4.724	5.714
691	2453315	2453375	17	18	FFTFFFFFF	FT	0.197	0.225	-0.008	-0.05	23.012	23.032
691	2453675	2453705	19	20	FFTFFFFFF	FT	0.225	0.232	-0.008	-0.048	12.119	12.685
691	2454425	2454455	19	20	FFTFFFFFF	FT	0.323	0.282	-0.165	-0.023	6.681	11.201
691	2451275	2451335	18	19	FFTFFFFFF	FT	0.554	0.527	-0.16	-0.008	4.116	4.938
691	2453465	2453495	18	19	FFTFFFFFF	FT	0.227	0.222	-0.068	0.013	13.206	20.885
691	2454845	2454875	19	20	FFTFFFFFF	FT	0.301	0.257	-0.147	-0.027	7.393	12.058
691	2448035	2448455	17	18	FFTFFFFFF	FT	0.497	0.6	-0.125	0.314	4.065	3.859
691	2453285	2453315	17	18	FFTFFFFFF	FT	0.185	0.19	-0.013	-0.041	20.278	19.542
691	2450825	2450975	18	19	FFFFFFFTF	FT	0.553	0.5	-0.07	-0.114	3.83	4.218
691	2451755	2451845	17	18	FFTFFFFFF	FT	0.383	0.345	0.005	-0.001	4.626	4.853
691	2450375	2450465	18	19	FFTFFFFFF	FT	0.548	0.455	-0.096	-0.102	3.814	5.841
691	2450405	2450675	17	18	FFTFFFFFF	FT	0.554	0.494	-0.143	-0.038	4.798	6.644
691	2453945	2453975	17	18	FFTFFFFFF	FT	0.209	0.227	-0.011	0.006	12.178	21.177
691	2451455	2451485	17	18	FFTFFFFFF	FT	0.323	0.349	0.043	-0.035	4.897	6.372
691	2451455	2451485	18	19	FFTFFFFFF	FT	0.312	0.341	0.041	-0.067	5.444	5.666
691	2452025	2452055	19	20	FFTFFFFFF	FT	0.389	0.346	-0.068	0.011	5.917	4.975
691	2454365	2454395	20	21	FFTFFFFFF	FT	0.331	0.285	-0.179	0.023	4.831	7.313
691	2454365	2454395	19	20	FFTFFFFFF	FT	0.326	0.278	-0.183	-0.025	6.363	9.908
691	2454395	2454425	19	20	FFTFFFFFF	FT	0.293	0.25	-0.164	-0.036	6.772	12.125

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
691	2450705	2451035	17	18	FFFFFFFTF	FT	0.61	0.478	-0.19	-0.078	3.133	4.51
691	2453255	2453285	18	19	FFTFFFFFF	FT	0.194	0.194	-0.017	-0.063	14.976	15.014
691	2449835	2450675	16	17	FFTFFFFFF	FT	0.582	0.474	-0.122	-0.028	4.388	7.405
691	2448215	2448455	18	19	FFTFFFFFF	FT	0.53	0.605	-0.09	0.361	3.504	3.164
691	2453555	2453585	17	18	FFTFFFFFF	FT	0.266	0.325	0.012	0.072	11.97	14.674
691	2453945	2453975	18	19	FFTFFFFFF	FT	0.219	0.244	-0.023	-0.029	12.302	15.634
691	2454995	2455025	17	18	FFTFFFFFF	FT	0.284	0.286	-0.132	0.088	12.42	14.736
691	2454785	2454815	18	19	FFTFFFFFF	FT	0.293	0.267	-0.145	-0.039	9.273	15.306
691	2452265	2452295	18	19	FFTFFFFFF	FT	0.48	0.369	-0.133	-0.071	3.639	7.671
691	2454065	2454155	17	18	FFTFFFFFF	TF	0.343	0.336	-0.085	-0.016	10.391	11.986
691	2454095	2454155	19	20	FFTFFFFFF	TF	0.316	0.308	-0.157	-0.018	7.37	11.784
691	2452205	2452235	17	18	FFTFFFFFF	FT	0.382	0.357	0	-0.052	4.178	7.512
691	2454725	2454755	20	21	FFTFFFFFF	FT	0.33	0.286	-0.174	0.045	5.231	7.066
691	2453285	2453315	18	19	FFTFFFFFF	FT	0.176	0.182	0.003	-0.065	12.932	12.859
691	2453675	2453705	20	21	FFTFFFFFF	FT	0.248	0.248	-0.018	-0.009	7.31	6.636
691	2452265	2452295	19	20	FFTFFFFFF	FT	0.464	0.385	-0.152	-0.078	3.771	8.028
691	2450075	2450285	17	18	FFTFFFFFF	FT	0.595	0.459	-0.115	-0.026	3.504	5.36
691	2450705	2451065	16	17	FFFFFFFTF	FT	0.585	0.498	-0.164	-0.011	3.262	4.886
691	2451665	2451755	18	19	FFTFFFFFF	FT	0.327	0.437	-0.052	0.051	6.031	5.003
691	2454065	2454095	20	21	FFTFFFFFF	FT	0.262	0.265	-0.039	-0.004	6.317	6.3
691	2451065	2451215	16	17	FFFFFFFTF	FT	0.626	0.439	-0.247	-0.071	3.062	11.097
691	2453735	2453765	20	21	FFTFFFFFF	FT	0.256	0.26	-0.027	-0.012	6.232	7.585
691	2451995	2452025	18	19	FFTFFFFFF	FT	0.36	0.31	-0.124	0.015	5.374	6.652
691	2452295	2452325	18	19	FFTFFFFFF	FT	0.44	0.353	-0.137	-0.051	4.178	6.939
691	2453675	2453705	19	20	FFTFFFFFF	TF	0.265	0.29	-0.036	-0.035	10.69	11.148
691	2453675	2453705	18	19	FFTFFFFFF	TF	0.29	0.346	-0.029	-0.049	10.201	11.679

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2449295	2449565	17	18	FFTFFFFFF	FT	0.587	0.485	-0.174	-0.03	3.758	6.477
691	2454185	2454215	20	21	FFTFFFFFF	FT	0.253	0.251	-0.074	0.049	5.957	6.696
691	2454215	2454245	19	20	FFTFFFFFF	FT	0.254	0.234	-0.097	0.055	9.049	12.199
691	2454215	2454245	20	21	FFTFFFFFF	FT	0.264	0.265	-0.064	0.066	6.301	6.588
691	2454695	2454725	19	20	FFTFFFFFF	FT	0.336	0.26	-0.214	0.011	4.826	10.418
691	2453165	2453195	18	19	FFTFFFFFF	FT	0.206	0.207	-0.03	0.01	13.872	21.208
691	2450315	2450675	17	18	FFFFFFFTF	FT	0.554	0.425	-0.245	-0.12	4.09	4.366
691	2453555	2453585	18	19	FFTFFFFFF	FT	0.249	0.27	0.014	0.046	16.04	12.649
691	2453555	2453585	20	21	FFTFFFFFF	FT	0.253	0.264	0.029	0.021	7.789	7.453
691	2453285	2453315	20	21	FFTFFFFFF	FT	0.227	0.222	0.026	-0.036	4.006	4.933
691	2454695	2454725	20	21	FFTFFFFFF	FT	0.357	0.289	-0.203	0.047	4.739	7.012
691	2454755	2454785	21	22	FFTFFFFFF	FT	0.4	0.31	-0.244	-0.036	3.89	5.176
691	2454485	2454515	21	22	FFTFFFFFF	FT	0.364	0.323	-0.139	0.053	4.228	6.036
691	2454485	2454515	20	21	FFTFFFFFF	FT	0.325	0.288	-0.139	0.034	5.233	7.058
691	2451095	2451125	19	20	FFTFFFFFF	FT	0.576	0.384	-0.121	-0.086	2.942	4.101
691	2451125	2451215	18	19	FFFFFFFTF	FT	0.593	0.397	-0.173	-0.202	2.81	4.537
691	2453555	2453585	19	20	FFTFFFFFF	FT	0.226	0.241	0.023	0.028	13.599	11.473
691	2450045	2450075	19	20	FFFFFFFTF	FT	0.407	0.33	-0.178	-0.077	3.555	3.326
691	2452175	2452205	19	20	FFTFFFFFF	FT	0.368	0.316	-0.054	-0.124	3.612	4.481
691	2452355	2452415	18	19	FFTFFFFFF	FT	0.356	0.505	-0.154	0.006	4.79	5.716
691	2455055	2455085	19	20	FFTFFFFFF	FT	0.307	0.269	-0.152	0.085	5.453	10.554
691	2453045	2453075	19	20	FFTFFFFFF	FT	0.211	0.191	-0.089	-0.068	9.484	11.221
691	2453525	2453555	18	19	FFTFFFFFF	FT	0.249	0.277	0.012	0.038	13.694	15.218
691	2453525	2453555	19	20	FFTFFFFFF	FT	0.231	0.241	0.022	0.031	10.415	10.655
691	2450795	2451065	17	18	FFTFFFFFF	FT	0.642	0.517	-0.178	-0.005	3.732	5.615
691	2453705	2453735	19	20	FFTFFFFFF	TF	0.268	0.293	-0.027	-0.032	9.298	10.869

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
691	2454455	2454485	18	19	FFTFFFFFF	FT	0.298	0.265	-0.155	-0.059	8.764	15.881
691	2453495	2453525	19	20	FFTFFFFFF	FT	0.231	0.235	0.001	0.039	10.92	12.072
691	2450705	2451095	16	17	FFTFFFFFF	FT	0.616	0.484	-0.118	-0.011	3.903	8.106
691	2450735	2450765	19	20	FFTFFFFFF	FT	0.572	0.39	-0.148	-0.075	4.128	3.285
691	2448485	2448995	16	17	FFFFFFFTF	FT	0.664	0.418	-0.266	0.034	3.221	7.323
691	2452235	2452265	20	21	FFTFFFFFF	FT	0.428	0.508	-0.069	-0.061	3.667	5.44
691	2453255	2453345	19	20	FFTFFFFFF	TF	0.207	0.245	0.004	-0.105	8.491	8.286
691	2454785	2454815	19	20	FFTFFFFFF	FT	0.295	0.257	-0.151	-0.022	7.152	11.862
691	2454815	2454845	19	20	FFTFFFFFF	TF	0.333	0.425	-0.114	-0.118	5.356	7.569
691	2450015	2450075	17	18	FFTFFFFFF	FT	0.517	0.425	-0.165	-0.067	4.362	6.69
691	2450045	2450075	18	19	FFTFFFFFF	FT	0.485	0.396	-0.194	-0.041	3.492	5.593
691	2452235	2452265	18	19	FFTFFFFFF	FT	0.458	0.522	-0.084	-0.034	3.596	5.8
691	2454605	2454635	19	20	FFTFFFFFF	FT	0.299	0.29	-0.105	0.054	9.023	10.965
691	2454245	2454275	18	19	FFTFFFFFF	FT	0.323	0.308	-0.124	0.068	9.481	11.69
691	2451875	2451905	18	19	FFTFFFFFF	FT	0.462	0.382	-0.098	-0.107	3.651	5.041
691	2449655	2449745	18	19	FFTFFFFFF	FT	0.528	0.525	-0.183	-0.039	4.142	4.841
691	2453585	2453615	18	19	FFTFFFFFF	FT	0.209	0.227	-0.012	-0.053	13.877	17.015
691	2450015	2450045	18	19	FFFFFFFTF	FT	0.431	0.352	-0.224	-0.169	3.268	4.061
691	2451575	2451605	18	19	FFTFFFFFF	FT	0.365	0.357	-0.053	-0.041	5.536	6.067
691	2453105	2453135	19	20	FFTFFFFFF	FT	0.221	0.183	-0.088	-0.006	5.159	7.12
691	2450525	2450555	20	21	FFTFFFFFF	FT	0.474	0.553	-0.111	-0.141	5.842	3.039
691	2453375	2453405	19	20	FFTFFFFFF	FT	0.219	0.227	-0.042	-0.079	9.987	10.569
691	2449025	2449145	19	20	FFTFFFFFF	FT	0.529	0.57	-0.159	-0.129	4.535	4.31
691	2450915	2450945	19	20	FFFFFFFTF	FT	0.58	0.537	0.019	-0.135	2.989	3.487
691	2454785	2454815	18	19	FFTFFFFFF	TF	0.342	0.386	-0.158	-0.097	6.355	9.416
691	2453765	2453795	19	20	FFTFFFFFF	FT	0.25	0.234	-0.071	-0.026	8.655	11.751

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2452055	2452085	19	20	FFTFFFFFF	FT	0.392	0.388	-0.109	-0.066	5.156	4.976
691	2448965	2449145	18	19	FFTFFFFFF	FT	0.553	0.505	-0.188	-0.086	5.004	4.508
691	2449325	2449535	17	18	FFFFFFFTF	FT	0.541	0.371	-0.181	0.007	5.207	5.797
691	2454965	2454995	18	19	FFTFFFFFF	FT	0.278	0.279	-0.078	0.051	10.638	15.403
691	2453825	2453855	19	20	FFTFFFFFF	FT	0.247	0.246	-0.027	0.027	9.504	12.342
691	2451245	2451275	20	21	FFTFFFFFF	FT	0.573	0.503	0.04	-0.088	3.219	3.944
691	2450465	2450675	18	19	FFTFFFFFF	FT	0.534	0.5	-0.204	-0.051	4.281	5.047
691	2451635	2451665	19	20	FFTFFFFFF	FT	0.36	0.375	-0.044	0.041	4.361	4.787
691	2448485	2449535	15	16	FFFFFFFTF	FT	0.578	0.426	-0.207	0.014	4.55	8.272
691	2452025	2452055	20	21	FFTFFFFFF	FT	0.36	0.344	0.023	-0.01	4.774	4.268
691	2453345	2453375	18	19	FFTFFFFFF	FT	0.204	0.22	-0.015	-0.069	18.007	18.038
691	2452295	2452325	19	20	FFTFFFFFF	FT	0.406	0.339	-0.109	-0.085	3.955	6.966
691	2451545	2451575	18	19	FFTFFFFFF	FT	0.354	0.396	-0.02	-0.069	5.094	5.978
691	2451095	2451125	18	19	FFFFFFFTF	FT	0.634	0.359	-0.251	-0.09	2.615	7.285
691	2449745	2449775	18	19	FFTFFFFFF	FT	0.474	0.517	-0.061	-0.037	5.778	6.111
691	2452175	2452205	18	19	FFTFFFFFF	FT	0.369	0.331	-0.05	-0.13	3.396	6.96
691	2453345	2453375	19	20	FFTFFFFFF	FT	0.196	0.221	-0.008	-0.072	8.64	7.06
691	2450315	2450675	16	17	FFFFFFFTF	FT	0.554	0.425	-0.29	-0.098	3.059	5.51
691	2451905	2451935	18	19	FFTFFFFFF	FT	0.479	0.338	-0.126	-0.076	4.358	6.77
691	2454425	2454515	18	19	FFTFFFFFF	TF	0.378	0.411	-0.151	-0.077	6.321	8.74
691	2448485	2448755	17	18	FFFFFFFTF	FT	0.657	0.437	-0.157	-0.053	3.828	5.764
691	2452205	2452235	18	19	FFTFFFFFF	FT	0.391	0.353	0.019	-0.089	4.048	9.272
691	2448665	2448725	19	20	FFTFFFFFF	FT	0.677	0.672	-0.111	-0.156	3.667	3.211
691	2448605	2448695	18	19	FFTFFFFFF	FT	0.675	0.589	-0.179	-0.106	3.489	4.603
691	2453855	2453885	19	20	FFTFFFFFF	FT	0.24	0.26	0.001	0.036	12.305	13.402
691	2448695	2448785	18	19	FFTFFFFFF	FT	0.683	0.661	-0.103	-0.067	3.754	3.877

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2451395	2451455	17	18	FFTFFFFFF	FT	0.44	0.447	-0.065	0.072	5.915	4.675
691	2451185	2451215	18	19	FFTFFFFFF	FT	0.603	0.46	-0.133	-0.154	3.471	6.078
691	2451845	2451875	18	19	FFTFFFFFF	FT	0.415	0.368	-0.068	-0.11	4.031	5.783
691	2454695	2454725	20	21	FFTFFFFFF	TF	0.369	0.414	-0.204	-0.139	5.184	7.214
691	2454395	2454425	17	18	FFTFFFFFF	TF	0.314	0.316	-0.152	-0.05	8.22	13.964
691	2450495	2450555	19	20	FFTFFFFFF	FT	0.528	0.565	-0.126	-0.188	5.38	2.855
691	2449385	2449415	19	20	FFTFFFFFF	FT	0.444	0.459	-0.019	-0.097	5.919	5.927
691	2449385	2449445	18	19	FFTFFFFFF	FT	0.482	0.488	-0.114	-0.112	5.659	5.565
691	2448995	2449535	16	17	FFFFFFFTF	FT	0.594	0.452	-0.243	0.004	4.788	6.187
691	2450555	2450675	20	21	FFTFFFFFF	FT	0.469	0.447	-0.163	0.051	4.431	3.918
691	2450555	2450615	19	20	FFTFFFFFF	FT	0.502	0.453	-0.181	0.005	4.348	4.534
691	2450135	2450285	18	19	FFTFFFFFF	FT	0.648	0.52	-0.082	-0.023	3.43	5.449
691	2452925	2452955	19	20	FFTFFFFFF	FT	0.194	0.207	-0.002	-0.111	9.067	5.805
691	2454485	2454515	19	20	FFTFFFFFF	FT	0.318	0.272	-0.17	-0.025	6.097	12.214
691	2451755	2451815	18	19	FFTFFFFFF	FT	0.381	0.36	0.02	-0.022	4.795	5.903
691	2449325	2449385	18	19	FFTFFFFFF	FT	0.611	0.462	-0.176	-0.078	4.007	6.257
691	2452025	2452145	21	22	FFTFFFFFF	FT	0.388	0.366	0.018	-0.066	4.444	3.961
691	2454515	2454545	20	21	FFTFFFFFF	FT	0.335	0.304	-0.139	0.046	5.056	6.34
691	2454515	2454545	21	22	FFTFFFFFF	FT	0.373	0.353	-0.151	0.083	4.233	4.677
691	2453105	2453135	20	21	FFTFFFFFF	FT	0.236	0.221	-0.038	-0.01	4.293	4.785
691	2453105	2453135	21	22	FFTFFFFFF	FT	0.289	0.281	-0.019	-0.046	4.378	4.337
691	2453765	2453795	21	22	FFTFFFFFF	FT	0.305	0.319	-0.021	-0.03	4.939	5.006
691	2454185	2454215	21	22	FFTFFFFFF	FT	0.297	0.312	-0.061	0.049	4.882	5.249
691	2454845	2454875	20	21	FFTFFFFFF	FT	0.303	0.273	-0.107	0.023	5.962	7.828
691	2453735	2453795	18	19	FFTFFFFFF	TF	0.281	0.315	-0.034	-0.002	10.606	11.533
691	2448545	2448605	19	20	FFTFFFFFF	FT	0.623	0.579	-0.183	-0.011	3.772	4.506

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2452205	2452235	19	20	FFTFFFFFF	FT	0.394	0.332	0.014	-0.107	4.565	7.593
691	2454935	2454965	19	20	FFTFFFFFF	FT	0.293	0.274	-0.095	0.041	8.513	10.901
691	2454965	2454995	19	20	FFTFFFFFF	FT	0.286	0.278	-0.053	0.061	10.235	11.892
691	2454995	2455025	18	19	FFTFFFFFF	FT	0.274	0.256	-0.105	0.063	9.642	13.665
691	2453495	2453525	20	21	FFTFFFFFF	FT	0.263	0.257	0.032	0.039	7.486	6.655
691	2451215	2451245	19	20	FFTFFFFFF	FT	0.558	0.484	-0.073	-0.167	3.618	7.048
691	2449445	2449565	18	19	FFTFFFFFF	FT	0.618	0.535	-0.204	0.043	3.793	5.528
691	2452325	2452355	19	20	FFTFFFFFF	FT	0.39	0.34	-0.149	-0.036	3.815	5.352
691	2453135	2453165	19	20	FFTFFFFFF	FT	0.216	0.193	-0.057	0.002	7.725	7.21
691	2453135	2453165	20	21	FFTFFFFFF	FT	0.244	0.231	-0.024	0.001	4.991	4.338
691	2452775	2452805	19	20	FFTFFFFFF	FT	0.453	0.648	0.057	0.352	3.253	3.989
691	2453885	2453915	19	20	FFTFFFFFF	FT	0.246	0.264	0.017	0.038	10.432	10.701
691	2450135	2450165	19	20	FFTFFFFFF	FT	0.607	0.482	-0.025	-0.039	3.203	4.952
691	2452355	2452415	19	20	FFTFFFFFF	FT	0.352	0.497	-0.111	0.024	5.832	6.122
691	2454455	2454485	19	20	FFTFFFFFF	FT	0.303	0.267	-0.145	-0.028	7.443	11.625
691	2451845	2451875	17	18	FFTFFFFFF	FT	0.414	0.372	-0.01	-0.08	4.824	5.215
691	2455025	2455055	20	21	FFTFFFFFF	FT	0.336	0.29	-0.148	0.072	6.295	6.899
691	2454395	2454425	18	19	FFTFFFFFF	TF	0.304	0.318	-0.146	-0.06	8.062	11.451
691	2454575	2454605	19	20	FFTFFFFFF	FT	0.299	0.282	-0.116	0.041	8.61	10.705
691	2453585	2453615	19	20	FFTFFFFFF	FT	0.215	0.213	-0.006	-0.048	9.748	10.779
691	2448875	2448995	17	18	FFTFFFFFF	FT	0.649	0.458	-0.231	-0.05	4.465	8.04
691	2453285	2453315	19	20	FFTFFFFFF	FT	0.193	0.192	0.01	-0.061	6.694	7.199
691	2450435	2450495	19	20	FFTFFFFFF	FT	0.524	0.446	-0.085	-0.14	4.396	4.296
691	2450135	2450285	18	19	FFFFFFFTF	FT	0.666	0.478	-0.003	-0.104	3.009	3.873
691	2452565	2452745	19	20	FFTFFFFFF	FT	0.455	0.569	0.011	0.273	3.017	4.46
691	2453165	2453195	19	20	FFTFFFFFF	FT	0.218	0.198	-0.009	0.001	6.227	6.085

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
691	2454245	2454275	19	20	FFTFFFFFF	FT	0.29	0.291	-0.103	0.068	7.743	8.757
691	2454875	2454905	21	22	FFTFFFFFF	FT	0.397	0.338	-0.13	0.053	4.777	5.259
691	2454545	2454575	19	20	FFTFFFFFF	FT	0.302	0.266	-0.145	0.032	7.134	11.066
691	2448725	2448785	19	20	FFTFFFFFF	FT	0.67	0.624	-0.042	0.065	3.792	3.875
691	2448005	2448215	18	19	FFTFFFFFF	FT	0.509	0.476	-0.202	0.155	3.652	4.819
691	2450015	2450045	19	20	FFTFFFFFF	FT	0.477	0.402	-0.178	-0.113	3.817	6.485
691	2450315	2450405	17	18	FFTFFFFFF	FT	0.58	0.401	-0.162	-0.022	4.706	6.209
691	2451905	2451935	19	20	FFTFFFFFF	FT	0.453	0.334	-0.122	-0.06	4.103	5.719
691	2448485	2448785	18	19	FFFFFFFTF	FT	0.694	0.507	-0.149	-0.112	3.726	4.942
691	2450375	2450405	19	20	FFTFFFFFF	FT	0.539	0.392	-0.125	-0.088	4.21	4.353
691	2451005	2451095	18	19	FFTFFFFFF	FT	0.644	0.454	-0.234	0.032	3.28	5.633
691	2453315	2453345	18	19	FFTFFFFFF	FT	0.168	0.204	-0.004	-0.077	17.813	14.844
691	2454755	2454785	20	21	FFTFFFFFF	FT	0.331	0.278	-0.179	0.018	4.904	7.429
691	2454815	2455085	18	19	FFTFFFFFF	TF	0.361	0.485	-0.136	-0.172	6.889	6.673
691	2450915	2451005	18	19	FFTFFFFFF	FT	0.66	0.544	-0.122	0.084	3.147	5.073
691	2451095	2451125	18	19	FFTFFFFFF	FT	0.588	0.395	-0.169	-0.09	3.323	7.097
691	2448275	2448365	19	20	FFTFFFFFF	FT	0.481	0.6	-0.028	0.374	3.796	3.226
691	2449265	2449535	18	19	FFFFFFFTF	FT	0.539	0.439	-0.185	0.054	4.44	5.547
691	2455055	2455085	20	21	FFTFFFFFF	FT	0.341	0.298	-0.157	0.079	5.245	5.944
691	2451365	2451455	18	19	FFTFFFFFF	FT	0.468	0.433	-0.116	0.096	5.64	5.256
691	2448215	2448305	20	21	FFTFFFFFF	FT	0.507	0.612	-0.175	0.289	3.645	3.604
691	2453015	2453045	19	20	FFTFFFFFF	FT	0.194	0.196	-0.05	-0.084	11.546	10.329
691	2452565	2452745	21	22	FFTFFFFFF	FT	0.458	0.566	0.097	0.247	3.352	4.099
691	2452745	2452775	21	22	FFTFFFFFF	FT	0.459	0.613	0.084	0.281	3.166	3.801
691	2454545	2454575	21	22	FFTFFFFFF	FT	0.367	0.343	-0.128	0.064	5.03	4.77
691	2454545	2454575	20	21	FFTFFFFFF	FT	0.307	0.286	-0.11	0.053	5.816	6.012

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2449895	2450015	17	18	FFTFFFFFF	FT	0.515	0.413	-0.218	-0.077	4.188	5.258
691	2452925	2452955	21	22	FFTFFFFFF	FT	0.271	0.253	-0.014	-0.068	4.94	4.341
691	2454815	2454845	21	22	FFTFFFFFF	FT	0.375	0.317	-0.18	0.024	4.483	6.245
691	2450435	2450495	19	20	FFFFFFFTF	FT	0.462	0.403	-0.005	-0.232	4.197	3.948
691	2452295	2452325	20	21	FFTFFFFFF	FT	0.389	0.332	-0.049	-0.051	4.084	6.194
691	2452775	2452805	20	21	FFTFFFFFF	FT	0.455	0.662	0.088	0.353	3.175	3.968
691	2453765	2453795	20	21	FFTFFFFFF	FT	0.252	0.252	-0.021	-0.006	5.687	7.444
691	2453795	2453825	20	21	FFTFFFFFF	FT	0.256	0.251	-0.023	0.014	6.396	7.05
691	2454095	2454125	20	21	FFTFFFFFF	FT	0.285	0.245	-0.145	0.018	4.567	7.415
691	2448905	2448995	19	20	FFTFFFFFF	FT	0.552	0.462	-0.159	-0.042	5.295	6.17
691	2452565	2452745	20	21	FFTFFFFFF	FT	0.448	0.565	0.073	0.255	3.16	4.356
691	2454875	2454905	20	21	FFTFFFFFF	FT	0.321	0.289	-0.118	0.043	5.834	7.219
691	2451125	2451155	19	20	FFTFFFFFF	FT	0.555	0.438	-0.12	-0.116	3.632	7.088
691	2449145	2449235	18	19	FFTFFFFFF	FT	0.642	0.533	-0.285	0.099	3.99	5.749
691	2454665	2454695	19	20	FFTFFFFFF	FT	0.361	0.276	-0.231	0.065	4.352	8.991
691	2448875	2449325	17	18	FFFFFFFTF	FT	0.609	0.48	-0.296	-0.046	4.742	5.236
691	2451305	2451335	19	20	FFTFFFFFF	FT	0.445	0.476	-0.096	0.024	5.15	5.004
691	2451335	2451365	18	19	FFTFFFFFF	FT	0.48	0.524	-0.228	0.131	6.075	5.063
691	2451935	2451965	19	20	FFTFFFFFF	FT	0.391	0.328	-0.081	-0.048	4.703	7.696
691	2452145	2452175	18	19	FFTFFFFFF	FT	0.341	0.381	-0.019	-0.064	5.103	5.917
691	2452955	2453405	18	19	FFTFFFFFF	TF	0.249	0.257	-0.031	-0.075	14.61	12.738
691	2451515	2451545	19	20	FFTFFFFFF	FT	0.362	0.41	-0.008	-0.079	5.573	4.66
691	2448365	2448455	19	20	FFTFFFFFF	FT	0.505	0.61	-0.061	0.387	3.553	2.747
691	2451185	2451215	19	20	FFTFFFFFF	FT	0.602	0.449	-0.109	-0.159	3.266	6.696
691	2452055	2452145	20	21	FFTFFFFFF	FT	0.357	0.366	-0.048	-0.059	4.799	4.777
691	2452355	2452415	20	21	FFTFFFFFF	FT	0.335	0.466	-0.034	0.037	4.41	5.345

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2448305	2448335	20	21	FFTFFFFFF	FT	0.46	0.616	-0.013	0.387	3.891	2.949
691	2450795	2450915	18	19	FFTFFFFFF	FT	0.558	0.472	-0.121	-0.138	3.729	6.533
691	2454785	2454815	20	21	FFTFFFFFF	FT	0.325	0.281	-0.153	0.029	5.325	7.578
691	2453945	2453975	19	20	FFTFFFFFF	FT	0.231	0.24	0.002	-0.046	10.619	11.373
691	2451755	2451815	19	20	FFTFFFFFF	FT	0.357	0.342	0.028	-0.06	4.298	5.682
691	2451785	2451815	20	21	FFTFFFFFF	FT	0.348	0.326	0.028	-0.027	4.184	4.404
691	2451845	2451875	20	21	FFTFFFFFF	FT	0.39	0.367	-0.004	-0.082	3.998	4.309
691	2451845	2451875	19	20	FFTFFFFFF	FT	0.41	0.356	-0.006	-0.098	3.949	4.309
691	2453735	2453795	19	20	FFTFFFFFF	TF	0.286	0.293	-0.003	-0.009	10.103	8.93
691	2450465	2450675	18	19	FFFFFFFTF	FT	0.519	0.51	-0.213	-0.19	3.177	3.796
691	2453855	2453885	20	21	FFTFFFFFF	FT	0.251	0.263	0.026	0.041	6.756	6.851
691	2452745	2452775	19	20	FFTFFFFFF	FT	0.442	0.635	0.021	0.335	3.034	4.125
691	2448215	2448275	19	20	FFTFFFFFF	FT	0.506	0.581	-0.228	0.273	3.348	3.596
691	2452895	2452925	19	20	FFTFFFFFF	FT	0.189	0.195	-0.006	-0.093	9.54	5.571
691	2452895	2452925	18	19	FFTFFFFFF	FT	0.186	0.195	-0.008	-0.079	15.92	15.283
691	2453525	2453555	20	21	FFTFFFFFF	FT	0.262	0.278	0.029	0.034	6.693	6.949
691	2448485	2448575	17	18	FFTFFFFFF	FT	0.704	0.494	-0.274	0.029	3.122	4.931
691	2451815	2451845	18	19	FFTFFFFFF	FT	0.378	0.377	-0.036	-0.085	4.194	5.053
691	2450105	2450135	19	20	FFTFFFFFF	FT	0.505	0.409	-0.025	-0.106	4.027	6.527
691	2450105	2450135	18	19	FFTFFFFFF	FT	0.553	0.389	-0.04	-0.093	4.022	5.644
691	2448995	2449565	16	17	FFTFFFFFF	FT	0.585	0.529	-0.171	0.035	4.462	5.69
691	2449595	2449655	18	19	FFTFFFFFF	FT	0.568	0.481	-0.285	0.021	3.664	5.933
691	2452175	2452295	21	22	FFTFFFFFF	FT	0.398	0.4	-0.025	-0.053	3.871	6.592
691	2450705	2450795	17	18	FFTFFFFFF	FT	0.606	0.419	-0.157	-0.068	3.136	6.2
691	2449235	2449325	18	19	FFTFFFFFF	FT	0.626	0.476	-0.224	-0.011	4.169	6.255
691	2448485	2448755	19	20	FFFFFFFTF	FT	0.648	0.546	-0.139	-0.079	4.269	4.122

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2449715	2449775	19	20	FFTFFFFFF	FT	0.484	0.543	-0.05	-0.105	5.383	4.813
691	2453705	2453735	20	21	FFTFFFFFF	FT	0.252	0.256	-0.018	-0.022	7.415	7.823
691	2450105	2450165	19	20	FFFFFFFTF	FT	0.506	0.389	-0.032	-0.156	3.702	4.603
691	2454395	2455085	16	17	FFTFFFFFF	TF	0.386	0.441	-0.151	-0.059	6.479	8.819
691	2449715	2455085	15	16	FFTFFFFFF	TF	0.361	0.396	-0.061	0.008	9.235	9.663
691	2454065	2454095	19	20	FFTFFFFFF	TF	0.269	0.281	-0.036	-0.032	9.539	11.076
691	2453405	2453435	19	20	FFTFFFFFF	FT	0.233	0.227	-0.067	-0.046	9.755	10.319
691	2449775	2449805	18	19	FFTFFFFFF	FT	0.504	0.587	-0.033	-0.079	4.799	4.462
691	2449715	2449895	17	18	FFTFFFFFF	FT	0.665	0.588	-0.015	0.081	6.042	4.9
691	2450975	2451095	18	19	FFFFFFFTF	FT	0.675	0.454	-0.288	0.129	2.902	4.382
691	2454275	2454335	20	21	FFTFFFFFF	FT	0.342	0.285	-0.196	0.056	4.799	7.109
691	2454335	2454365	20	21	FFTFFFFFF	FT	0.345	0.297	-0.195	0.07	4.973	6.805
691	2452925	2452955	20	21	FFTFFFFFF	FT	0.217	0.226	-0.005	-0.092	4.872	5.053
691	2448605	2448695	20	21	FFTFFFFFF	FT	0.627	0.611	-0.134	0.019	3.409	3.3
691	2449595	2449835	16	17	FFTFFFFFF	FT	0.533	0.561	-0.147	0.127	3.948	4.843
691	2452835	2452895	18	19	FFTFFFFFF	FT	0.211	0.22	-0.052	0.024	17.884	12.895
691	2448995	2449025	19	20	FFTFFFFFF	FT	0.535	0.478	-0.113	-0.129	4.353	4.721
691	2451815	2451845	19	20	FFTFFFFFF	FT	0.367	0.35	-0.03	-0.076	4.75	4.835
691	2454275	2454305	18	19	FFTFFFFFF	FT	0.3	0.27	-0.155	0.065	8.05	11.356
691	2454335	2454365	19	20	FFTFFFFFF	FT	0.345	0.284	-0.213	-0.016	5.553	9.956
691	2453795	2453825	21	22	FFTFFFFFF	FT	0.319	0.315	-0.03	0.003	4.855	4.979
691	2454215	2454275	21	22	FFTFFFFFF	FT	0.315	0.344	-0.082	0.049	4.878	4.848
691	2454245	2454275	20	21	FFTFFFFFF	FT	0.308	0.322	-0.096	0.081	5.542	5.841
691	2454755	2454845	20	21	FFTFFFFFF	TF	0.349	0.388	-0.139	-0.014	4.891	7.35
691	2454635	2454665	18	19	FFTFFFFFF	FT	0.311	0.278	-0.164	0.07	7.904	12.532
691	2448905	2448965	18	19	FFTFFFFFF	FT	0.58	0.454	-0.188	-0.082	5.148	8.604

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2448185	2448215	19	20	FFTFFFFFF	FT	0.505	0.485	-0.184	0.132	3.779	4.277
691	2449355	2449385	19	20	FFTFFFFFF	FT	0.61	0.495	-0.112	-0.075	4.013	5.07
691	2449595	2451215	15	16	FFFFFFFTF	FT	0.554	0.404	-0.207	-0.05	3.884	7.235
691	2450075	2450105	18	19	FFTFFFFFF	FT	0.506	0.396	-0.165	-0.074	4.157	6.219
691	2451935	2451965	20	21	FFTFFFFFF	FT	0.367	0.317	-0.025	-0.025	4.272	6.479
691	2453315	2453345	19	20	FFTFFFFFF	FT	0.191	0.203	0.038	-0.064	7.211	8.003
691	2454935	2454965	20	21	FFTFFFFFF	FT	0.314	0.293	-0.086	0.061	6.347	6.435
691	2453945	2454065	19	20	FFTFFFFFF	TF	0.251	0.27	0.003	-0.046	11.608	11.909
691	2448365	2448455	20	21	FFTFFFFFF	FT	0.498	0.622	-0.053	0.375	3.218	2.948
691	2451605	2451635	19	20	FFTFFFFFF	FT	0.374	0.35	-0.046	-0.014	4.183	5.173
691	2452805	2452835	18	19	FFTFFFFFF	FT	0.211	0.201	-0.022	0.047	16.793	9.769
691	2452805	2452865	19	20	FFTFFFFFF	FT	0.223	0.227	-0.005	0.034	7.983	9.986
691	2451185	2451215	19	20	FFFFFFFTF	FT	0.599	0.407	-0.04	-0.2	3.114	5.035
691	2451995	2452025	19	20	FFTFFFFFF	FT	0.343	0.319	-0.089	0.017	4.534	6.471
691	2448995	2449295	17	18	FFTFFFFFF	FT	0.571	0.523	-0.199	0.033	4.917	6.472
691	2449655	2449775	18	19	FFFFFFFTF	FT	0.461	0.398	-0.158	-0.136	4.317	6.672
691	2450825	2450855	19	20	FFTFFFFFF	FT	0.496	0.473	-0.155	-0.144	4.494	6.446
691	2453495	2453615	21	22	FFTFFFFFF	FT	0.327	0.328	0.018	-0.003	6.045	7.512
691	2450765	2450795	18	19	FFTFFFFFF	FT	0.633	0.474	-0.14	-0.142	3.061	7.21
691	2449805	2449895	18	19	FFTFFFFFF	FT	0.844	0.626	0.172	0.047	4.723	3.882
691	2452985	2453015	19	20	FFTFFFFFF	FT	0.202	0.217	-0.015	-0.1	13.035	9.014
691	2451185	2451215	20	21	FFTFFFFFF	FT	0.59	0.444	-0.051	-0.153	3.186	4.819
691	2451665	2451695	19	20	FFTFFFFFF	FT	0.341	0.382	-0.051	0.025	5.089	4.467
691	2452985	2453015	21	22	FFTFFFFFF	FT	0.276	0.295	0.006	-0.083	4.146	4.682
691	2453705	2453735	20	21	FFTFFFFFF	TF	0.287	0.31	-0.012	0.015	7.43	6.188
691	2451875	2451905	19	20	FFTFFFFFF	FT	0.447	0.387	-0.088	-0.107	4.379	5.46

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
691	2451875	2451905	20	21	FFTFFFFFF	FT	0.427	0.383	-0.069	-0.092	4.018	4.773
691	2450915	2450975	19	20	FFTFFFFFF	FT	0.611	0.56	-0.048	0.001	3.304	3.825
691	2451275	2451305	19	20	FFTFFFFFF	FT	0.545	0.526	-0.109	-0.088	3.332	3.925
691	2452265	2452295	20	21	FFTFFFFFF	FT	0.458	0.382	-0.147	-0.053	3.647	6.855
691	2453315	2453345	20	21	FFTFFFFFF	FT	0.225	0.234	0.046	-0.057	5.175	4.658
691	2448725	2453795	21	22	FFTFFFFFF	TF	0.354	0.365	-0.032	-0.022	5.938	6.232
691	2454395	2454425	20	21	FFTFFFFFF	FT	0.32	0.277	-0.166	0.025	5.23	7.86
691	2454455	2454485	20	21	FFTFFFFFF	FT	0.316	0.282	-0.137	0.03	5.273	7.525
691	2451425	2451455	19	20	FFTFFFFFF	FT	0.466	0.4	-0.096	0.106	4.541	4.882
691	2450765	2450825	18	19	FFFFFFFTF	FT	0.6	0.451	-0.108	-0.247	3.261	5.328
691	2451095	2451125	20	21	FFTFFFFFF	FT	0.543	0.415	-0.078	-0.089	3.159	4.188
691	2451545	2451575	19	20	FFTFFFFFF	FT	0.339	0.37	-0.005	-0.036	4.35	5.556
691	2451455	2451485	20	21	FFTFFFFFF	FT	0.343	0.357	0.065	-0.058	4.624	5.446
691	2449775	2449955	18	19	FFFFFFFTF	FT	0.564	0.473	-0.092	-0.177	7.104	4.381
691	2448545	2454155	16	17	FFTFFFFFF	TF	0.346	0.372	-0.042	-0.017	9.48	11.132
691	2449595	2449715	17	18	FFTFFFFFF	FT	0.541	0.486	-0.247	0.05	3.994	4.752
691	2454425	2454455	20	21	FFTFFFFFF	FT	0.336	0.292	-0.171	0.025	5.069	7.304
691	2454395	2454425	19	20	FFTFFFFFF	TF	0.29	0.283	-0.14	-0.047	6.863	10.829
691	2449775	2449805	19	20	FFTFFFFFF	FT	0.496	0.633	0.01	-0.167	5.453	3.74
691	2448035	2448425	21	22	FFTFFFFFF	FT	0.519	0.665	-0.067	0.336	3.354	3.176
691	2449595	2449655	18	19	FFFFFFFTF	FT	0.535	0.392	-0.296	-0.075	4.15	5.678
691	2454155	2454185	20	21	FFTFFFFFF	FT	0.266	0.244	-0.098	0.046	5.584	7.069
691	2450975	2451065	19	20	FFTFFFFFF	FT	0.627	0.512	-0.137	0.159	3.384	4.356
691	2448485	2451215	13	15	FFFFFFFTF	FT	0.562	0.411	-0.18	-0.055	3.442	6.619
691	2450855	2450885	20	21	FFTFFFFFF	FT	0.495	0.378	-0.023	-0.047	4.539	5.889
691	2451335	2451395	19	20	FFTFFFFFF	FT	0.466	0.513	-0.215	0.162	4.741	4.376

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
691	2451695	2451755	19	20	FFTFFFFFF	FT	0.339	0.438	-0.023	0.048	5.497	4.417
691	2448185	2448215	20	21	FFTFFFFFF	FT	0.495	0.53	-0.195	0.171	3.512	3.758
691	2449325	2449415	20	21	FFTFFFFFF	FT	0.562	0.549	-0.031	-0.02	4.012	4.788
691	2450015	2450045	19	20	FFFFFFFTF	FT	0.443	0.335	-0.221	-0.103	3.218	4.532
691	2450075	2450105	19	20	FFTFFFFFF	FT	0.487	0.361	-0.106	-0.053	5.124	6.109
691	2454425	2454455	21	22	FFTFFFFFF	FT	0.423	0.337	-0.238	-0.004	3.818	6.316
691	2453735	2453795	20	21	FFTFFFFFF	TF	0.291	0.322	0.009	0.018	6.529	6.172
691	2449775	2449955	19	20	FFFFFFFTF	FT	0.525	0.508	-0.07	-0.17	6.088	5.357
691	2451215	2451245	20	21	FFTFFFFFF	FT	0.537	0.461	-0.026	-0.17	3.231	6.185
691	2451725	2451785	20	21	FFTFFFFFF	FT	0.312	0.368	0.024	-0.023	4.824	4.987
691	2450045	2450105	20	21	FFTFFFFFF	FT	0.483	0.417	-0.151	0.008	4.099	5.987
691	2450375	2450465	18	19	FFFFFFFTF	FT	0.507	0.373	-0.167	-0.167	3.662	6.537
691	2452955	2453135	19	20	FFTFFFFFF	TF	0.203	0.222	0	-0.079	8.982	7.688
691	2449265	2449415	19	20	FFFFFFFTF	FT	0.523	0.436	-0.094	0.037	4.026	6.839
691	2448575	2448785	17	18	FFTFFFFFF	FT	0.682	0.573	-0.131	-0.025	3.858	4.469
691	2453345	2453405	19	20	FFTFFFFFF	TF	0.224	0.242	-0.033	-0.069	11.734	8.751
691	2450195	2450285	19	20	FFFFFFFTF	FT	0.638	0.426	0.058	0.028	2.796	4.78
691	2450765	2450795	19	20	FFTFFFFFF	FT	0.578	0.472	-0.095	-0.201	3.396	6.178
691	2449595	2449865	20	21	FFFFFFFTF	FT	0.466	0.547	-0.076	-0.153	5.289	4.287
691	2451485	2451515	19	20	FFTFFFFFF	FT	0.318	0.318	0.007	-0.064	4.577	5.104
691	2454035	2454065	21	22	FFTFFFFFF	FT	0.296	0.304	-0.042	-0.056	4.876	5.602
691	2454635	2454665	19	20	FFTFFFFFF	FT	0.307	0.278	-0.146	0.074	6.497	8.698
691	2452085	2452145	19	20	FFTFFFFFF	FT	0.382	0.379	-0.092	-0.074	4.552	6.021
691	2450405	2450435	19	20	FFTFFFFFF	FT	0.512	0.497	-0.075	-0.148	4.177	7.877
691	2450855	2450915	19	20	FFFFFFFTF	FT	0.524	0.388	-0.028	-0.16	2.765	5.083
691	2450885	2450915	20	21	FFTFFFFFF	FT	0.521	0.536	0.035	-0.2	3.328	2.985

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2454995	2455025	20	21	FFTFFFFFF	FT	0.304	0.317	-0.066	0.073	5.125	4.671
691	2453315	2453435	21	22	FFTFFFFFF	FT	0.314	0.319	0.023	-0.052	4.741	4.421
691	2454125	2454155	21	22	FFTFFFFFF	FT	0.294	0.293	-0.08	0.024	5.502	6.488
691	2451095	2451155	19	20	FFFFFFFTF	FT	0.532	0.363	-0.132	-0.109	2.738	4.241
691	2454695	2454785	18	19	FFTFFFFFF	TF	0.325	0.337	-0.161	-0.098	9.082	11.621
691	2449955	2450015	18	19	FFFFFFFTF	FT	0.522	0.347	-0.335	-0.022	3.374	6.828
691	2453375	2453405	20	21	FFTFFFFFF	FT	0.248	0.242	-0.001	-0.041	5.614	5.357
691	2451455	2451485	19	20	FFTFFFFFF	FT	0.322	0.331	0.045	-0.064	5.004	4.987
691	2450435	2450495	20	21	FFTFFFFFF	FT	0.514	0.429	-0.037	-0.158	4.28	3.56
691	2450705	2450735	20	21	FFTFFFFFF	FT	0.534	0.429	-0.225	-0.094	3.127	6.616
691	2450885	2450915	19	20	FFTFFFFFF	FT	0.555	0.522	0.001	-0.186	3.386	3.808
691	2454845	2455085	19	20	FFTFFFFFF	TF	0.361	0.404	-0.14	-0.125	7.693	8.682
691	2450495	2450525	20	21	FFTFFFFFF	FT	0.467	0.553	-0.071	-0.272	4.358	2.94
691	2450495	2450525	20	21	FFFFFFFTF	FT	0.426	0.611	-0.03	-0.463	3.617	2.416
691	2450495	2450525	19	20	FFFFFFFTF	FT	0.458	0.639	-0.098	-0.482	3.454	2.256
691	2453615	2453645	20	21	FFTFFFFFF	FT	0.235	0.228	0.006	-0.038	6.143	6.508
691	2451965	2451995	19	20	FFTFFFFFF	FT	0.392	0.338	-0.143	0.002	4.263	5.878
691	2449985	2450015	18	19	FFTFFFFFF	FT	0.49	0.414	-0.178	-0.048	4.468	5.559
691	2449985	2450015	19	20	FFTFFFFFF	FT	0.465	0.396	-0.154	-0.039	3.904	5.78
691	2451545	2451575	20	21	FFTFFFFFF	FT	0.351	0.408	0.031	-0.043	4.57	5.23
691	2451605	2451635	20	21	FFTFFFFFF	FT	0.372	0.361	0.008	-0.004	3.697	4.943
691	2450015	2450045	18	19	FFTFFFFFF	FT	0.472	0.393	-0.137	-0.129	4.397	5.597
691	2453945	2454005	21	22	FFTFFFFFF	FT	0.297	0.279	0.023	-0.047	5.858	6.722
691	2450435	2450495	20	21	FFFFFFFTF	FT	0.464	0.399	0.024	-0.209	3.492	3.369
691	2450795	2450855	19	20	FFFFFFFTF	FT	0.475	0.392	-0.179	-0.144	4.154	6.502
691	2451125	2451215	20	21	FFFFFFFTF	FT	0.552	0.4	-0.08	-0.182	3.278	3.4

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2451995	2452025	20	21	FFTFFFFFF	FT	0.327	0.322	-0.014	0.032	4.548	5.375
691	2448875	2449265	18	19	FFFFFFFTF	FT	0.584	0.53	-0.27	-0.162	4.61	4.799
691	2454065	2454155	20	21	FFTFFFFFF	TF	0.27	0.28	-0.035	0.014	6.711	7.942
691	2453255	2453285	19	20	FFTFFFFFF	FT	0.207	0.206	-0.006	-0.07	7.706	6.828
691	2453465	2453495	21	22	FFTFFFFFF	FT	0.314	0.317	0.037	-0.006	4.347	4.935
691	2449595	2449745	19	20	FFFFFFFTF	FT	0.479	0.445	-0.202	-0.083	4.014	4.924
691	2449625	2449685	19	20	FFTFFFFFF	FT	0.542	0.5	-0.201	-0.007	4.317	5.441
691	2450075	2450105	19	20	FFFFFFFTF	FT	0.353	0.335	-0.082	-0.059	3.448	5.989
691	2452985	2453015	20	21	FFTFFFFFF	FT	0.227	0.242	-0.002	-0.084	5.594	5.066
691	2451065	2451095	19	20	FFTFFFFFF	FT	0.613	0.431	-0.203	-0.047	3.451	4.089
691	2453675	2453705	21	22	FFTFFFFFF	FT	0.324	0.329	-0.047	-0.052	4.638	4.658
691	2454575	2454605	20	21	FFTFFFFFF	FT	0.296	0.295	-0.07	0.047	6.371	6.476
691	2454995	2455085	21	22	FFTFFFFFF	FT	0.38	0.346	-0.181	-0.001	4.803	6.9
691	2451395	2451425	19	20	FFTFFFFFF	FT	0.454	0.492	-0.201	0.216	3.591	4.081
691	2451245	2451365	21	22	FFTFFFFFF	FT	0.559	0.511	0.019	-0.069	3.333	4.213
691	2453825	2453855	20	21	FFTFFFFFF	FT	0.261	0.269	0.01	0.033	6.002	6.682
691	2449025	2449085	20	21	FFTFFFFFF	FT	0.46	0.683	-0.096	-0.319	5.571	3.389
691	2449415	2449535	19	20	FFFFFFFTF	FT	0.538	0.495	-0.147	0.055	4.453	4.718
691	2450165	2450195	19	20	FFFFFFFTF	FT	0.648	0.58	-0.026	-0.147	3.353	2.488
691	2453015	2453045	21	22	FFTFFFFFF	FT	0.238	0.222	0.024	-0.035	5.067	4.739
691	2453045	2453075	21	22	FFTFFFFFF	FT	0.257	0.238	-0.001	-0.024	5.219	5.344
691	2453045	2453075	20	21	FFTFFFFFF	FT	0.218	0.204	-0.04	-0.044	6.511	5.135
691	2454095	2454125	21	22	FFTFFFFFF	FT	0.32	0.278	-0.135	0.02	5.469	5.346
691	2454635	2454695	20	21	FFTFFFFFF	FT	0.346	0.306	-0.18	0.075	4.874	5.716
691	2454395	2454425	21	22	FFTFFFFFF	FT	0.388	0.321	-0.213	-0.001	4.16	6.387
691	2452895	2452925	20	21	FFTFFFFFF	FT	0.209	0.204	0.01	-0.063	3.956	4.926

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
691	2452805	2452925	21	22	FFTFFFFFF	FT	0.251	0.243	0.032	-0.045	4.582	5.579
691	2454275	2454305	19	20	FFTFFFFFF	FT	0.312	0.3	-0.13	0.079	5.792	6.794
691	2450315	2450375	19	20	FFTFFFFFF	FT	0.564	0.381	-0.185	-0.043	4.118	4.933
691	2450315	2450375	18	19	FFTFFFFFF	FT	0.552	0.364	-0.156	-0.047	3.685	5.399
691	2451635	2451665	20	26	FFTFFFFFF	FT	0.351	0.387	-0.001	0.029	4.071	4.717
691	2451695	2451725	20	21	FFTFFFFFF	FT	0.332	0.469	0.004	0.077	4.567	3.869
691	2451575	2451605	19	20	FFTFFFFFF	FT	0.347	0.352	-0.026	-0.028	4.24	4.944
691	2452235	2452265	19	20	FFTFFFFFF	FT	0.459	0.506	-0.082	-0.084	3.894	5.836
691	2454425	2454515	20	21	FFTFFFFFF	TF	0.322	0.334	-0.119	0.014	4.693	6.71
691	2453735	2453765	21	22	FFTFFFFFF	FT	0.327	0.33	-0.011	-0.028	5.627	4.844
691	2452775	2452805	21	22	FFTFFFFFF	FT	0.458	0.624	0.109	0.288	3.218	4.165
691	2450195	2450285	19	20	FFTFFFFFF	FT	0.688	0.505	-0.016	0.059	3.436	4.687
691	2450315	2450405	19	20	FFFFFFFTF	FT	0.563	0.315	-0.263	-0.046	3.364	5.078
691	2450315	2450375	18	19	FFFFFFFTF	FT	0.609	0.308	-0.342	-0.026	2.655	3.983
691	2449805	2449895	19	20	FFTFFFFFF	FT	0.789	0.639	0.175	-0.019	5.06	3.691
691	2449745	2449775	19	20	FFFFFFFTF	FT	0.38	0.457	0.007	-0.213	4.011	5.757
691	2450705	2450765	19	20	FFFFFFFTF	FT	0.555	0.417	-0.241	-0.135	3.341	4.448
691	2452145	2452175	19	20	FFTFFFFFF	FT	0.336	0.382	-0.002	-0.087	5.359	6.226
691	2453825	2453855	21	22	FFTFFFFFF	FT	0.317	0.341	0.009	0.006	4.582	4.8
691	2449895	2449955	18	19	FFTFFFFFF	FT	0.523	0.449	-0.247	-0.059	3.981	5.536
691	2451335	2451425	20	21	FFTFFFFFF	FT	0.433	0.494	-0.172	0.203	3.854	3.193
691	2450405	2450435	19	20	FFFFFFFTF	FT	0.47	0.411	-0.117	-0.201	3.834	6.93
691	2453075	2453105	20	21	FFTFFFFFF	FT	0.237	0.21	-0.069	-0.019	4.971	5.777
691	2453675	2453705	20	21	FFTFFFFFF	TF	0.277	0.298	-0.034	0.021	7.435	8.888
691	2451965	2451995	20	21	FFTFFFFFF	FT	0.356	0.335	-0.08	0.022	4.641	4.743
691	2450795	2450825	19	20	FFTFFFFFF	FT	0.614	0.423	-0.17	-0.126	3.07	5.801

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2449955	2449985	18	19	FFTFFFFFF	FT	0.478	0.401	-0.161	-0.065	6.929	7.202
691	2454005	2454035	21	22	FFTFFFFFF	FT	0.378	0.318	0.094	-0.109	3.771	4.451
691	2454785	2454815	21	22	FFTFFFFFF	FT	0.398	0.336	-0.196	0.001	4.295	5.613
691	2452355	2452415	21	22	FFTFFFFFF	FT	0.352	0.452	0.036	0.028	4.02	4.954
691	2452865	2452895	19	20	FFTFFFFFF	FT	0.19	0.222	-0.028	-0.029	4.549	15.1
691	2449955	2450015	19	20	FFFFFFFTF	FT	0.454	0.367	-0.233	0.041	3.659	6.528
691	2450525	2450675	20	21	FFFFFFFTF	FT	0.481	0.498	-0.215	-0.148	3.858	3.095
691	2450525	2450585	19	20	FFFFFFFTF	FT	0.511	0.486	-0.25	-0.178	3.773	2.889
691	2452325	2452355	20	21	FFTFFFFFF	FT	0.374	0.335	-0.086	-0.001	3.814	5.07
691	2452745	2452775	20	21	FFTFFFFFF	FT	0.445	0.624	0.07	0.312	3.039	4.165
691	2450915	2450975	20	21	FFTFFFFFF	FT	0.576	0.522	-0.03	-0.008	3.433	3.447
691	2448875	2449265	19	20	FFFFFFFTF	FT	0.557	0.587	-0.208	-0.189	4.083	3.82
691	2449925	2449985	19	20	FFTFFFFFF	FT	0.474	0.421	-0.17	-0.059	4.003	6.899
691	2450015	2450045	20	21	FFTFFFFFF	FT	0.44	0.405	-0.137	-0.069	4.388	4.634
691	2451275	2451305	20	21	FFTFFFFFF	FT	0.529	0.564	-0.037	-0.153	3.329	3.389
691	2453075	2453105	21	22	FFTFFFFFF	FT	0.264	0.257	-0.021	-0.039	4.397	4.801
691	2449145	2449295	19	20	FFTFFFFFF	FT	0.613	0.546	-0.23	0.095	3.976	4.539
691	2454965	2454995	20	21	FFTFFFFFF	FT	0.293	0.293	-0.056	0.08	5.788	6.466
691	2449715	2449775	20	21	FFTFFFFFF	FT	0.475	0.604	0.018	-0.115	5.194	4.59
691	2453435	2453465	20	21	FFTFFFFFF	FT	0.243	0.237	0.015	0.008	5.841	6.471
691	2453705	2453735	21	22	FFTFFFFFF	FT	0.313	0.315	-0.044	-0.056	5.884	5.428
691	2451905	2451935	20	21	FFTFFFFFF	FT	0.419	0.34	-0.072	-0.051	3.915	5.819
691	2454455	2454515	19	20	FFTFFFFFF	TF	0.314	0.379	-0.108	-0.079	7.676	8.304
691	2450735	2450825	20	21	FFTFFFFFF	FT	0.542	0.439	-0.115	-0.154	3.481	4.262
691	2450765	2450795	19	20	FFFFFFFTF	FT	0.541	0.493	-0.105	-0.291	2.877	4.593
691	2448515	2452355	19	20	FFTFFFFFF	TF	0.507	0.428	-0.135	-0.083	4.53	5.361

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2449445	2449565	19	20	FFTFFFFFF	FT	0.589	0.585	-0.169	0.021	4.272	4.348
691	2450165	2450195	19	20	FFTFFFFFF	FT	0.65	0.544	0.002	-0.028	3.063	4.972
691	2454395	2454425	20	21	FFTFFFFFF	TF	0.315	0.291	-0.137	0.019	6.237	6.472
691	2448035	2448995	16	17	FFTFFFFFF	FT	0.619	0.596	-0.171	0.195	4.56	4.186
691	2448875	2448905	18	19	FFTFFFFFF	FT	0.791	0.516	-0.424	-0.098	3.331	7.322
691	2454845	2454875	21	22	FFTFFFFFF	FT	0.345	0.305	-0.124	0.036	4.714	4.528
691	2454845	2455085	20	21	FFTFFFFFF	TF	0.381	0.45	-0.148	-0.115	5.503	6.551
691	2450015	2450075	20	21	FFFFFFFTF	FT	0.415	0.339	-0.166	-0.046	4.288	4.264
691	2451815	2451845	20	21	FFTFFFFFF	FT	0.339	0.351	0.001	-0.029	3.9	4.319
691	2453225	2453255	19	20	FFTFFFFFF	FT	0.201	0.198	-0.01	-0.037	10.33	12.321
691	2453885	2453915	20	21	FFTFFFFFF	FT	0.266	0.277	0.013	0.049	6.309	4.888
691	2451665	2451845	21	22	FFTFFFFFF	FT	0.359	0.398	0.038	0	3.711	4.32
691	2452715	2453195	22	23	FFTFFFFFF	FT	0.379	0.386	-0.002	-0.02	4.206	5.996
691	2451155	2451215	21	22	FFTFFFFFF	FT	0.594	0.471	-0.052	-0.118	3.343	5.033
691	2450075	2450165	20	21	FFFFFFFTF	FT	0.462	0.338	0.024	-0.038	4.653	4.301
691	2450105	2450135	20	21	FFTFFFFFF	FT	0.509	0.414	0.067	-0.06	3.343	6.845
691	2448035	2448185	20	21	FFTFFFFFF	FT	0.524	0.481	-0.208	0.175	3.422	3.889
691	2453945	2454065	20	21	FFTFFFFFF	TF	0.264	0.294	0.017	-0.015	8.185	7.4
691	2451215	2451245	21	22	FFTFFFFFF	FT	0.556	0.423	-0.074	-0.123	2.741	3.833
691	2453945	2453975	20	21	FFTFFFFFF	FT	0.249	0.256	0.039	-0.034	4.968	8.199
691	2451575	2451665	21	22	FFTFFFFFF	FT	0.377	0.401	0.058	0	3.378	4.415
691	2451125	2451155	20	21	FFTFFFFFF	FT	0.526	0.453	-0.1	-0.102	3.09	6.928
691	2451575	2451605	20	21	FFTFFFFFF	FT	0.349	0.379	0.03	-0.021	4.156	6.412
691	2451995	2452025	21	22	FFTFFFFFF	FT	0.345	0.335	0.021	0.002	4.806	4.216
691	2450045	2450075	19	20	FFTFFFFFF	FT	0.486	0.416	-0.161	-0.033	4.133	4.869
691	2450975	2451065	20	21	FFTFFFFFF	FT	0.601	0.5	-0.087	0.146	3.183	3.257

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2448695	2448785	20	21	FFTFFFFFF	FT	0.633	0.691	-0.025	0.047	3.193	3.286
691	2451155	2451185	19	20	FFFFFFFTF	FT	0.574	0.433	-0.107	-0.221	3.108	4.38
691	2450315	2450435	20	21	FFFFFFFTF	FT	0.489	0.333	-0.168	-0.042	3.146	3.868
691	2449805	2449895	20	21	FFTFFFFFF	FT	0.625	0.634	0.047	-0.104	5.4	3.743
691	2454635	2454755	21	22	FFTFFFFFF	FT	0.38	0.326	-0.196	-0.034	5.095	6.803
691	2453615	2453675	21	22	FFTFFFFFF	FT	0.306	0.318	-0.035	-0.088	5.157	5.289
691	2451065	2451095	20	21	FFTFFFFFF	FT	0.567	0.406	-0.133	-0.043	3.268	4.477
691	2453585	2453615	20	21	FFTFFFFFF	FT	0.235	0.229	-0.004	-0.019	6.691	8.94
691	2449085	2449145	20	21	FFTFFFFFF	FT	0.527	0.639	-0.131	-0.156	4.267	3.544
691	2448875	2448905	19	20	FFTFFFFFF	FT	0.768	0.479	-0.459	-0.032	3.156	5.939
691	2452175	2452205	20	21	FFTFFFFFF	FT	0.385	0.319	-0.039	-0.112	3.604	5.012
691	2450195	2450285	20	21	FFTFFFFFF	FT	0.669	0.492	0.008	0.066	3.514	4.643
691	2454155	2454185	21	22	FFTFFFFFF	FT	0.311	0.299	-0.082	0.055	4.947	4.849
691	2449895	2449925	19	20	FFTFFFFFF	FT	0.522	0.468	-0.207	-0.029	4.403	4.771
691	2450315	2450405	20	21	FFTFFFFFF	FT	0.545	0.374	-0.17	-0.032	3.831	4.675
691	2454605	2454635	20	21	FFTFFFFFF	FT	0.299	0.304	-0.076	0.065	6.037	6.954
691	2453255	2453285	20	21	FFTFFFFFF	FT	0.24	0.241	0.019	-0.053	4.539	5.228
691	2452145	2452175	20	21	FFTFFFFFF	FT	0.343	0.337	-0.007	-0.097	4.52	5.371
691	2449685	2449715	19	20	FFTFFFFFF	FT	0.479	0.557	-0.153	-0.086	4.208	4.251
691	2450825	2450855	20	21	FFTFFFFFF	FT	0.448	0.46	-0.116	-0.121	3.387	7.052
691	2448485	2448515	19	20	FFTFFFFFF	FT	0.657	0.577	-0.29	-0.033	3.954	4.052
691	2450855	2450975	20	21	FFFFFFFTF	FT	0.545	0.429	0.006	-0.115	3.261	3.761
691	2449175	2449535	20	21	FFFFFFFTF	FT	0.543	0.518	-0.108	0.017	4.789	3.829
691	2452325	2452355	21	22	FFTFFFFFF	FT	0.357	0.355	0.001	-0.001	4.036	4.358
691	2450945	2451065	19	20	FFFFFFFTF	FT	0.632	0.515	-0.062	0.234	2.68	3.201
691	2451155	2451185	20	21	FFTFFFFFF	FT	0.583	0.464	-0.095	-0.146	3.203	5.31

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2452295	2452325	21	22	FFTFFFFFF	FT	0.387	0.369	0.024	-0.048	4.263	5.811
691	2451305	2451335	20	21	FFTFFFFFF	FT	0.423	0.47	-0.036	0.001	6.134	4.171
691	2453255	2453405	20	21	FFTFFFFFF	TF	0.24	0.277	0.01	-0.053	6.298	5.895
691	2451515	2451545	20	21	FFTFFFFFF	FT	0.354	0.396	0.023	-0.064	4.251	4.641
691	2449415	2449445	19	20	FFTFFFFFF	FT	0.51	0.526	-0.07	-0.138	6.177	5.706
691	2451965	2451995	21	22	FFTFFFFFF	FT	0.352	0.364	-0.027	0.019	3.833	4.502
691	2451065	2451095	19	20	FFFFFFFTF	FT	0.645	0.393	-0.331	0.003	2.737	5.391
691	2448875	2449025	20	21	FFTFFFFFF	FT	0.611	0.513	-0.177	-0.035	4.491	4.147
691	2449295	2449355	19	20	FFTFFFFFF	FT	0.587	0.519	-0.199	-0.052	4.639	5.644
691	2449865	2450015	20	21	FFFFFFFTF	FT	0.444	0.372	-0.18	0.074	4.51	7.031
691	2450585	2450675	19	20	FFFFFFFTF	FT	0.504	0.476	-0.272	0.093	3.23	5.53
691	2448485	2448785	21	22	FFTFFFFFF	FT	0.623	0.653	-0.041	0.199	3.1	2.876
691	2452835	2452895	20	21	FFTFFFFFF	FT	0.215	0.216	-0.004	-0.003	3.997	4.771
691	2453015	2453045	20	21	FFTFFFFFF	FT	0.202	0.197	-0.008	-0.056	5.659	6.195
691	2451035	2451155	21	22	FFTFFFFFF	FT	0.556	0.462	-0.115	-0.072	3.291	5.625
691	2451485	2451515	20	21	FFTFFFFFF	FT	0.327	0.311	0.017	-0.056	4.845	4.736
691	2450405	2450435	20	21	FFTFFFFFF	FT	0.535	0.585	-0.117	-0.094	4.268	8.008
691	2452955	2453135	20	21	FFTFFFFFF	TF	0.228	0.24	0.022	-0.052	6.476	8.376
691	2454995	2455025	19	20	FFTFFFFFF	FT	0.279	0.284	-0.076	0.056	6.745	7.451
691	2450615	2450675	19	20	FFTFFFFFF	FT	0.541	0.469	-0.243	0.086	4.692	5.576
691	2451935	2451965	21	22	FFTFFFFFF	FT	0.374	0.34	0.011	-0.043	4.101	4.83
691	2450135	2450165	20	21	FFTFFFFFF	FT	0.623	0.492	0.042	-0.002	3.705	4.668
691	2449145	2449325	20	21	FFTFFFFFF	FT	0.59	0.588	-0.166	0.085	3.946	4.06
691	2452205	2452235	20	21	FFTFFFFFF	FT	0.385	0.326	0.036	-0.087	3.577	5.607
691	2450975	2451125	20	21	FFFFFFFTF	FT	0.58	0.413	-0.176	0.061	2.923	3.685
691	2449595	2449625	19	20	FFTFFFFFF	FT	0.57	0.497	-0.289	0.042	3.651	6.504

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2453435	2453465	21	22	FFTFFFFFF	FT	0.3	0.301	0.007	-0.022	4.649	5.899
691	2453165	2453195	20	21	FFTFFFFFF	FT	0.251	0.245	0.001	-0.001	5.487	5.261
691	2450765	2450855	20	21	FFFFFFFTF	FT	0.479	0.434	-0.079	-0.192	3.877	5.425
691	2454695	2454785	19	20	FFTFFFFFF	TF	0.325	0.331	-0.189	-0.057	6.547	7.656
691	2449595	2449715	20	21	FFTFFFFFF	FT	0.535	0.596	-0.207	0.008	4.257	3.765
691	2453135	2453195	21	22	FFTFFFFFF	FT	0.28	0.281	-0.014	-0.03	4.962	4.693
691	2450705	2451035	21	22	FFTFFFFFF	FT	0.527	0.459	-0.052	-0.046	3.492	4.685
691	2449985	2450015	20	21	FFTFFFFFF	FT	0.425	0.408	-0.084	0.013	5.037	4.601
691	2451845	2451935	21	22	FFTFFFFFF	FT	0.395	0.377	-0.025	-0.068	4.318	4.143
691	2452805	2452835	20	21	FFTFFFFFF	FT	0.244	0.254	0.014	0.024	3.563	5.282
691	2453345	2453375	20	21	FFTFFFFFF	FT	0.225	0.254	0.015	-0.055	6.43	5.059
691	2449775	2449805	20	21	FFTFFFFFF	FT	0.479	0.66	0.039	-0.205	4.53	3.643
691	2449445	2449565	20	21	FFTFFFFFF	FT	0.545	0.62	-0.139	-0.037	4.059	3.702
691	2453225	2453255	20	21	FFTFFFFFF	FT	0.24	0.227	0.017	-0.018	4.367	4.275
691	2453855	2453915	21	22	FFTFFFFFF	FT	0.324	0.34	0.013	0.023	5.649	5.723
691	2449895	2449955	20	21	FFTFFFFFF	FT	0.483	0.463	-0.168	-0.068	3.31	5.171
691	2449415	2449445	20	21	FFTFFFFFF	FT	0.491	0.599	0.005	-0.126	5.983	5.059
691	2451425	2451455	20	21	FFTFFFFFF	FT	0.494	0.393	-0.172	0.132	4.099	4.304
691	2451365	2451485	21	22	FFTFFFFFF	FT	0.405	0.408	-0.046	0.031	5.245	4.534
691	2451485	2451515	21	22	FFTFFFFFF	FT	0.318	0.332	0.024	-0.041	3.106	5.937
691	2454455	2454485	21	22	FFTFFFFFF	FT	0.368	0.323	-0.152	0.048	4.035	4.842
691	2449955	2449985	20	21	FFTFFFFFF	FT	0.428	0.391	-0.145	0.01	4.063	6.134
691	2450315	2450675	21	22	FFTFFFFFF	FT	0.484	0.48	-0.064	-0.119	4.38	3.71
691	2451515	2451575	21	22	FFTFFFFFF	FT	0.361	0.411	0.035	-0.077	4.149	4.352
691	2450165	2450195	20	21	FFTFFFFFF	FT	0.585	0.522	0.067	0.013	3.208	4.142
691	2450165	2450285	20	21	FFFFFFFTF	FT	0.627	0.52	0.065	-0.045	3.386	3.02

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
691	2449595	2450285	21	22	FFTFFFFFF	FT	0.505	0.499	-0.051	0.015	4.076	4.52
691	2453945	2454155	21	22	FFTFFFFFF	TF	0.326	0.35	-0.017	-0.002	5.194	7.41
691	2448035	2451365	22	23	FFTFFFFFF	FT	0.582	0.557	-0.068	0.043	3.57	3.597
691	2448485	2449175	20	21	FFFFFFFTF	FT	0.543	0.59	-0.122	-0.122	4.366	4.462
691	2452145	2452175	21	22	FFTFFFFFF	FT	0.353	0.316	-0.002	-0.068	3.5	5.07
691	2454935	2454995	21	22	FFTFFFFFF	FT	0.397	0.374	-0.105	0.059	4.625	4.211
691	2450705	2450765	20	21	FFFFFFFTF	FT	0.497	0.401	-0.156	-0.126	3.943	2.97
691	2454905	2454935	21	22	FFTFFFFFF	FT	0.417	0.36	-0.181	0.074	3.943	5.327
691	2454575	2454635	21	22	FFTFFFFFF	FT	0.383	0.362	-0.093	0.055	4.941	4.613
691	2448515	2452355	18	19	FFTFFFFFF	TF	0.535	0.451	-0.144	-0.061	4.149	5.452
691	2453285	2454245	22	23	FFTFFFFFF	FT	0.441	0.413	-0.035	-0.116	4.187	4.969
691	2453225	2453315	21	22	FFTFFFFFF	FT	0.305	0.318	0.048	-0.082	4.642	4.337
691	2448545	2452355	20	21	FFTFFFFFF	TF	0.454	0.42	-0.123	-0.116	4.377	4.333
691	2448875	2449565	21	22	FFTFFFFFF	FT	0.541	0.646	-0.045	-0.052	4.245	3.459
691	2454395	2455085	21	22	FFTFFFFFF	TF	0.391	0.431	-0.166	-0.064	4.451	6.013
691	2451395	2452415	22	23	FFTFFFFFF	FT	0.42	0.422	0.035	-0.046	4.148	4.579
691	2448515	2451215	21	22	FFFFFFFTF	FT	0.5	0.466	-0.071	-0.097	3.902	3.917
691	2454305	2455085	22	23	FFTFFFFFF	FT	0.458	0.375	-0.196	-0.037	4.541	5.298
695	2452925	2453105	18	19	FFTFFFFFF	FT	0.217	0.183	-0.009	0.011	9.183	12.246
695	2453225	2453555	19	20	FFTFFFFFF	FT	0.234	0.19	0.032	0.073	10.614	9.766
695	2452925	2453105	19	20	FFTFFFFFF	FT	0.243	0.192	-0.004	0.026	9.478	9.362
695	2449055	2454155	13	18	FFTFFFFFF	FT	0.33	0.284	0.008	0.06	12.557	12.676
695	2453285	2453555	18	19	FFTFFFFFF	FT	0.219	0.194	-0.003	0.044	14.029	34.036
695	2453675	2454605	18	19	FFTFFFFFF	FT	0.206	0.17	0.01	0.03	11.421	11.545
695	2449055	2452745	18	19	FFTFFFFFF	FT	0.416	0.404	0.054	0.099	6.392	8.21
695	2451965	2452745	19	20	TFTFFFFFF	FT	0.397	0.354	0.098	0.1	6.619	5.47

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
695	2452145	2452745	20	21	FFTFFFFFF	FT	0.453	0.376	0.159	0.143	7.591	5.718
695	2452925	2453345	20	21	FFTFFFFFF	FT	0.272	0.206	0.03	0.086	11.293	6.992
695	2453285	2454545	21	22	FFTFFFFFF	FT	0.286	0.2	0.065	0.077	6.214	3.765
695	2453435	2454605	20	21	FFTFFFFFF	FT	0.232	0.182	0.056	0.079	6.643	5.705
695	2449745	2453105	21	22	FFTFFFFFF	FT	0.474	0.393	0.195	0.177	5.205	5.89
695	2449355	2452085	20	21	FFTFFFFFF	FT	0.426	0.432	0.167	0.248	7.316	4.745
695	2449115	2451905	19	20	FFTFFFFFF	FT	0.449	0.499	0.062	0.187	6.635	7.503
695	2453615	2454605	19	20	FFTFFFFFF	FT	0.231	0.2	0.032	0.062	19.276	26.614
699	2451935	2451965	15	16	FFTFFFFFF	FT	0.435	0.346	0.125	0.136	5.371	6.875
699	2452175	2452205	15	16	FFTFFFFFF	FT	0.325	0.29	-0.05	0.131	6.117	7.34
699	2452175	2452265	14	15	FFTFFFFFF	FT	0.302	0.231	-0.035	0.113	8.205	7.434
699	2452655	2452715	15	16	FFTFFFFFF	FT	0.314	0.228	0.069	0.05	6.145	7.417
699	2451155	2451215	15	16	FFTFFFFFF	FT	0.457	0.421	0.035	0.096	4.11	4.531
699	2451155	2451185	17	18	FFTFFFFFF	FT	0.618	0.583	0.048	0.072	3.312	3.591
699	2451335	2451395	16	17	FFTFFFFFF	FT	0.513	0.643	0.06	0.351	3.786	3.494
699	2451875	2451905	15	16	FFTFFFFFF	FT	0.414	0.45	0.025	0.261	4.585	4.451
699	2451875	2451905	16	17	FFTFFFFFF	FT	0.525	0.526	-0.007	0.296	4.27	4.067
699	2451935	2451965	17	18	FFTFFFFFF	FT	0.552	0.511	0.094	0.249	4.191	4.23
699	2452655	2452685	17	18	FFTFFFFFF	FT	0.464	0.386	0.056	0.09	4.438	5.669
699	2452655	2452685	16	17	FFTFFFFFF	FT	0.388	0.294	0.078	0.054	4.536	7.658
699	2452715	2452835	15	16	FFTFFFFFF	FT	0.258	0.267	-0.049	-0.041	8.787	12.166
699	2453195	2453255	15	16	FFTFFFFFF	FT	0.288	0.361	0.008	0.163	9.713	6.194
699	2453255	2453285	15	16	FFTFFFFFF	FT	0.253	0.322	0.057	0.198	7.513	4.255
699	2453285	2453315	15	16	FFTFFFFFF	FT	0.279	0.311	0.086	0.177	7.911	4.207
699	2453375	2453405	16	17	FFTFFFFFF	FT	0.391	0.338	0.225	0.122	3.633	5.72
699	2453675	2453705	16	17	FFTFFFFFF	FT	0.344	0.349	0.078	0.095	6.044	5.834

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
699	2453675	2453705	17	18	FFTFFFFFF	FT	0.444	0.443	0.081	0.103	4.794	4.766
699	2453735	2453765	15	16	FFTFFFFFF	FT	0.322	0.27	0.07	0.005	8.079	8.25
699	2453735	2453765	16	17	FFTFFFFFF	FT	0.37	0.318	0.103	0.02	5.21	7.174
699	2453765	2453795	16	17	FFTFFFFFF	FT	0.387	0.32	0.169	0.07	4.674	7.18
699	2453765	2453825	15	16	FFTFFFFFF	FT	0.341	0.261	0.129	0.034	5.314	7.611
699	2452085	2452175	14	15	FFTFFFFFF	FT	0.347	0.274	-0.031	0.124	6.345	7.049
699	2452445	2452835	13	14	FFTFFFFFF	FT	0.254	0.201	-0.027	0.044	7.985	6.864
699	2452235	2452265	16	17	FFTFFFFFF	FT	0.392	0.325	0.025	0.081	4.417	6.421
699	2452775	2452805	16	17	FFTFFFFFF	FT	0.306	0.328	-0.022	0.039	6.855	7.133
699	2453645	2453675	16	17	FFTFFFFFF	FT	0.314	0.345	0.056	0.144	6.211	5.218
699	2453675	2453705	15	16	FFTFFFFFF	FT	0.294	0.299	0.068	0.101	6.147	7.316
699	2453675	2453915	14	15	FFTFFFFFF	FT	0.298	0.262	0.085	0.058	6.069	7.2
699	2452205	2452445	13	14	FFTFFFFFF	FT	0.27	0.205	-0.018	0.033	5.536	8.731
699	2453285	2453405	14	15	FFTFFFFFF	FT	0.304	0.284	0.142	0.144	5.288	4.803
699	2453375	2453435	15	16	FFTFFFFFF	FT	0.383	0.291	0.254	0.097	3.759	8.698
699	2451905	2451935	17	18	FFTFFFFFF	FT	0.533	0.518	0.06	0.245	4.141	4.079
699	2451905	2451935	18	19	FFTFFFFFF	FT	0.612	0.597	0.048	0.245	3.936	3.623
699	2452025	2452055	16	17	FFTFFFFFF	FT	0.472	0.396	0.112	0.182	5.294	5.776
699	2452925	2452955	17	18	FFTFFFFFF	FT	0.375	0.361	0.02	0.041	5.783	5.937
699	2452955	2452985	17	18	FFTFFFFFF	FT	0.384	0.37	0.026	0.022	5.609	6.359
699	2452955	2452985	16	17	FFTFFFFFF	FT	0.285	0.268	0.022	0.021	8.969	10.779
699	2453015	2453045	16	17	FFTFFFFFF	FT	0.285	0.267	0.01	-0.005	8.955	8.53
699	2453015	2453075	15	16	FFTFFFFFF	FT	0.241	0.241	-0.014	-0.027	10.737	13.669
699	2453105	2453135	16	17	FFTFFFFFF	FT	0.263	0.267	0.005	0.022	10.151	11.301
699	2453495	2453525	16	17	FFTFFFFFF	FT	0.399	0.389	0.106	0.169	4.996	5.15
699	2453495	2453585	15	16	FFTFFFFFF	FT	0.322	0.354	0.08	0.165	6.598	6.46

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
699	2453525	2453555	16	17	FFTFFFFFF	FT	0.424	0.445	0.109	0.244	5.309	4.513
699	2453915	2454035	14	15	FFTFFFFFF	FT	0.276	0.352	-0.002	0.231	7.266	4.264
699	2454095	2454125	17	18	FFTFFFFFF	FT	0.493	0.449	0.159	0.082	3.809	4.831
699	2454125	2454155	17	18	FFTFFFFFF	FT	0.544	0.503	0.173	0.146	3.791	4.355
699	2451125	2451155	15	16	FFTFFFFFF	FT	0.47	0.529	0.061	0.256	4.265	4.083
699	2450795	2451395	14	15	FFTFFFFFF	FT	0.443	0.483	0.086	0.247	3.645	3.571
699	2452955	2453225	14	15	FFTFFFFFF	FT	0.208	0.212	0.01	0.005	11.333	15.082
699	2451785	2451875	14	15	FFTFFFFFF	FT	0.451	0.407	-0.134	0.214	5.424	5.139
699	2453075	2453105	15	16	FFTFFFFFF	FT	0.241	0.225	0.006	-0.01	11.19	12.751
699	2451275	2451395	15	16	FFTFFFFFF	FT	0.461	0.504	0.155	0.254	4.249	3.732
699	2451755	2451815	15	16	FFTFFFFFF	FT	0.517	0.449	-0.172	0.254	5.047	3.819
699	2451905	2451935	16	17	FFTFFFFFF	FT	0.458	0.431	0.06	0.202	4.874	4.303
699	2452115	2452175	15	16	FFTFFFFFF	FT	0.374	0.305	-0.044	0.133	5.137	7.31
699	2452325	2452355	16	17	FFTFFFFFF	FT	0.371	0.285	0.018	0.06	5.767	7.687
699	2452295	2452475	15	16	FFTFFFFFF	FT	0.318	0.246	0.023	0.034	6.186	9.704
699	2452625	2452745	14	15	FFTFFFFFF	FT	0.285	0.234	-0.014	-0.007	5.699	7.816
699	2452745	2452835	14	15	FFTFFFFFF	FT	0.211	0.205	-0.011	-0.003	10.162	16.291
699	2454065	2454275	13	14	FFTFFFFFF	FT	0.365	0.315	0.141	0.118	6.207	6.957
699	2451485	2451515	16	17	FFTFFFFFF	FT	0.453	0.545	-0.113	0.307	4.534	3.435
699	2451515	2451575	15	16	FFTFFFFFF	FT	0.393	0.421	0.058	0.219	4.757	4.633
699	2452925	2452955	15	16	FFTFFFFFF	FT	0.211	0.234	-0.003	0.046	9.017	16.175
699	2453315	2453345	16	17	FFTFFFFFF	FT	0.363	0.368	0.124	0.16	4.641	4.819
699	2453405	2453585	14	15	FFTFFFFFF	FT	0.312	0.276	0.137	0.122	5.384	5.455
699	2451215	2451275	15	16	FFTFFFFFF	FT	0.544	0.458	0.344	0.195	2.652	4.276
699	2451815	2451845	15	16	FFTFFFFFF	FT	0.387	0.415	-0.083	0.265	5.004	3.545
699	2451815	2451845	16	17	FFTFFFFFF	FT	0.438	0.428	-0.073	0.242	4.769	4.147

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
699	2452175	2452205	17	18	FFTFFFFFF	FT	0.457	0.408	-0.036	0.106	4.306	5.094
699	2452175	2452205	16	17	FFTFFFFFF	FT	0.378	0.332	-0.041	0.112	4.623	5.815
699	2452265	2452475	14	15	FFTFFFFFF	FT	0.279	0.21	0.015	0.019	6.238	12.951
699	2453825	2453975	15	16	FFTFFFFFF	FT	0.339	0.332	0.086	0.138	6.045	5.883
699	2454425	2454545	15	16	FFTFFFFFF	FT	0.276	0.26	0.028	-0.012	12.155	20.15
699	2454455	2454485	16	17	FFTFFFFFF	FT	0.377	0.347	0.047	-0.02	10.019	16.517
699	2451875	2451935	14	15	FFTFFFFFF	FT	0.352	0.339	0.016	0.186	5.916	3.277
699	2451935	2452205	13	14	FFTFFFFFF	FT	0.32	0.267	0.022	0.132	4.91	7.134
699	2453135	2453195	15	16	FFTFFFFFF	FT	0.293	0.308	0.115	0.096	7.477	8.867
699	2454065	2454125	15	16	FFTFFFFFF	FT	0.355	0.31	0.139	0.082	6.233	8.59
699	2452475	2452625	14	15	FFTFFFFFF	FT	0.303	0.255	-0.033	0.1	6.656	7.802
699	2452865	2452925	15	16	FFTFFFFFF	FT	0.229	0.241	0.007	0.071	12.372	11.329
699	2454305	2454545	13	14	FFTFFFFFF	FT	0.273	0.28	-0.033	0.101	12.318	8.331
699	2451515	2451545	16	17	FFTFFFFFF	FT	0.449	0.598	0.013	0.339	4.082	4.277
699	2451635	2451935	13	14	FFTFFFFFF	FT	0.387	0.36	-0.039	0.191	5.056	3.632
699	2452955	2452985	15	16	FFTFFFFFF	FT	0.221	0.201	0.013	0.019	12.316	10.472
699	2453285	2453315	16	17	FFTFFFFFF	FT	0.318	0.356	0.091	0.163	5.462	4.954
699	2453315	2453345	15	16	FFTFFFFFF	FT	0.29	0.302	0.114	0.166	4.499	3.888
699	2451215	2451245	16	17	FFTFFFFFF	FT	0.553	0.436	0.367	0.147	3.099	3.719
699	2452625	2452655	16	17	FFTFFFFFF	FT	0.394	0.317	0.066	0.077	4.72	6.735
699	2453405	2453435	16	17	FFTFFFFFF	FT	0.499	0.372	0.317	0.149	3.503	5.957
699	2453435	2453465	16	17	FFTFFFFFF	FT	0.438	0.345	0.256	0.149	3.831	6.085
699	2453705	2453735	16	17	FFTFFFFFF	FT	0.38	0.345	0.133	0.09	5.407	5.963
699	2453705	2453735	15	16	FFTFFFFFF	FT	0.32	0.31	0.111	0.086	6.533	8.368
699	2452595	2452625	16	17	FFTFFFFFF	FT	0.403	0.328	0.007	0.067	6.538	6.051
699	2452865	2453015	13	14	FFTFFFFFF	FT	0.224	0.188	-0.02	0.048	12.558	12.679

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
699	2453555	2454035	13	14	FFTFFFFFF	FT	0.298	0.272	0.033	0.099	6.513	5.926
699	2454155	2454275	14	15	FFTFFFFFF	FT	0.351	0.301	0.171	0.134	4.893	5.651
699	2452295	2452325	16	17	FFTFFFFFF	FT	0.367	0.307	0.032	0.065	5.015	6.577
699	2452925	2452955	16	17	FFTFFFFFF	FT	0.26	0.271	0.012	0.031	8.623	11.873
699	2454065	2454095	7	17	FFTFFFFFF	FT	0.396	0.39	0.08	0.112	5.397	5.851
699	2454365	2454395	15	16	FFTFFFFFF	FT	0.307	0.3	-0.016	0.1	14.282	13.91
699	2454305	2454545	14	15	FFTFFFFFF	FT	0.268	0.298	-0.014	0.096	9.192	13.009
699	2454395	2454425	15	16	FFTFFFFFF	FT	0.258	0.268	-0.012	0.071	15.999	23.859
699	2451635	2451755	15	16	FFTFFFFFF	FT	0.468	0.426	0.003	0.194	4.269	4.636
699	2452445	2452505	16	17	FFTFFFFFF	FT	0.396	0.322	-0.014	0.088	4.255	7.96
699	2452565	2452655	15	16	FFTFFFFFF	FT	0.337	0.266	0.012	0.088	7.323	9.028
699	2453105	2453135	15	16	FFTFFFFFF	FT	0.231	0.222	-0.008	-0.002	14.427	12.948
699	2451995	2452055	15	16	FFTFFFFFF	FT	0.409	0.336	0.112	0.136	4.777	5.732
699	2453225	2453285	14	15	FFTFFFFFF	FT	0.241	0.328	0.027	0.213	4.837	3.73
699	2453345	2453375	16	17	FFTFFFFFF	FT	0.425	0.361	0.234	0.128	3.891	5.346
699	2453345	2453375	15	16	FFTFFFFFF	FT	0.343	0.276	0.194	0.106	4.343	6.841
699	2451395	2451455	15	16	FFTFFFFFF	FT	0.417	0.65	-0.14	0.474	4.01	3.007
699	2451455	2451485	15	16	FFTFFFFFF	FT	0.415	0.652	-0.171	0.477	4.501	3.008
699	2451845	2451875	15	16	FFTFFFFFF	FT	0.417	0.427	0.004	0.255	4.916	4.882
699	2451935	2452085	14	15	FFTFFFFFF	FT	0.381	0.304	0.117	0.14	5.158	4.659
699	2453345	2454545	12	13	FFTFFFFFF	FT	0.333	0.31	0.025	0.116	5.743	5.562
699	2451635	2452835	12	13	FFTFFFFFF	FT	0.301	0.254	-0.038	0.1	5.485	4.713
699	2453015	2453405	13	14	FFTFFFFFF	FT	0.261	0.257	0.031	0.105	4.914	5.154
699	2451185	2451215	17	18	FFTFFFFFF	FT	0.613	0.595	0.097	0.034	3.163	3.75
699	2451185	2451215	16	17	FFTFFFFFF	FT	0.528	0.505	0.084	0.026	3.563	4.374
699	2451215	2451245	17	18	FFTFFFFFF	FT	0.649	0.556	0.396	0.158	2.976	3.956

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
699	2451695	2451725	16	17	FFTFFFFFF	FT	0.515	0.519	0.07	0.277	4.258	4.573
699	2452265	2452295	16	17	FFTFFFFFF	FT	0.398	0.338	0.011	0.084	4.922	6.3
699	2452265	2452295	17	18	FFTFFFFFF	FT	0.47	0.427	-0.004	0.093	4.291	4.996
699	2452715	2452745	16	17	FFTFFFFFF	FT	0.313	0.294	-0.094	-0.043	6.52	8.468
699	2452775	2452805	17	18	FFTFFFFFF	FT	0.427	0.44	-0.01	0.093	4.871	5.261
699	2451395	2451575	14	15	FFTFFFFFF	FT	0.377	0.528	-0.087	0.366	5.564	3.102
699	2452235	2452295	15	16	FFTFFFFFF	FT	0.322	0.259	-0.001	0.08	6.916	6.698
699	2452865	2452955	14	15	FFTFFFFFF	FT	0.215	0.206	0.006	0.069	17.179	11.98
699	2451485	2451515	15	16	FFTFFFFFF	FT	0.406	0.504	-0.135	0.33	5.123	3.421
699	2454155	2454185	16	17	FFTFFFFFF	FT	0.46	0.362	0.219	0.122	3.896	6.451
699	2454125	2454215	15	16	FFTFFFFFF	FT	0.421	0.361	0.212	0.131	4.757	6.365
699	2451065	2451095	16	17	FFTFFFFFF	FT	0.481	0.606	0.086	0.367	4.216	3.371
699	2451095	2451125	16	17	FFTFFFFFF	FT	0.5	0.513	0.086	0.261	4.44	3.604
699	2452085	2452115	16	17	FFTFFFFFF	FT	0.474	0.426	-0.054	0.169	4.028	5.888
699	2452115	2452145	16	17	FFTFFFFFF	FT	0.426	0.346	-0.014	0.129	5.3	5.901
699	2453405	2453435	17	18	FFTFFFFFF	FT	0.534	0.43	0.302	0.159	3.434	5.265
699	2453885	2453945	16	17	FFTFFFFFF	FT	0.388	0.437	0.081	0.239	4.96	4.014
699	2451155	2451185	18	19	FFTFFFFFF	FT	0.697	0.655	-0.012	0.04	2.889	3.271
699	2452355	2452385	16	17	FFTFFFFFF	FT	0.402	0.301	0.069	0.069	5.072	7.297
699	2452415	2452445	16	17	FFTFFFFFF	FT	0.395	0.378	0.022	0.104	5.08	8.304
699	2452415	2452475	17	18	FFTFFFFFF	FT	0.479	0.442	0.015	0.156	3.997	4.514
699	2452805	2452835	16	17	FFTFFFFFF	FT	0.316	0.308	-0.021	0.057	6.8	6.371
699	2453285	2453315	18	19	FFTFFFFFF	FT	0.548	0.542	0.102	0.155	3.706	3.753
699	2454485	2454545	16	17	FFTFFFFFF	FT	0.309	0.277	0.031	-0.056	12.969	19.098
699	2451965	2451995	15	16	FFTFFFFFF	FT	0.403	0.305	0.16	0.117	5.461	6.074
699	2454125	2454155	16	17	FFTFFFFFF	FT	0.467	0.429	0.199	0.101	3.77	5.944

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
699	2454425	2454455	16	17	FFTFFFFFF	FT	0.381	0.322	0.088	-0.002	8.948	14.472
699	2451095	2451125	15	16	FFTFFFFFF	FT	0.44	0.485	0.071	0.271	4.26	4.322
699	2451605	2451695	11	15	FFFFFFFTF	FT	0.369	0.289	0.129	0.135	4.941	8.593
699	2453435	2453465	15	16	FFTFFFFFF	FT	0.355	0.29	0.218	0.121	3.556	7.146
699	2453465	2453495	17	18	FFTFFFFFF	FT	0.504	0.454	0.203	0.193	3.88	4.453
699	2453465	2453495	16	17	FFTFFFFFF	FT	0.418	0.361	0.192	0.161	3.965	4.685
699	2453495	2453525	17	18	FFTFFFFFF	FT	0.498	0.473	0.117	0.194	4.21	4.118
699	2451305	2451335	16	17	FFTFFFFFF	FT	0.528	0.526	0.228	0.224	3.585	4.327
699	2453465	2453495	15	16	FFTFFFFFF	FT	0.346	0.339	0.168	0.153	5.443	6.738
699	2452295	2452325	17	18	FFTFFFFFF	FT	0.46	0.399	0.011	0.077	4.396	4.827
699	2453405	2453555	13	14	FFTFFFFFF	FT	0.32	0.292	0.143	0.124	3.269	4.581
699	2452985	2453015	16	17	FFTFFFFFF	FT	0.323	0.311	0.007	0.013	7.199	6.615
699	2452985	2453015	15	16	FFTFFFFFF	FT	0.241	0.238	0.014	-0.002	15.629	15.645
699	2450795	2451035	15	16	FFTFFFFFF	FT	0.417	0.503	0.064	0.209	4.701	4.206
699	2454065	2454155	14	15	FFTFFFFFF	FT	0.327	0.301	0.116	0.083	6.458	10.143
699	2453375	2453405	17	18	FFTFFFFFF	FT	0.507	0.445	0.25	0.144	3.798	4.549
699	2453615	2453645	15	16	FFTFFFFFF	FT	0.256	0.343	0.007	0.172	8.452	5.128
699	2453585	2453675	14	15	FFTFFFFFF	FT	0.26	0.301	0.019	0.161	9.363	5.139
699	2453645	2453675	15	16	FFTFFFFFF	FT	0.282	0.319	0.05	0.152	9.025	5.633
699	2451905	2451935	15	16	FFTFFFFFF	FT	0.39	0.358	0.032	0.182	5.798	5.318
699	2451965	2451995	16	17	FFTFFFFFF	FT	0.458	0.387	0.164	0.17	4.687	5.518
699	2452805	2452835	17	18	FFTFFFFFF	FT	0.425	0.435	-0.012	0.096	4.394	4.558
699	2452985	2453015	17	18	FFTFFFFFF	FT	0.456	0.45	0.029	0.039	4.474	4.874
699	2453015	2453045	17	18	FFTFFFFFF	FT	0.376	0.363	0.001	0.017	5.534	6.4
699	2453495	2453525	18	19	FFTFFFFFF	FT	0.612	0.588	0.115	0.2	3.421	3.514
699	2453795	2453825	16	17	FFTFFFFFF	FT	0.383	0.318	0.073	0.046	5.163	6.122

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
699	2453825	2453855	16	17	FFTFFFFFF	FT	0.404	0.354	0.124	0.09	4.396	5.959
699	2454215	2454275	15	16	FFTFFFFFF	FT	0.375	0.38	0.13	0.194	5.716	4.641
699	2454365	2454395	16	17	FFTFFFFFF	FT	0.364	0.354	-0.012	0.071	7.324	9.429
699	2454395	2454425	17	18	FFTFFFFFF	FT	0.39	0.356	0.032	0.019	6.992	10.022
699	2450795	2450975	16	17	FFTFFFFFF	FT	0.479	0.509	0.076	0.149	3.902	4.057
699	2451455	2451485	16	17	FFTFFFFFF	FT	0.476	0.687	-0.16	0.434	4.077	3.366
699	2451485	2451515	17	18	FFTFFFFFF	FT	0.546	0.611	-0.066	0.292	3.912	3.401
699	2453705	2453735	17	18	FFTFFFFFF	FT	0.484	0.467	0.132	0.121	4.182	4.505
699	2452205	2452235	15	16	FFTFFFFFF	FT	0.308	0.27	-0.043	0.087	4.624	6.68
699	2452205	2452235	16	17	FFTFFFFFF	FT	0.373	0.317	-0.03	0.101	4.563	5.681
699	2452865	2453345	12	13	FFTFFFFFF	FT	0.247	0.238	0.016	0.091	6	6.259
699	2451275	2451305	16	17	FFTFFFFFF	FT	0.545	0.48	0.315	0.192	3.138	4.103
699	2451545	2451575	16	17	FFTFFFFFF	FT	0.493	0.467	0.16	0.201	4.127	4.35
699	2451605	2451695	15	21	FFFFFFFTF	FT	0.43	0.38	0.128	0.157	5.891	7.561
699	2453975	2454035	15	16	FFTFFFFFF	FT	0.291	0.356	0.018	0.221	8.578	4.141
699	2451035	2451095	15	16	FFTFFFFFF	FT	0.419	0.558	0.091	0.35	4.848	3.053
699	2450795	2451335	13	14	FFTFFFFFF	FT	0.471	0.465	0.073	0.216	3.574	3.598
699	2452685	2452715	16	17	FFTFFFFFF	FT	0.304	0.269	0.067	0.044	5.898	9.873
699	2452685	2452715	17	18	FFTFFFFFF	FT	0.39	0.344	0.073	0.084	4.513	6.159
699	2453735	2453765	17	18	FFTFFFFFF	FT	0.456	0.402	0.101	0.029	4.428	5.428
699	2453765	2453795	17	18	FFTFFFFFF	FT	0.478	0.4	0.185	0.091	4.102	5.122
699	2454215	2454245	16	17	FFTFFFFFF	FT	0.439	0.408	0.174	0.205	4.161	4.436
699	2451065	2451095	17	18	FFTFFFFFF	FT	0.555	0.688	0.092	0.377	3.962	3.246
699	2452325	2452355	17	18	FFTFFFFFF	FT	0.442	0.366	0.016	0.089	4.447	5.171
699	2451935	2451965	16	17	FFTFFFFFF	FT	0.487	0.411	0.11	0.185	4.85	5.09
699	2451815	2451845	18	19	FFTFFFFFF	FT	0.646	0.658	-0.073	0.37	3.868	3.361

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
699	2451815	2451845	17	18	FFTFFFFFF	FT	0.525	0.537	-0.073	0.297	4.172	3.796
699	2451845	2451875	16	17	FFTFFFFFF	FT	0.535	0.522	0.058	0.306	4.934	3.98
699	2453135	2453165	17	18	FFTFFFFFF	FT	0.457	0.454	0.098	0.149	5.07	4.591
699	2453135	2453165	18	19	FFTFFFFFF	FT	0.545	0.542	0.082	0.137	3.782	3.805
699	2451515	2451545	17	18	FFTFFFFFF	FT	0.552	0.734	0	0.392	3.612	3.661
699	2452085	2452115	15	16	FFTFFFFFF	FT	0.404	0.36	-0.064	0.139	4.264	7.128
699	2452505	2452535	16	17	FFTFFFFFF	FT	0.381	0.311	-0.03	0.113	4.982	5.14
699	2452565	2452595	16	17	FFTFFFFFF	FT	0.349	0.31	-0.058	0.107	4.909	7.768
699	2453015	2453045	18	19	FFTFFFFFF	FT	0.511	0.501	0.002	0.046	4.046	4.156
699	2453585	2453615	16	17	FFTFFFFFF	FT	0.32	0.346	0.011	0.124	7.89	6.273
699	2453585	2453615	15	16	FFTFFFFFF	FT	0.29	0.309	0	0.148	13.151	4.771
699	2453615	2453645	16	17	FFTFFFFFF	FT	0.321	0.364	0.022	0.15	7.073	5.098
699	2453135	2453165	16	17	FFTFFFFFF	FT	0.351	0.365	0.108	0.141	6.144	5.399
699	2453375	2453405	18	19	FFTFFFFFF	FT	0.625	0.573	0.264	0.171	3.277	3.671
699	2454425	2454455	18	19	FFTFFFFFF	FT	0.547	0.465	0.087	0.023	4.509	5.419
699	2452865	2452925	16	17	FFTFFFFFF	FT	0.29	0.282	0	0.054	8.799	8.725
699	2451125	2451155	17	18	FFTFFFFFF	FT	0.604	0.636	0.072	0.258	3.405	3.36
699	2451245	2451275	16	17	FFTFFFFFF	FT	0.607	0.503	0.371	0.144	3.155	4.296
699	2454515	2454545	17	18	FFTFFFFFF	FT	0.329	0.3	0.017	-0.055	9.742	15.107
699	2451335	2451575	13	14	FFTFFFFFF	FT	0.396	0.548	-0.077	0.352	4.983	4.116
699	2452745	2452775	16	17	FFTFFFFFF	FT	0.271	0.283	-0.013	0.007	8.206	10.999
699	2453795	2453825	17	18	FFTFFFFFF	FT	0.46	0.401	0.087	0.069	4.234	5.401
699	2454095	2454125	16	17	FFTFFFFFF	FT	0.406	0.352	0.164	0.074	4.453	7.274
699	2451545	2451575	17	18	FFTFFFFFF	FT	0.573	0.577	0.136	0.225	3.573	3.641
699	2452475	2452565	15	16	FFTFFFFFF	FT	0.338	0.28	-0.034	0.113	6.136	8.161
699	2452745	2452775	17	18	FFTFFFFFF	FT	0.379	0.376	-0.016	0.052	5.483	6.269

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
699	2452055	2452085	17	18	FFTFFFFFFF	FT	0.584	0.603	0.056	0.292	3.667	3.845
699	2452115	2452145	17	18	FFTFFFFFFF	FT	0.473	0.4	-0.016	0.106	3.971	5.555
699	2452595	2452625	17	18	FFTFFFFFFF	FT	0.447	0.41	0.028	0.089	4.339	5.616
699	2453885	2453945	17	18	FFTFFFFFFF	FT	0.51	0.529	0.107	0.258	3.826	3.68
699	2454455	2454485	17	18	FFTFFFFFFF	FT	0.453	0.392	0.076	-0.036	6.435	7.495
699	2452385	2452415	16	17	FFTFFFFFFF	FT	0.356	0.294	0.027	0.111	4.552	5.274
699	2453825	2453855	17	18	FFTFFFFFFF	FT	0.485	0.421	0.117	0.119	4.013	4.458
699	2453855	2453885	16	17	FFTFFFFFFF	FT	0.427	0.399	0.184	0.208	4.141	4.661
699	2454215	2454245	17	18	FFTFFFFFFF	FT	0.536	0.51	0.192	0.247	3.617	3.829
699	2454215	2454245	18	19	FFTFFFFFFF	FT	0.658	0.654	0.18	0.271	3.169	3.173
699	2451635	2451785	14	15	FFTFFFFFFF	FT	0.432	0.34	-0.054	0.171	4.126	3.789
699	2451155	2451185	16	17	FFTFFFFFFF	FT	0.521	0.493	0.074	0.085	3.802	4.087
699	2451455	2451485	17	18	FFTFFFFFFF	FT	0.566	0.769	-0.137	0.434	3.621	3.384
699	2451665	2451695	17	18	FFTFFFFFFF	FT	0.572	0.573	0.144	0.3	4.003	3.957
699	2452985	2453015	18	19	FFTFFFFFFF	FT	0.57	0.561	0.035	0.052	3.77	3.761
699	2452205	2452235	17	18	FFTFFFFFFF	FT	0.453	0.406	-0.03	0.101	4.295	4.939
699	2450975	2451005	16	17	FFTFFFFFFF	FT	0.479	0.587	-0.053	0.274	3.807	3.485
699	2454005	2454035	16	17	FFTFFFFFFF	FT	0.341	0.354	0.04	0.162	7.358	4.428
699	2452055	2452085	15	16	FFTFFFFFFF	FT	0.473	0.437	0.025	0.215	6.355	6.3
699	2452145	2452175	16	17	FFTFFFFFFF	FT	0.424	0.351	-0.042	0.115	4.516	6.039
699	2451485	2451515	18	19	FFTFFFFFFF	FT	0.638	0.719	-0.049	0.264	3.334	3.338
699	2451605	2451635	16	17	FFFFFFFFTF	FT	0.403	0.381	0.074	0.167	3.889	4.924
699	2451635	2451665	10	17	FFFFFFFFTF	FT	0.446	0.389	0.127	0.196	4.991	4.558
699	2451695	2451725	17	18	FFTFFFFFFF	FT	0.605	0.617	0.092	0.315	3.942	3.927
699	2451695	2451725	18	19	FFTFFFFFFF	FT	0.704	0.71	0.11	0.322	3.453	3.408
699	2453075	2453105	16	17	FFTFFFFFFF	FT	0.292	0.287	0.004	0.019	9.378	12.902

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
699	2453765	2453795	18	19	FFTFFFFFF	FT	0.587	0.523	0.191	0.115	3.405	3.913
699	2454245	2454275	17	18	FFTFFFFFF	FT	0.539	0.583	0.072	0.269	3.424	3.446
699	2454245	2454275	18	19	FFTFFFFFF	FT	0.66	0.681	0.138	0.277	3.191	3.203
699	2454305	2454365	15	16	FFTFFFFFF	FT	0.321	0.391	0.024	0.227	7.081	4.238
699	2452535	2452565	16	17	FFTFFFFFF	FT	0.395	0.347	-0.035	0.127	4.469	5.632
699	2453165	2453195	16	17	FFTFFFFFF	FT	0.365	0.367	0.137	0.19	5.608	3.778
699	2451125	2451155	16	17	FFTFFFFFF	FT	0.513	0.603	0.063	0.286	3.827	3.657
699	2452685	2452715	18	19	FFTFFFFFF	FT	0.528	0.484	0.075	0.12	3.722	4.141
699	2452955	2452985	18	19	FFTFFFFFF	FT	0.52	0.5	0.027	0.049	4.101	4.324
699	2453045	2453075	16	17	FFTFFFFFF	FT	0.34	0.281	-0.11	-0.102	6.647	6.048
699	2454005	2454035	18	19	FFTFFFFFF	FT	0.556	0.555	0.04	0.169	3.738	3.758
699	2452595	2452625	18	19	FFTFFFFFF	FT	0.548	0.52	0.02	0.098	3.729	4.125
699	2454005	2454035	17	18	FFTFFFFFF	FT	0.421	0.428	0.039	0.167	4.49	4.352
699	2452475	2452505	17	18	FFTFFFFFF	FT	0.476	0.389	0.002	0.1	3.865	5.187
699	2453225	2453255	16	17	FFTFFFFFF	FT	0.328	0.396	0.025	0.193	7.633	5.309
699	2454485	2454515	17	18	FFTFFFFFF	FT	0.398	0.346	0.049	-0.026	7.23	10.452
699	2451185	2451215	18	19	FFTFFFFFF	FT	0.71	0.66	0.062	0.032	2.819	3.186
699	2451665	2451695	18	19	FFTFFFFFF	FT	0.676	0.665	0.175	0.304	3.653	3.66
699	2452055	2452085	16	17	FFTFFFFFF	FT	0.488	0.521	0.032	0.261	4.09	5.088
699	2453045	2453075	17	18	FFTFFFFFF	FT	0.382	0.362	-0.109	-0.065	4.869	6.639
699	2454155	2454185	18	19	FFTFFFFFF	FT	0.626	0.555	0.246	0.173	3.19	3.598
699	2454155	2454185	17	18	FFTFFFFFF	FT	0.523	0.435	0.229	0.145	3.562	4.701
699	2453615	2453645	17	18	FFTFFFFFF	FT	0.409	0.44	0.031	0.142	5.208	4.488
699	2453645	2453675	17	18	FFTFFFFFF	FT	0.402	0.417	0.062	0.133	5.015	4.634
699	2451965	2451995	17	18	FFTFFFFFF	FT	0.535	0.461	0.18	0.21	4.077	4.637
699	2451995	2452025	16	17	FFTFFFFFF	FT	0.488	0.392	0.192	0.178	4.172	5.85

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
699	2451995	2452025	17	18	FFTFFFFFF	FT	0.571	0.476	0.202	0.217	3.917	4.538
699	2451845	2451875	17	18	FFTFFFFFF	FT	0.611	0.611	0.01	0.346	4.215	3.706
699	2453285	2453315	17	18	FFTFFFFFF	FT	0.422	0.427	0.104	0.155	4.705	4.659
699	2454395	2454425	16	17	FFTFFFFFF	FT	0.324	0.284	0.014	0.031	13.908	17.688
699	2451935	2451965	18	19	FFTFFFFFF	FT	0.61	0.657	0.062	0.353	3.832	3.572
699	2451965	2451995	18	19	FFTFFFFFF	FT	0.646	0.569	0.232	0.27	3.751	3.793
699	2453315	2453345	17	18	FFTFFFFFF	FT	0.476	0.474	0.139	0.197	4.435	4.028
699	2452655	2452685	18	19	FFTFFFFFF	FT	0.568	0.505	0.036	0.11	3.575	4.024
699	2452925	2452955	18	19	FFTFFFFFF	FT	0.528	0.507	0.031	0.054	3.981	4.064
699	2453435	2453465	17	18	FFTFFFFFF	FT	0.509	0.424	0.277	0.191	3.46	4.477
699	2453075	2453105	17	18	FFTFFFFFF	FT	0.4	0.381	-0.002	0.063	6.111	6.435
699	2453105	2453135	17	18	FFTFFFFFF	FT	0.368	0.354	0.012	0.056	5.699	6.13
699	2453345	2453375	17	18	FFTFFFFFF	FT	0.52	0.456	0.241	0.134	3.839	4.343
699	2454185	2454215	16	17	FFTFFFFFF	FT	0.483	0.442	0.228	0.206	3.641	4.852
699	2451875	2451905	17	18	FFTFFFFFF	FT	0.612	0.638	-0.041	0.352	3.998	3.519
699	2451005	2451035	16	17	FFTFFFFFF	FT	0.546	0.53	0.108	0.28	4.961	3.595
699	2451095	2451125	17	18	FFTFFFFFF	FT	0.581	0.586	0.077	0.227	3.513	3.474
699	2454425	2454455	17	18	FFTFFFFFF	FT	0.466	0.399	0.087	0.01	5.638	8.961
699	2453855	2453885	17	18	FFTFFFFFF	FT	0.517	0.491	0.199	0.243	3.843	3.919
699	2451605	2451695	16	17	FFTFFFFFF	FT	0.481	0.459	0.153	0.251	4.092	5.343
699	2453255	2453285	16	17	FFTFFFFFF	FT	0.303	0.35	0.073	0.184	5.913	4.8
699	2451545	2451575	18	19	FFTFFFFFF	FT	0.662	0.671	0.126	0.254	3.343	3.224
699	2451635	2451665	17	18	FFFFFFFTF	FT	0.531	0.481	0.164	0.247	4.169	4.212
699	2452715	2452745	17	18	FFTFFFFFF	FT	0.409	0.373	-0.1	-0.009	4.502	5.264
699	2453375	2454545	11	12	FFTFFFFFF	FT	0.361	0.376	0.026	0.149	5.113	6.512
699	2450795	2451575	12	13	FFTFFFFFF	FT	0.419	0.384	0.144	0.145	4.205	4.214

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
699	2451665	2451695	16	17	FFFFFFFTF	FT	0.447	0.407	0.168	0.227	5.081	4.06
699	2454065	2454095	17	18	FFTFFFFFF	FT	0.502	0.502	0.07	0.145	4.229	4.178
699	2451395	2451425	16	17	FFTFFFFFF	FT	0.486	0.639	-0.091	0.431	4.429	3.417
699	2454245	2454275	16	17	FFTFFFFFF	FT	0.435	0.455	0.071	0.23	4.149	4.424
699	2451035	2451065	16	17	FFTFFFFFF	FT	0.495	0.567	0.139	0.322	4.751	3.187
699	2451425	2451455	16	17	FFTFFFFFF	FT	0.479	0.676	-0.15	0.453	4.239	3.076
699	2453255	2453285	17	18	FFTFFFFFF	FT	0.403	0.424	0.086	0.173	5.018	4.667
699	2454305	2454335	16	17	FFTFFFFFF	FT	0.342	0.421	-0.001	0.259	7.246	4.269
699	2454335	2454365	16	17	FFTFFFFFF	FT	0.35	0.386	0.049	0.178	5.116	4.638
699	2451605	2451635	17	18	FFFFFFFTF	FT	0.469	0.46	0.085	0.235	3.83	4.132
699	2453165	2453195	17	18	FFTFFFFFF	FT	0.472	0.493	0.135	0.23	4.193	3.795
699	2453525	2453555	17	18	FFTFFFFFF	FT	0.513	0.529	0.115	0.253	3.702	3.77
699	2452625	2452655	17	18	FFTFFFFFF	FT	0.49	0.434	0.057	0.103	3.965	4.53
699	2453555	2453585	16	17	FFTFFFFFF	FT	0.381	0.413	0.004	0.22	5.95	4.311
699	2453675	2453705	18	19	FFTFFFFFF	FT	0.563	0.55	0.098	0.108	3.766	3.893
699	2452895	2452925	18	19	FFTFFFFFF	FT	0.542	0.526	0.024	0.069	3.867	3.957
699	2454395	2454425	18	19	FFTFFFFFF	FT	0.492	0.439	0.04	0.016	4.911	6.371
699	2451095	2451125	18	19	FFTFFFFFF	FT	0.677	0.674	0.154	0.252	3.081	3.1
699	2454365	2454395	17	18	FFTFFFFFF	FT	0.445	0.417	0.004	0.053	5.883	6.714
699	2452025	2452055	17	18	FFTFFFFFF	FT	0.549	0.513	0.158	0.242	3.872	4.658
699	2452025	2452055	18	19	FFTFFFFFF	FT	0.658	0.617	0.19	0.279	3.716	3.825
699	2451125	2451155	18	19	FFTFFFFFF	FT	0.697	0.679	0.118	0.229	2.948	3.158
699	2451725	2451755	16	17	FFTFFFFFF	FT	0.602	0.582	-0.125	0.226	3.592	4.008
699	2451755	2451785	16	17	FFTFFFFFF	FT	0.502	0.457	-0.222	0.167	4.232	5.38
699	2451785	2451815	16	17	FFTFFFFFF	FT	0.588	0.523	-0.166	0.278	4.068	3.894
699	2451875	2451905	18	19	FFTFFFFFF	FT	0.665	0.7	-0.132	0.369	3.517	3.468

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
699	2453225	2453255	17	18	FFTFFFFFF	FT	0.397	0.44	0.044	0.183	4.945	4.119
699	2452565	2452595	17	18	FFTFFFFFF	FT	0.436	0.394	-0.038	0.112	4.513	5.377
699	2451455	2451485	18	19	FFTFFFFFF	FT	0.661	0.831	-0.108	0.405	3.276	3.124
699	2451425	2451455	17	18	FFTFFFFFF	FT	0.572	0.758	-0.111	0.463	3.734	3.139
699	2454125	2454155	18	19	FFTFFFFFF	FT	0.645	0.647	0.164	0.236	3.202	3.359
699	2451245	2451275	18	19	FFTFFFFFF	FT	0.769	0.65	0.481	0.143	2.672	3.322
699	2451245	2451275	17	18	FFTFFFFFF	FT	0.696	0.598	0.408	0.166	2.919	3.754
699	2452775	2452805	19	20	FFTFFFFFF	FT	0.698	0.714	0.02	0.106	2.975	2.968
699	2452775	2452805	18	19	FFTFFFFFF	FT	0.582	0.601	-0.008	0.133	3.486	3.527
699	2450795	2450945	17	18	FFTFFFFFF	FT	0.602	0.597	0.111	0.123	3.622	3.71
699	2451305	2451335	18	19	FFTFFFFFF	FT	0.723	0.705	0.317	0.226	2.844	3.128
699	2451305	2451335	17	18	FFTFFFFFF	FT	0.639	0.647	0.281	0.244	3.091	3.505
699	2452385	2452415	17	18	FFTFFFFFF	FT	0.467	0.423	0.035	0.142	4.164	5.004
699	2454485	2454515	18	19	FFTFFFFFF	FT	0.48	0.428	0.059	-0.004	5.068	6.982
699	2452895	2452925	17	18	FFTFFFFFF	FT	0.405	0.392	0.01	0.054	5.434	5.445
699	2453045	2453075	18	19	FFTFFFFFF	FT	0.519	0.46	-0.129	-0.041	3.912	4.358
699	2453705	2453735	18	19	FFTFFFFFF	FT	0.603	0.578	0.129	0.124	3.494	3.65
699	2452355	2452385	17	18	FFTFFFFFF	FT	0.498	0.399	0.086	0.106	4.112	5.011
699	2452235	2452265	18	19	FFTFFFFFF	FT	0.58	0.548	-0.039	0.105	3.472	3.656
699	2453495	2453525	19	20	FFTFFFFFF	FT	0.724	0.702	0.111	0.199	2.882	2.973
699	2454515	2454545	18	19	FFTFFFFFF	FT	0.432	0.391	0.038	-0.04	6.481	8.334
699	2451035	2451065	17	18	FFTFFFFFF	FT	0.544	0.631	0.109	0.324	3.667	3.233
699	2450795	2450945	18	19	FFTFFFFFF	FT	0.757	0.724	0.147	0.123	3.109	3.134
699	2451335	2451365	17	18	FFTFFFFFF	FT	0.629	0.709	0.175	0.318	3.186	3.198
699	2452385	2452415	18	19	FFTFFFFFF	FT	0.586	0.558	0.013	0.184	3.336	3.61
699	2452985	2453015	19	20	FFTFFFFFF	FT	0.64	0.63	0.038	0.074	3.239	3.282

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
699	2453345	2453375	19	20	FFTFFFFFF	FT	0.729	0.67	0.207	0.167	3.023	3.109
699	2453435	2453465	18	19	FFTFFFFFF	FT	0.622	0.528	0.293	0.199	3.219	3.73
699	2452445	2452505	18	19	FFTFFFFFF	FT	0.576	0.529	-0.007	0.103	3.291	3.797
699	2453735	2453765	18	19	FFTFFFFFF	FT	0.563	0.516	0.101	0.047	3.64	4.036
699	2450795	2451095	19	20	FFTFFFFFF	FT	0.733	0.817	0.155	0.337	2.901	2.805
699	2451785	2451815	17	18	FFTFFFFFF	FT	0.675	0.61	-0.186	0.325	3.576	3.612
699	2453405	2453435	18	19	FFTFFFFFF	FT	0.632	0.513	0.317	0.168	3.273	3.933
699	2453405	2453435	19	20	FFTFFFFFF	FT	0.711	0.627	0.302	0.186	2.886	3.288
699	2453435	2453465	19	20	FFTFFFFFF	FT	0.734	0.652	0.303	0.208	2.834	3.129
699	2453675	2453705	19	20	FFTFFFFFF	FT	0.674	0.661	0.114	0.133	3.107	3.187
699	2454365	2454395	18	19	FFTFFFFFF	FT	0.536	0.501	0.013	0.045	4.385	4.883
699	2454455	2454485	19	20	FFTFFFFFF	FT	0.594	0.549	0.061	0.015	3.771	4.137
699	2450795	2453375	11	12	FFTFFFFFF	FT	0.323	0.309	-0.013	0.082	6.278	5.584
699	2453975	2454005	16	17	FFTFFFFFF	FT	0.329	0.395	0.044	0.219	7.136	4.193
699	2454095	2454125	18	19	FFTFFFFFF	FT	0.599	0.554	0.161	0.1	3.402	3.68
699	2452205	2452235	18	19	FFTFFFFFF	FT	0.548	0.519	-0.032	0.113	3.654	3.905
699	2452295	2452325	18	19	FFTFFFFFF	FT	0.533	0.488	0.001	0.104	3.658	3.865
699	2453885	2453945	18	19	FFTFFFFFF	FT	0.639	0.637	0.135	0.245	3.311	3.258
699	2452745	2452775	18	19	FFTFFFFFF	FT	0.524	0.507	-0.015	0.089	3.858	3.985
699	2452085	2452115	17	18	FFTFFFFFF	FT	0.572	0.522	-0.062	0.186	3.552	4.137
699	2453795	2453825	18	19	FFTFFFFFF	FT	0.579	0.524	0.086	0.088	3.552	3.91
699	2451275	2451305	17	18	FFTFFFFFF	FT	0.674	0.609	0.378	0.191	2.848	3.503
699	2452175	2452205	18	19	FFTFFFFFF	FT	0.554	0.5	-0.046	0.116	3.477	3.85
699	2451065	2451095	18	19	FFTFFFFFF	FT	0.655	0.774	0.168	0.388	3.136	2.859
699	2452085	2452115	18	19	FFTFFFFFF	FT	0.643	0.603	-0.066	0.172	3.317	3.487
699	2452115	2452145	18	19	FFTFFFFFF	FT	0.554	0.494	-0.018	0.126	3.478	4.036

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
699	2452655	2452685	19	20	FFTFFFFFF	FT	0.653	0.63	0.004	0.122	3.158	3.206
699	2452925	2452955	19	20	FFTFFFFFF	FT	0.658	0.643	0.033	0.058	3.17	3.19
699	2453105	2453135	18	19	FFTFFFFFF	FT	0.517	0.494	0.009	0.091	3.916	4.111
699	2453315	2453345	18	19	FFTFFFFFF	FT	0.608	0.588	0.161	0.192	3.489	3.505
699	2454065	2454095	18	19	FFTFFFFFF	FT	0.6	0.639	0.048	0.174	3.379	3.438
699	2452325	2452355	18	19	FFTFFFFFF	FT	0.554	0.497	0.009	0.121	3.723	3.923
699	2452235	2452265	17	18	FFTFFFFFF	FT	0.495	0.429	-0.003	0.096	4.138	4.532
699	2451845	2451875	18	19	FFTFFFFFF	FT	0.659	0.681	-0.091	0.361	3.821	3.406
699	2452385	2452415	19	20	FFTFFFFFF	FT	0.679	0.669	0.024	0.19	3.013	3.017
699	2452805	2452835	19	20	FFTFFFFFF	FT	0.686	0.705	0.011	0.109	2.979	3.066
699	2452985	2453105	20	21	FFTFFFFFF	FT	0.72	0.72	0.014	0.094	2.914	2.843
699	2450855	2454545	10	11	FFTFFFFFF	FT	0.352	0.642	0.008	0.145	4.775	4.302
699	2452415	2452445	18	19	FFTFFFFFF	FT	0.625	0.59	0.049	0.184	3.282	3.358
699	2453195	2453225	18	19	FFTFFFFFF	FT	0.567	0.584	0.004	0.13	3.523	3.636
699	2453225	2453255	18	19	FFTFFFFFF	FT	0.548	0.571	0.059	0.202	3.626	3.47
699	2453345	2453375	18	19	FFTFFFFFF	FT	0.617	0.578	0.214	0.139	3.391	3.552
699	2451665	2451695	17	18	FFFFFFFTF	FT	0.553	0.511	0.152	0.255	4.116	4.234
699	2452265	2452295	18	19	FFTFFFFFF	FT	0.551	0.524	-0.027	0.106	3.711	4.037
699	2452565	2452595	18	19	FFTFFFFFF	FT	0.54	0.512	-0.057	0.112	3.694	3.876
699	2453165	2453195	18	19	FFTFFFFFF	FT	0.6	0.608	0.152	0.237	3.41	3.254
699	2451905	2451935	19	20	FFTFFFFFF	FT	0.657	0.689	0.001	0.261	3.384	3.477
699	2453135	2453165	19	20	FFTFFFFFF	FT	0.645	0.653	0.079	0.127	3.177	3.104
699	2452535	2452565	17	18	FFTFFFFFF	FT	0.482	0.428	-0.013	0.122	4.072	4.596
699	2453945	2453975	16	17	FFTFFFFFF	FT	0.326	0.367	-0.003	0.164	6.586	5.024
699	2453615	2453645	18	19	FFTFFFFFF	FT	0.528	0.545	0.034	0.155	3.843	3.736
699	2451095	2451125	19	20	FFTFFFFFF	FT	0.732	0.735	0.199	0.263	2.856	2.955

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
699	2454455	2454485	18	19	FFTFFFFFF	FT	0.491	0.456	0.073	-0.011	4.497	5.828
699	2452535	2452565	18	19	FFTFFFFFF	FT	0.575	0.539	-0.014	0.133	3.391	3.608
699	2451515	2451545	18	19	FFTFFFFFF	FT	0.651	0.808	-0.052	0.405	3.1	3.343
699	2452865	2452895	17	18	FFTFFFFFF	FT	0.507	0.509	-0.021	0.064	4.234	3.952
699	2452145	2452175	17	18	FFTFFFFFF	FT	0.494	0.423	-0.041	0.118	3.989	4.75
699	2451275	2451305	18	19	FFTFFFFFF	FT	0.778	0.695	0.448	0.146	2.721	3.129
699	2451725	2451755	17	18	FFTFFFFFF	FT	0.697	0.682	-0.118	0.239	3.34	3.665
699	2452805	2452835	18	19	FFTFFFFFF	FT	0.587	0.587	-0.013	0.098	3.496	3.628
699	2452175	2452205	19	20	FFTFFFFFF	FT	0.657	0.63	-0.058	0.122	3.027	3.214
699	2452895	2452925	20	21	FFTFFFFFF	FT	0.752	0.765	0.082	0.1	2.942	2.923
699	2452865	2452925	19	20	FFTFFFFFF	FT	0.665	0.647	0.046	0.075	3.188	3.306
699	2450945	2450975	17	18	FFTFFFFFF	FT	0.573	0.593	0.045	0.148	3.946	3.832
699	2453255	2453285	18	19	FFTFFFFFF	FT	0.535	0.535	0.094	0.18	3.704	3.699
699	2451455	2451485	19	20	FFTFFFFFF	FT	0.749	0.894	-0.083	0.378	3.198	2.868
699	2453525	2453555	19	20	FFTFFFFFF	FT	0.744	0.712	0.139	0.222	2.979	2.994
699	2453525	2453555	18	19	FFTFFFFFF	FT	0.645	0.642	0.135	0.264	3.221	3.192
699	2451815	2451845	19	20	FFTFFFFFF	FT	0.764	0.781	-0.078	0.423	3.36	3.286
699	2452325	2452355	19	20	FFTFFFFFF	FT	0.666	0.644	-0.043	0.141	3.08	3.182
699	2452925	2452955	20	21	FFTFFFFFF	FT	0.762	0.755	0.021	0.078	2.738	2.881
699	2452505	2452535	17	18	FFTFFFFFF	FT	0.471	0.397	-0.015	0.105	3.935	5.021
699	2452025	2452055	19	20	FFTFFFFFF	FT	0.741	0.73	0.204	0.298	3.47	3.5
699	2453165	2453195	19	20	FFTFFFFFF	FT	0.696	0.702	0.143	0.227	3.043	2.968
699	2453615	2453645	19	20	FFTFFFFFF	FT	0.66	0.674	0.05	0.178	3.128	3.109
699	2454185	2454215	17	18	FFTFFFFFF	FT	0.561	0.519	0.226	0.236	3.404	3.987
699	2452625	2452655	18	19	FFTFFFFFF	FT	0.593	0.552	0.043	0.094	3.452	3.634
699	2453375	2453405	19	20	FFTFFFFFF	FT	0.711	0.663	0.264	0.149	2.898	3.1

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
699	2453645	2453675	18	19	FFTFFFFFF	FT	0.537	0.538	0.07	0.135	3.807	3.796
699	2453945	2453975	17	18	FFTFFFFFF	FT	0.423	0.43	0.003	0.149	5.18	4.86
699	2453855	2453885	19	20	FFTFFFFFF	FT	0.732	0.719	0.212	0.3	2.808	2.901
699	2453195	2453225	16	17	FFTFFFFFF	FT	0.328	0.358	-0.016	0.124	5.07	5.468
699	2451995	2452025	18	19	FFTFFFFFF	FT	0.672	0.596	0.236	0.266	3.552	3.757
699	2452715	2452745	18	19	FFTFFFFFF	FT	0.552	0.519	-0.101	0.02	3.641	3.996
699	2453825	2453855	18	19	FFTFFFFFF	FT	0.614	0.557	0.122	0.153	3.392	3.609
699	2453585	2453615	17	18	FFTFFFFFF	FT	0.388	0.406	0.014	0.118	5.139	4.916
699	2452055	2452085	18	19	FFTFFFFFF	FT	0.688	0.709	0.107	0.319	3.504	3.554
699	2451605	2451665	17	18	FFTFFFFFF	FT	0.53	0.503	0.119	0.258	4.304	4.025
699	2451755	2451785	17	18	FFTFFFFFF	FT	0.573	0.553	-0.179	0.2	3.714	3.843
699	2452595	2452625	19	27	FFTFFFFFF	FT	0.635	0.624	-0.05	0.093	3.314	3.477
699	2451185	2451215	19	20	FFTFFFFFF	FT	0.879	0.689	-0.273	-0.025	2.385	2.922
699	2452685	2452715	19	20	FFTFFFFFF	FT	0.669	0.641	0.088	0.145	3.044	3.253
699	2451665	2451695	19	20	FFTFFFFFF	FT	0.761	0.735	0.202	0.304	3.474	3.208
699	2453465	2453495	18	19	FFTFFFFFF	FT	0.615	0.559	0.213	0.213	3.366	3.582
699	2451305	2451395	19	20	FFTFFFFFF	FT	0.812	0.771	0.309	0.225	2.636	2.845
699	2451365	2451395	17	18	FFTFFFFFF	FT	0.553	0.772	0.004	0.466	3.282	2.878
699	2451395	2451425	17	18	FFTFFFFFF	FT	0.58	0.732	-0.06	0.422	3.432	3.169
699	2453855	2453885	18	19	FFTFFFFFF	FT	0.628	0.609	0.196	0.255	3.253	3.361
699	2451005	2451035	17	18	FFTFFFFFF	FT	0.6	0.644	0.146	0.304	3.45	3.454
699	2452955	2452985	19	20	FFTFFFFFF	FT	0.642	0.623	0.028	0.067	3.277	3.395
699	2453555	2453585	18	19	FFTFFFFFF	FT	0.596	0.619	0.04	0.194	3.437	3.436
699	2451215	2451245	18	19	FFTFFFFFF	FT	0.732	0.636	0.424	0.115	2.712	3.364
699	2452865	2452895	18	19	FFTFFFFFF	FT	0.651	0.69	-0.026	0.102	3.093	2.987
699	2453015	2453045	19	20	FFTFFFFFF	FT	0.626	0.623	0.003	0.066	3.248	3.336

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
699	2453945	2453975	18	19	FFTFFFFFF	FT	0.537	0.526	0.027	0.143	4.05	4.038
699	2454095	2454125	19	20	FFTFFFFFF	FT	0.694	0.668	0.159	0.129	3.041	3.123
699	2454125	2454155	19	20	FFTFFFFFF	FT	0.742	0.795	0.191	0.313	2.79	2.736
699	2454215	2454275	19	20	FFTFFFFFF	FT	0.756	0.765	0.218	0.29	2.78	2.802
699	2452745	2452775	19	20	FFTFFFFFF	FT	0.669	0.653	0.011	0.111	3.126	3.197
699	2454425	2454455	19	20	FFTFFFFFF	FT	0.617	0.549	0.065	0.031	3.854	4
699	2451875	2451905	19	20	FFTFFFFFF	FT	0.723	0.808	-0.228	0.423	3.3	3.244
699	2453765	2453795	19	20	FFTFFFFFF	FT	0.691	0.659	0.193	0.13	2.987	3.186
699	2454155	2454185	19	20	FFTFFFFFF	FT	0.745	0.698	0.261	0.224	2.797	2.943
699	2454185	2454215	19	20	FFTFFFFFF	FT	0.769	0.73	0.247	0.264	2.784	2.88
699	2452235	2452265	19	20	FFTFFFFFF	FT	0.649	0.64	-0.085	0.071	3.161	3.069
699	2453585	2453615	18	19	FFTFFFFFF	FT	0.527	0.53	0.014	0.145	3.851	3.672
699	2453795	2453825	19	20	FFTFFFFFF	FT	0.682	0.642	0.108	0.118	3.091	3.24
699	2452505	2452535	18	19	FFTFFFFFF	FT	0.584	0.529	-0.007	0.118	3.342	3.651
699	2452355	2452385	18	19	FFTFFFFFF	FT	0.601	0.521	0.071	0.133	3.334	3.855
699	2453705	2453735	19	20	FFTFFFFFF	FT	0.699	0.676	0.137	0.148	3.009	3.093
699	2453555	2453585	17	18	FFTFFFFFF	FT	0.462	0.493	0.025	0.209	4.534	3.729
699	2452265	2452295	19	20	FFTFFFFFF	FT	0.629	0.611	-0.083	0.107	3.167	3.278
699	2452295	2452325	19	20	FFTFFFFFF	FT	0.602	0.595	-0.05	0.126	3.192	3.253
699	2452235	2452445	20	21	FFTFFFFFF	FT	0.711	0.72	-0.061	0.163	2.91	2.901
699	2454425	2454455	20	21	FFTFFFFFF	FT	0.709	0.637	0.043	0.071	3.637	3.499
699	2451635	2451665	18	19	FFFFFFFTF	FT	0.634	0.593	0.204	0.297	3.806	3.734
699	2453075	2453105	18	19	FFTFFFFFF	FT	0.527	0.514	-0.023	0.1	4.084	4.105
699	2450975	2451005	17	18	FFTFFFFFF	FT	0.582	0.674	-0.034	0.26	3.343	3.188
699	2452145	2452175	18	19	FFTFFFFFF	FT	0.586	0.521	-0.044	0.119	3.39	3.811
699	2453315	2453345	19	20	FFTFFFFFF	FT	0.683	0.669	0.135	0.19	2.975	3.07

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
699	2453675	2453735	20	21	FFTFFFFFF	FT	0.768	0.773	0.167	0.137	2.741	2.719
699	2453285	2453315	19	20	FFTFFFFFF	FT	0.663	0.65	0.097	0.158	3.072	3.135
699	2450945	2451005	18	19	FFTFFFFFF	FT	0.678	0.723	0.041	0.184	3.733	3.205
699	2452205	2452235	19	20	FFTFFFFFF	FT	0.631	0.624	-0.056	0.128	3.145	3.232
699	2451935	2451965	19	20	FFTFFFFFF	FT	0.677	0.837	0.025	0.484	3.579	3.116
699	2451125	2451155	19	20	FFTFFFFFF	FT	0.771	0.722	0.087	0.215	2.763	3.099
699	2453075	2453105	19	20	FFTFFFFFF	FT	0.657	0.644	-0.006	0.141	3.263	3.259
699	2451635	2451665	19	22	FFFFFFFTF	FT	0.724	0.678	0.23	0.321	3.208	3.414
699	2453105	2453135	19	20	FFTFFFFFF	FT	0.66	0.626	0.022	0.107	3.138	3.258
699	2454185	2454215	18	19	FFTFFFFFF	FT	0.666	0.62	0.228	0.247	3.13	3.343
699	2452085	2452115	19	20	FFTFFFFFF	FT	0.67	0.637	-0.038	0.129	3.127	3.191
699	2453975	2454005	17	18	FFTFFFFFF	FT	0.411	0.457	0.055	0.215	5.054	4.127
699	2451005	2451035	18	19	FFTFFFFFF	FT	0.666	0.693	0.124	0.262	3.338	3.201
699	2451695	2451785	19	20	FFTFFFFFF	FT	0.786	0.763	0.021	0.266	3.198	3.35
699	2453045	2453075	19	20	FFTFFFFFF	FT	0.629	0.593	-0.098	0.004	3.215	3.549
699	2451245	2451275	19	20	FFTFFFFFF	FT	0.85	0.721	0.513	0.106	2.734	2.886
699	2451785	2451815	18	19	FFTFFFFFF	FT	0.795	0.722	-0.236	0.381	3.217	3.226
699	2454305	2454335	17	18	FFTFFFFFF	FT	0.4	0.448	-0.015	0.236	4.918	4.046
699	2454335	2454365	17	18	FFTFFFFFF	FT	0.429	0.447	0.046	0.162	4.455	4.296
699	2453375	2453435	20	21	FFTFFFFFF	FT	0.771	0.719	0.244	0.176	2.764	2.809
699	2451035	2451065	18	19	FFTFFFFFF	FT	0.634	0.717	0.164	0.331	3.566	2.87
699	2453975	2454005	18	19	FFTFFFFFF	FT	0.545	0.565	0.06	0.228	3.733	3.551
699	2452115	2452145	19	20	FFTFFFFFF	FT	0.66	0.614	-0.023	0.148	3.051	3.295
699	2454485	2454515	19	20	FFTFFFFFF	FT	0.606	0.544	0.075	0.026	3.933	4.091
699	2451515	2451575	19	20	FFTFFFFFF	FT	0.786	0.792	-0.144	0.235	2.724	3.164
699	2452415	2452475	19	20	FFTFFFFFF	FT	0.707	0.683	0.076	0.185	2.937	3.051

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
699	2454515	2454545	19	20	FFTFFFFFF	FT	0.575	0.544	0.034	0.012	3.802	3.93
699	2453195	2453225	17	18	FFTFFFFFF	FT	0.425	0.446	-0.012	0.119	4.662	4.288
699	2454065	2454095	19	20	FFTFFFFFF	FT	0.687	0.738	0.022	0.239	2.998	2.874
699	2451275	2451305	19	20	FFTFFFFFF	FT	0.834	0.775	0.48	0.137	2.839	3.068
699	2453825	2453855	19	20	FFTFFFFFF	FT	0.744	0.698	0.151	0.179	2.834	3.031
699	2453735	2453765	19	20	FFTFFFFFF	FT	0.667	0.636	0.1	0.057	3.096	3.272
699	2452685	2452715	20	21	FFTFFFFFF	FT	0.751	0.731	0.029	0.17	2.698	2.88
699	2453885	2453945	19	20	FFTFFFFFF	FT	0.756	0.741	0.159	0.221	2.764	2.802
699	2452535	2452565	19	20	FFTFFFFFF	FT	0.687	0.648	-0.022	0.146	2.958	3.197
699	2453255	2453285	19	20	FFTFFFFFF	FT	0.668	0.661	0.094	0.202	3.065	3.046
699	2451485	2451515	19	20	FFTFFFFFF	FT	0.735	0.772	-0.044	0.238	2.943	2.985
699	2451335	2451365	18	19	FFTFFFFFF	FT	0.712	0.763	0.268	0.301	2.982	3.226
699	2451995	2452025	19	20	FFTFFFFFF	FT	0.773	0.728	0.251	0.315	3.35	3.284
699	2451725	2451755	18	19	FFTFFFFFF	FT	0.784	0.78	-0.165	0.18	3.137	3.329
699	2452625	2452655	19	20	FFTFFFFFF	FT	0.67	0.625	-0.032	0.064	3.214	3.487
699	2451155	2451185	19	20	FFTFFFFFF	FT	0.847	0.686	-0.276	-0.023	2.509	3.057
699	2451965	2451995	19	20	FFTFFFFFF	FT	0.743	0.697	0.261	0.32	3.494	3.284
699	2451395	2451425	18	19	FFTFFFFFF	FT	0.662	0.801	0.08	0.431	3.068	2.938
699	2454395	2454425	19	20	FFTFFFFFF	FT	0.611	0.554	0.035	0.035	3.828	4.094
699	2454455	2454485	20	21	FFTFFFFFF	FT	0.696	0.644	0.039	0.065	3.399	3.824
699	2451425	2451455	18	19	FFTFFFFFF	FT	0.654	0.836	-0.004	0.473	3.202	2.88
699	2454515	2454545	20	21	FFTFFFFFF	FT	0.716	0.694	0.043	0.06	3.215	3.474
699	2451365	2451395	18	19	FFTFFFFFF	FT	0.627	0.822	0.128	0.455	3.225	2.745
699	2451215	2451245	19	20	FFTFFFFFF	FT	0.801	0.675	0.438	0.087	2.529	3.13
699	2454005	2454035	19	20	FFTFFFFFF	FT	0.683	0.679	0.08	0.191	3.043	2.978
699	2454365	2454395	19	20	FFTFFFFFF	FT	0.646	0.593	0.01	0.037	3.599	3.788

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
699	2451845	2451875	19	20	FFTFFFFFF	FT	0.72	0.73	-0.186	0.34	3.513	3.308
699	2451605	2451635	18	19	FFFFFFFTF	FT	0.581	0.596	0.136	0.315	3.631	3.722
699	2454395	2454425	20	21	FFTFFFFFF	FT	0.715	0.678	0.026	0.085	3.292	3.318
699	2453645	2453675	19	20	FFTFFFFFF	FT	0.675	0.67	0.082	0.137	3.143	3.083
699	2451755	2451785	18	19	FFTFFFFFF	FT	0.711	0.677	-0.2	0.244	3.252	3.502
699	2452475	2452505	19	20	FFTFFFFFF	FT	0.683	0.634	0.02	0.092	2.982	3.244
699	2451785	2451815	19	20	FFTFFFFFF	FT	0.888	0.813	-0.337	0.38	2.993	3.119
699	2452565	2452595	19	20	FFTFFFFFF	FT	0.648	0.654	-0.101	0.143	3.062	3.369
699	2451395	2451455	19	20	FFTFFFFFF	FT	0.718	0.893	0.054	0.457	3.022	2.859
699	2452955	2452985	20	21	FFTFFFFFF	FT	0.737	0.746	0.025	0.105	2.741	2.934
699	2452355	2452385	19	20	FFTFFFFFF	FT	0.683	0.645	0.062	0.163	2.986	3.139
699	2451665	2451695	18	19	FFFFFFFTF	FT	0.63	0.642	0.157	0.32	3.672	3.598
699	2452055	2452085	19	20	FFTFFFFFF	FT	0.775	0.76	0.112	0.33	3.031	3.209
699	2452505	2452535	19	20	FFTFFFFFF	FT	0.703	0.662	-0.001	0.141	2.887	3.065
699	2453225	2453255	19	20	FFTFFFFFF	FT	0.667	0.671	0.088	0.201	3.112	3.01
699	2452715	2452745	19	20	FFTFFFFFF	FT	0.686	0.654	-0.075	0.04	3.013	3.2
699	2451635	2451665	18	19	FFTFFFFFF	FT	0.659	0.636	0.186	0.318	3.728	3.848
699	2452475	2452685	20	21	FFTFFFFFF	FT	0.735	0.704	-0.027	0.126	3.127	3.169
699	2454485	2454515	20	21	FFTFFFFFF	FT	0.712	0.673	0.075	0.056	3.545	3.672
699	2454335	2454365	18	19	FFTFFFFFF	FT	0.561	0.561	0.025	0.172	3.628	3.531
699	2454305	2454395	20	21	FFTFFFFFF	FT	0.765	0.732	0.011	0.076	3.238	3.144
699	2452715	2452745	20	21	FFTFFFFFF	FT	0.756	0.767	-0.015	0.04	2.663	2.861
699	2452145	2452235	20	21	FFTFFFFFF	FT	0.727	0.733	-0.052	0.09	2.869	2.987
699	2452745	2452835	20	21	FFTFFFFFF	FT	0.759	0.768	0.026	0.136	2.741	2.674
699	2453765	2453795	20	21	FFTFFFFFF	FT	0.766	0.757	0.162	0.133	2.67	2.807
699	2453585	2453615	19	20	FFTFFFFFF	FT	0.676	0.673	0.021	0.175	3.014	3.042

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
699	2452145	2452175	19	20	FFTFFFFFF	FT	0.675	0.628	-0.045	0.127	2.996	3.211
699	2453285	2453375	20	21	FFTFFFFFF	FT	0.773	0.723	0.165	0.136	2.885	2.779
699	2454335	2454365	19	20	FFTFFFFFF	FT	0.68	0.681	0.019	0.204	3.037	3.005
699	2453735	2453765	20	21	FFTFFFFFF	FT	0.734	0.728	0.069	0.054	2.825	2.913
699	2450795	2452085	20	21	FFTFFFFFF	FT	0.821	0.829	0.012	0.331	3.129	3.066
699	2453465	2453495	19	20	FFTFFFFFF	FT	0.726	0.671	0.221	0.227	2.934	3.032
699	2454305	2454335	18	19	FFTFFFFFF	FT	0.529	0.562	-0.019	0.256	3.677	3.255
699	2453975	2454005	19	20	FFTFFFFFF	FT	0.685	0.69	0.06	0.232	3.058	3.001
699	2453435	2453585	20	21	FFTFFFFFF	FT	0.802	0.754	0.241	0.196	2.595	2.78
699	2453915	2454035	20	21	FFTFFFFFF	FT	0.795	0.775	0.074	0.24	2.698	2.709
699	2451665	2451695	19	20	FFFFFFFTF	FT	0.67	0.695	0.176	0.324	3.204	3.169
699	2453795	2453915	20	21	FFTFFFFFF	FT	0.774	0.765	0.137	0.184	2.691	2.822
699	2453945	2453975	19	20	FFTFFFFFF	FT	0.68	0.654	0.053	0.149	3.11	3.119
699	2453195	2453225	19	20	FFTFFFFFF	FT	0.679	0.676	-0.014	0.18	2.847	3.101
699	2451605	2451635	19	20	FFFFFFFTF	FT	0.692	0.696	0.187	0.334	3.301	3.488
699	2453555	2453585	19	20	FFTFFFFFF	FT	0.689	0.705	0.067	0.159	3.099	3.043
699	2452085	2452145	20	21	FFTFFFFFF	FT	0.708	0.709	-0.023	0.136	2.847	3.064
699	2454305	2454335	19	20	FFTFFFFFF	FT	0.658	0.697	-0.026	0.283	3.019	2.838
699	2454065	2454155	20	21	FFTFFFFFF	FT	0.796	0.828	0.106	0.262	2.616	2.586
699	2453585	2453675	20	21	FFTFFFFFF	FT	0.752	0.775	0.101	0.134	2.744	2.814
699	2451635	2451665	19	20	FFTFFFFFF	FT	0.772	0.711	0.258	0.317	3.304	3.279
699	2453105	2453225	20	21	FFTFFFFFF	FT	0.759	0.744	0.067	0.145	2.773	2.813
699	2453225	2453285	20	21	FFTFFFFFF	FT	0.727	0.767	0.088	0.229	2.757	2.745
699	2451605	2451635	18	19	FFTFFFFFF	FT	0.614	0.668	0.131	0.353	3.523	3.479
699	2454155	2454275	20	21	FFTFFFFFF	FT	0.826	0.81	0.288	0.253	2.555	2.635
699	2451605	2451635	19	20	FFTFFFFFF	FT	0.716	0.754	0.18	0.377	3.309	3.264

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
701	2453675	2454275	18	19	FFTFFFFFF	FT	0.412	0.334	-0.02	-0.025	5.889	7.639
701	2450915	2454155	17	18	FFTFFFFFF	FT	0.429	0.404	-0.032	-0.002	6.119	7.428
701	2454335	2454905	18	19	FFTFFFFFF	FT	0.404	0.338	0.035	0.022	5.907	6.404
701	2453465	2453675	18	19	FFTFFFFFF	FT	0.449	0.448	-0.017	0.028	5.227	4.71
701	2454335	2454905	19	20	FFTFFFFFF	FT	0.493	0.383	0.031	0.038	4.595	5.461
701	2450945	2454245	19	20	FFTFFFFFF	FT	0.527	0.483	-0.018	-0.005	4.973	5.621
701	2450915	2453465	18	19	FFTFFFFFF	FT	0.559	0.527	-0.038	-0.059	5.712	5.944
701	2450945	2454815	16	17	FFTFFFFFF	FT	0.396	0.363	0.008	0	7.739	10.345
701	2450945	2454905	20	21	FFTFFFFFF	FT	0.601	0.513	0.008	0.044	4.256	4.866
701	2454215	2454905	17	18	FFTFFFFFF	FT	0.381	0.341	0.044	0.01	5.837	8.35
703	2453285	2453345	15	16	FFTFFFFFF	FT	0.318	0.404	-0.065	-0.258	9.494	4.343
703	2454035	2454065	15	16	FFTFFFFFF	FT	0.311	0.274	-0.076	0.027	8.163	12.232
703	2454065	2454155	13	14	FFTFFFFFF	FT	0.234	0.204	-0.047	-0.015	5.288	13.13
703	2454065	2454125	14	15	FFTFFFFFF	FT	0.285	0.243	-0.083	-0.019	8.814	14.127
703	2453165	2453225	17	18	FFTFFFFFF	FT	0.603	0.605	-0.188	0.13	3.346	3.821
703	2453165	2453225	16	17	FFTFFFFFF	FT	0.519	0.524	-0.132	0.157	4.515	4.715
703	2453375	2453405	16	17	FFTFFFFFF	FT	0.497	0.448	-0.3	-0.165	3.617	4.934
703	2453615	2453645	17	18	FFTFFFFFF	FT	0.476	0.473	-0.156	0.121	4.333	5.23
703	2453645	2453675	16	17	FFTFFFFFF	FT	0.378	0.349	-0.141	0.064	5.81	8.838
703	2453675	2453705	16	17	FFTFFFFFF	FT	0.388	0.365	-0.121	0.032	6.195	8.764
703	2453705	2453735	15	16	FFTFFFFFF	FT	0.321	0.295	-0.116	0.008	6.609	11.618
703	2453735	2453765	15	16	FFTFFFFFF	FT	0.338	0.307	-0.135	0.002	7.248	11.959
703	2453765	2453795	15	16	FFTFFFFFF	FT	0.37	0.287	-0.14	-0.023	6.751	13.704
703	2454095	2454125	17	18	FFTFFFFFF	FT	0.469	0.448	-0.178	0.004	4.332	5.574
703	2454095	2454125	16	17	FFTFFFFFF	FT	0.399	0.354	-0.147	-0.005	6.165	8.849
703	2454155	2454185	15	16	FFTFFFFFF	FT	0.346	0.256	-0.149	-0.007	6.158	9.972

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
703	2454155	2454305	14	15	FFTFFFFFF	FT	0.3	0.246	-0.118	-0.006	8.389	14.183
703	2454605	2454875	14	15	FFTFFFFFF	FT	0.293	0.276	-0.043	0.052	7.417	11.306
703	2454755	2454785	15	16	FFTFFFFFF	FT	0.313	0.305	-0.04	0.088	7.108	9.858
703	2454785	2454845	15	16	FFTFFFFFF	FT	0.321	0.283	-0.088	0.058	8.195	11.499
703	2454845	2454875	16	17	FFTFFFFFF	FT	0.391	0.343	-0.137	0.01	5.681	7.588
703	2453615	2453945	12	13	FFTFFFFFF	FT	0.348	0.287	-0.037	-0.078	7.162	11.551
703	2453705	2453765	14	15	FFTFFFFFF	FT	0.318	0.271	-0.095	-0.009	9.898	15.107
703	2454455	2454695	12	13	FFTFFFFFF	FT	0.322	0.278	0.003	-0.109	6.562	8.702
703	2454425	2454665	13	14	FFTFFFFFF	FT	0.265	0.206	-0.066	-0.014	5.894	13.393
703	2451485	2451515	17	18	FFFFFFFTF	FT	0.408	0.375	-0.078	0.078	6.006	6.226
703	2451515	2451575	17	18	FFFFFFFTF	FT	0.4	0.392	-0.072	0.052	5.43	5.692
703	2452235	2452355	17	18	FFTFFFFFF	FT	0.449	0.435	-0.064	0.116	4.706	5.224
703	2451065	2452775	16	17	FFTFFFFFF	FT	0.585	0.623	-0.047	0.113	3.837	4.084
703	2453345	2453375	16	17	FFTFFFFFF	FT	0.44	0.475	-0.222	-0.283	4.438	4.214
703	2453825	2453855	16	17	FFTFFFFFF	FT	0.463	0.366	-0.237	0.061	4.708	8.173
703	2453855	2453885	17	18	FFTFFFFFF	FT	0.537	0.468	-0.25	0.109	3.726	4.949
703	2454665	2454695	17	18	FFTFFFFFF	FT	0.478	0.435	-0.178	0.102	4.136	5.457
703	2453855	2453945	15	16	FFTFFFFFF	FT	0.384	0.326	-0.151	0.065	5.697	10.595
703	2454065	2454095	15	16	FFTFFFFFF	FT	0.343	0.299	-0.102	0.018	7.426	10.285
703	2451485	2451515	9	17	FFFFFFFTF	FT	0.33	0.303	-0.075	0.094	9.428	9.58
703	2452955	2452985	16	17	FFTFFFFFF	FT	0.532	0.507	-0.211	-0.022	3.711	5.183
703	2453075	2453105	15	16	FFTFFFFFF	FT	0.438	0.464	-0.08	0.155	5.225	5.544
703	2453105	2453135	16	17	FFTFFFFFF	FT	0.498	0.504	-0.11	0.109	4.425	4.726
703	2453135	2453165	17	18	FFTFFFFFF	FT	0.569	0.572	-0.13	0.054	3.621	4.038
703	2453165	2453225	18	19	FFTFFFFFF	FT	0.698	0.664	-0.197	0.083	2.929	3.209
703	2453375	2453405	17	18	FFTFFFFFF	FT	0.584	0.488	-0.362	-0.111	3.258	4.37

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
703	2453465	2453495	16	17	FFTFFFFFF	FT	0.439	0.407	-0.215	0.099	4.998	6.307
703	2453495	2453525	15	16	FFTFFFFFF	FT	0.397	0.402	-0.17	0.091	6.179	7.791
703	2453495	2453525	16	17	FFTFFFFFF	FT	0.461	0.434	-0.197	0.104	4.988	6.136
703	2453975	2454035	14	15	FFTFFFFFF	FT	0.286	0.255	-0.078	0.085	7.837	15.711
703	2454035	2454065	14	15	FFTFFFFFF	FT	0.26	0.202	-0.075	0.013	9.928	11.614
703	2454065	2454095	16	17	FFTFFFFFF	FT	0.391	0.356	-0.135	0.02	6.405	8.439
703	2454125	2454155	16	17	FFTFFFFFF	FT	0.394	0.352	-0.162	-0.016	5.99	9.952
703	2454125	2454155	17	18	FFTFFFFFF	FT	0.466	0.433	-0.176	0.003	4.456	5.887
703	2454365	2454395	17	18	FFTFFFFFF	FT	0.438	0.486	-0.094	0.234	4.492	4.277
703	2454365	2454395	18	19	FFTFFFFFF	FT	0.547	0.593	-0.099	0.289	3.469	3.442
703	2454425	2454455	16	17	FFTFFFFFF	FT	0.402	0.354	-0.152	0.067	5.398	8.549
703	2454485	2454515	15	16	FFTFFFFFF	FT	0.325	0.264	-0.115	-0.003	5.87	12.08
703	2452925	2452985	15	16	FFTFFFFFF	FT	0.505	0.489	-0.196	0.015	4.123	5.31
703	2451605	2453255	13	14	FFTFFFFFF	FT	0.392	0.421	-0.061	0.082	6.047	6.734
703	2453975	2454065	13	14	FFTFFFFFF	FT	0.272	0.229	-0.04	0.056	8.646	13.069
703	2454125	2454155	14	15	FFTFFFFFF	FT	0.283	0.232	-0.082	-0.047	7.224	14.538
703	2454335	2454365	15	16	FFTFFFFFF	FT	0.312	0.343	-0.082	0.178	6.032	6.438
703	2454365	2454395	15	16	FFTFFFFFF	FT	0.293	0.301	-0.054	0.11	7.701	9.571
703	2454395	2454545	14	15	FFTFFFFFF	FT	0.285	0.225	-0.083	0.001	8.506	12.26
703	2454545	2454605	14	15	FFTFFFFFF	FT	0.322	0.246	-0.134	0.036	6.231	20.102
703	2454575	2454665	15	16	FFTFFFFFF	FT	0.367	0.308	-0.164	0.07	5.826	10.847
703	2453045	2453255	14	15	FFTFFFFFF	FT	0.382	0.419	-0.055	0.091	6.306	6.989
703	2454125	2454155	15	16	FFTFFFFFF	FT	0.333	0.289	-0.144	-0.019	7.348	11.826
703	2452775	2452805	16	17	FFTFFFFFF	FT	0.671	0.648	-0.052	0.097	3.035	3.369
703	2453225	2453255	16	17	FFTFFFFFF	FT	0.482	0.497	-0.2	0.015	3.981	4.956
703	2453705	2453735	16	17	FFTFFFFFF	FT	0.396	0.378	-0.152	0.035	5.224	9.102

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
703	2454365	2454395	16	17	FFTFFFFFFF	FT	0.355	0.384	-0.083	0.168	6.733	6.174
703	2454395	2454425	15	16	FFTFFFFFFF	FT	0.322	0.283	-0.064	0.08	7.315	9.858
703	2454425	2454455	15	16	FFTFFFFFFF	FT	0.341	0.304	-0.071	0.04	8.771	13.456
703	2454545	2454575	15	16	FFTFFFFFFF	FT	0.355	0.269	-0.153	0.048	5.846	10.982
703	2454875	2455085	14	15	FFTFFFFFFF	FT	0.293	0.259	-0.082	0.029	7.008	10.635
703	2453345	2453375	15	16	FFTFFFFFFF	FT	0.375	0.429	-0.175	-0.287	5.359	3.786
703	2453285	2453495	14	15	FFTFFFFFFF	FT	0.301	0.336	-0.12	-0.14	6.81	6.72
703	2453525	2453585	15	16	FFTFFFFFFF	FT	0.434	0.381	-0.167	0.082	6.305	7.817
703	2454335	2454425	13	14	FFTFFFFFFF	FT	0.242	0.22	-0.005	0.039	5	10.772
703	2454515	2454545	15	16	FFTFFFFFFF	FT	0.326	0.248	-0.141	0.011	6.738	8.163
703	2454545	2454575	16	17	FFTFFFFFFF	FT	0.42	0.373	-0.203	0.1	4.602	7.115
703	2454845	2454875	15	16	FFTFFFFFFF	FT	0.31	0.264	-0.093	-0.024	5.917	8.74
703	2454935	2455085	15	16	FFTFFFFFFF	FT	0.37	0.317	-0.13	0.119	5.789	6.845
703	2453495	2453525	17	18	FFTFFFFFFF	FT	0.54	0.506	-0.239	0.133	3.715	4.685
703	2453735	2453765	17	18	FFTFFFFFFF	FT	0.474	0.443	-0.199	0.043	4.218	5.665
703	2453735	2453765	16	17	FFTFFFFFFF	FT	0.391	0.364	-0.165	0.017	5.154	8.702
703	2454485	2454515	16	17	FFTFFFFFFF	FT	0.387	0.323	-0.169	0.023	5.775	9.981
703	2454515	2454545	16	17	FFTFFFFFFF	FT	0.403	0.325	-0.189	0.033	5.389	8.954
703	2454815	2454845	16	17	FFTFFFFFFF	FT	0.393	0.364	-0.166	0.052	5.333	7.76
703	2454905	2454935	15	16	FFTFFFFFFF	FT	0.319	0.305	-0.118	0.026	4.612	13.485
703	2454335	2454455	12	13	FFTFFFFFFF	FT	0.314	0.283	0.013	-0.088	4.235	7.801
703	2453135	2453255	15	16	FFTFFFFFFF	FT	0.397	0.426	-0.081	0.073	6.156	6.281
703	2453975	2454125	12	13	FFTFFFFFFF	FT	0.307	0.251	-0.007	-0.036	5.325	13.413
703	2454815	2455085	13	14	FFTFFFFFFF	FT	0.3	0.212	-0.045	-0.012	7.13	9.499
703	2453405	2453585	13	14	FFTFFFFFFF	FT	0.282	0.259	-0.096	0.005	8.054	15.325
703	2453495	2453585	14	15	FFTFFFFFFF	FT	0.347	0.328	-0.108	0.045	6.723	13.011

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
703	2454335	2454395	14	15	FFTFFFFFFF	FT	0.273	0.271	-0.03	0.101	9.98	9.044
703	2453465	2453495	15	16	FFTFFFFFFF	FT	0.367	0.367	-0.147	0.051	6.51	8.858
703	2453525	2453555	16	17	FFTFFFFFFF	FT	0.498	0.442	-0.199	0.094	4.76	6.451
703	2454755	2454785	16	17	FFTFFFFFFF	FT	0.374	0.366	-0.052	0.101	6.186	7.38
703	2451335	2452805	15	16	FFTFFFFFFF	FT	0.625	0.62	-0.052	0.057	3.865	3.861
703	2453405	2453435	16	17	FFTFFFFFFF	FT	0.363	0.344	-0.157	0.007	7.584	9.369
703	2453435	2453465	16	17	FFTFFFFFFF	FT	0.418	0.384	-0.194	0.075	5.505	7.241
703	2453435	2453465	17	18	FFTFFFFFFF	FT	0.491	0.464	-0.211	0.088	4.288	5.065
703	2453465	2453495	17	18	FFTFFFFFFF	FT	0.523	0.489	-0.252	0.109	3.92	4.821
703	2453645	2453675	17	18	FFTFFFFFFF	FT	0.463	0.42	-0.186	0.061	4.467	5.694
703	2453795	2453825	15	16	FFTFFFFFFF	FT	0.368	0.282	-0.178	-0.012	7.099	9.606
703	2453855	2453885	16	17	FFTFFFFFFF	FT	0.471	0.4	-0.211	0.09	4.78	7.485
703	2453675	2453705	15	16	FFTFFFFFFF	FT	0.329	0.302	-0.085	0.024	7.131	11.637
703	2453675	2453705	14	15	FFTFFFFFFF	FT	0.258	0.233	-0.054	0.027	8.649	14.893
703	2454095	2454125	15	16	FFTFFFFFFF	FT	0.337	0.309	-0.095	-0.025	8.12	14.007
703	2453615	2453945	13	14	FFTFFFFFFF	FT	0.267	0.212	-0.061	0	9.073	19.659
703	2451485	2453045	14	15	FFTFFFFFFF	FT	0.468	0.475	-0.109	0.068	4.891	5.177
703	2453375	2453435	15	16	FFTFFFFFFF	FT	0.397	0.363	-0.224	-0.134	5.198	6.037
703	2452715	2452745	17	18	FFTFFFFFFF	FT	0.742	0.873	-0.127	0.263	2.603	2.542
703	2453105	2453135	15	16	FFTFFFFFFF	FT	0.454	0.474	-0.08	0.116	5.352	5.248
703	2454875	2454905	15	16	FFTFFFFFFF	FT	0.318	0.283	-0.108	-0.013	7.512	15.271
703	2454935	2454965	16	17	FFTFFFFFFF	FT	0.427	0.381	-0.206	0.142	4.646	6.125
703	2454965	2455025	16	17	FFTFFFFFFF	FT	0.443	0.398	-0.224	0.16	3.871	5.215
703	2454005	2454035	15	16	FFTFFFFFFF	FT	0.314	0.301	-0.091	0.074	7.978	12.085
703	2454155	2454305	13	14	FFTFFFFFFF	FT	0.286	0.185	-0.1	-0.024	7.149	10.103
703	2451245	2451635	13	15	FFFFFFFFTF	FT	0.273	0.32	-0.014	0.088	12.26	10.794

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
703	2453615	2453675	14	15	FFTFFFFFF	FT	0.281	0.275	-0.076	0.056	7.451	15.473
703	2454665	2454815	13	14	FFTFFFFFF	FT	0.267	0.236	-0.023	0.07	9.749	12.859
703	2452745	2452775	17	18	FFTFFFFFF	FT	0.75	0.698	-0.044	0.094	2.857	3.03
703	2452775	2452805	17	18	FFTFFFFFF	FT	0.756	0.682	0.005	0.077	2.86	2.996
703	2453345	2453375	17	18	FFTFFFFFF	FT	0.514	0.519	-0.263	-0.256	3.621	3.993
703	2454875	2454905	16	17	FFTFFFFFF	FT	0.381	0.335	-0.147	0.038	5.555	8.777
703	2454905	2454935	17	18	FFTFFFFFF	FT	0.503	0.468	-0.25	0.126	3.74	4.798
703	2454905	2454935	16	17	FFTFFFFFF	FT	0.418	0.376	-0.19	0.071	4.653	8.014
703	2453765	2453825	14	15	FFTFFFFFF	FT	0.292	0.236	-0.096	-0.029	6.831	13.061
703	2453825	2453945	14	15	FFTFFFFFF	FT	0.334	0.259	-0.145	0.023	5.952	13.649
703	2453135	2453165	16	17	FFTFFFFFF	FT	0.468	0.475	-0.078	0.099	4.456	5.524
703	2453825	2453855	15	16	FFTFFFFFF	FT	0.391	0.308	-0.2	0.011	5.994	12.186
703	2454425	2454455	17	18	FFTFFFFFF	FT	0.467	0.452	-0.172	0.108	4.173	5.564
703	2454725	2454755	16	17	FFTFFFFFF	FT	0.365	0.458	0.016	0.207	5.995	5.305
703	2453075	2453105	18	19	FFTFFFFFF	FT	0.621	0.603	-0.123	0.177	3.284	3.449
703	2453435	2453465	15	16	FFTFFFFFF	FT	0.352	0.325	-0.155	0.054	6.336	9.098
703	2454035	2454065	16	17	FFTFFFFFF	FT	0.374	0.351	-0.1	0.05	7.168	8.681
703	2454065	2454095	17	18	FFTFFFFFF	FT	0.469	0.461	-0.165	0.037	4.361	5.196
703	2454395	2454425	17	18	FFTFFFFFF	FT	0.451	0.445	-0.157	0.168	4.234	4.948
703	2454395	2454425	16	17	FFTFFFFFF	FT	0.379	0.36	-0.123	0.121	5.637	6.397
703	2454455	2454485	16	17	FFTFFFFFF	FT	0.394	0.347	-0.15	0.054	5.919	8.264
703	2454455	2454485	15	16	FFTFFFFFF	FT	0.325	0.269	-0.122	-0.009	6.045	10.927
703	2454575	2454605	17	18	FFTFFFFFF	FT	0.549	0.505	-0.281	0.193	3.384	4.274
703	2454575	2454605	18	19	FFTFFFFFF	FT	0.651	0.619	-0.303	0.235	2.95	3.323
703	2452985	2453015	16	17	FFTFFFFFF	FT	0.56	0.49	-0.205	0.07	3.697	4.501
703	2453705	2453735	17	18	FFTFFFFFF	FT	0.479	0.458	-0.189	0.062	4.177	5.23

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
703	2454515	2454545	17	18	FFTFFFFFF	FT	0.48	0.426	-0.221	0.093	4.001	5.57
703	2454545	2454575	17	18	FFTFFFFFF	FT	0.515	0.467	-0.241	0.139	3.641	4.862
703	2454755	2454785	17	18	FFTFFFFFF	FT	0.455	0.464	-0.059	0.136	4.696	4.949
703	2453015	2453075	15	16	FFTFFFFFF	FT	0.479	0.444	-0.075	0.07	5.22	5.173
703	2454125	2454305	12	13	FFTFFFFFF	FT	0.345	0.237	-0.057	-0.034	5.78	7.864
703	2453645	2453675	15	16	FFTFFFFFF	FT	0.326	0.298	-0.107	0.062	7.49	11.181
703	2453675	2453705	17	18	FFTFFFFFF	FT	0.459	0.432	-0.153	0.058	4.603	5.689
703	2453975	2454005	16	17	FFTFFFFFF	FT	0.376	0.36	-0.131	0.117	6.192	7.879
703	2453285	2453405	13	14	FFTFFFFFF	FT	0.31	0.362	-0.088	-0.264	7.466	2.62
703	2453015	2453045	16	17	FFTFFFFFF	FT	0.49	0.489	-0.12	0.084	4.786	5.056
703	2453615	2453645	16	17	FFTFFFFFF	FT	0.397	0.394	-0.142	0.124	5.865	8.093
703	2454785	2454815	16	17	FFTFFFFFF	FT	0.381	0.367	-0.122	0.091	5.803	6.844
703	2453795	2453825	16	17	FFTFFFFFF	FT	0.417	0.355	-0.208	0.025	5.042	8.407
703	2453015	2453045	17	18	FFTFFFFFF	FT	0.539	0.513	-0.152	0.057	3.875	4.261
703	2453015	2453045	18	19	FFTFFFFFF	FT	0.613	0.585	-0.166	0.049	3.342	3.621
703	2453045	2453075	18	19	FFTFFFFFF	FT	0.591	0.564	-0.131	0.07	3.367	3.799
703	2453045	2453075	17	18	FFTFFFFFF	FT	0.51	0.474	-0.102	0.086	4.434	5.131
703	2453465	2453495	18	19	FFTFFFFFF	FT	0.617	0.593	-0.267	0.117	3.143	3.516
703	2453495	2453525	18	19	FFTFFFFFF	FT	0.621	0.598	-0.267	0.118	3.098	3.502
703	2453885	2453945	16	17	FFTFFFFFF	FT	0.436	0.41	-0.183	0.098	4.847	8.122
703	2454215	2454245	16	17	FFTFFFFFF	FT	0.44	0.387	-0.199	0.087	4.765	7.387
703	2454245	2454305	16	17	FFTFFFFFF	FT	0.451	0.429	-0.175	0.107	4.673	6.249
703	2454455	2454485	17	18	FFTFFFFFF	FT	0.463	0.435	-0.174	0.096	4.297	5.437
703	2454215	2454305	15	16	FFTFFFFFF	FT	0.369	0.328	-0.151	0.061	6.591	9.401
703	2454695	2455085	12	13	FFTFFFFFF	FT	0.327	0.294	0.022	-0.082	4.61	8.921
703	2453615	2453645	15	16	FFTFFFFFF	FT	0.347	0.359	-0.089	0.122	6.811	10.328

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
703	2453765	2453795	16	17	FFTFFFFFFF	FT	0.414	0.344	-0.186	0.02	5.14	8.991
703	2453765	2453795	17	18	FFTFFFFFFF	FT	0.478	0.431	-0.215	0.055	4.091	5.808
703	2454665	2454755	15	16	FFTFFFFFFF	FT	0.324	0.352	-0.009	0.159	8.016	7.426
703	2453975	2454005	15	16	FFTFFFFFFF	FT	0.333	0.331	-0.083	0.105	7.123	9.408
703	2452955	2452985	17	18	FFTFFFFFFF	FT	0.602	0.584	-0.218	-0.103	3.404	3.956
703	2454005	2454035	17	18	FFTFFFFFFF	FT	0.46	0.454	-0.162	0.102	4.387	5.496
703	2454815	2454845	17	18	FFTFFFFFFF	FT	0.459	0.451	-0.183	0.094	4.375	4.838
703	2452235	2453195	12	13	FFTFFFFFFF	FT	0.385	0.457	-0.033	0.08	5.272	6.509
703	2453225	2453585	12	13	FFTFFFFFFF	FT	0.333	0.353	-0.041	-0.158	4.992	5.883
703	2453705	2453735	18	19	FFTFFFFFFF	FT	0.57	0.558	-0.211	0.088	3.394	3.795
703	2453735	2453765	18	19	FFTFFFFFFF	FT	0.565	0.541	-0.214	0.064	3.456	4.008
703	2454185	2454215	16	17	FFTFFFFFFF	FT	0.411	0.349	-0.203	0.039	4.943	7.577
703	2454215	2454245	17	18	FFTFFFFFFF	FT	0.537	0.498	-0.236	0.084	3.731	4.73
703	2454125	2454155	18	19	FFTFFFFFFF	FT	0.563	0.546	-0.188	0.008	3.589	3.97
703	2454395	2454425	18	19	FFTFFFFFFF	FT	0.562	0.552	-0.173	0.204	3.353	3.597
703	2454425	2454455	18	19	FFTFFFFFFF	FT	0.568	0.548	-0.189	0.147	3.422	3.792
703	2454575	2454605	16	17	FFTFFFFFFF	FT	0.451	0.397	-0.226	0.13	4.094	6.253
703	2454605	2454665	16	17	FFTFFFFFFF	FT	0.464	0.392	-0.224	0.124	4.29	7.064
703	2454035	2454065	17	18	FFTFFFFFFF	FT	0.431	0.434	-0.135	0.073	4.926	5.818
703	2454185	2454215	15	16	FFTFFFFFFF	FT	0.358	0.279	-0.161	-0.013	6.425	15.032
703	2454605	2454635	17	18	FFTFFFFFFF	FT	0.56	0.525	-0.279	0.217	3.416	4.125
703	2451605	2451635	18	19	FFFFFFFFTF	FT	0.537	0.495	-0.083	0.096	3.955	4.039
703	2451605	2451635	17	18	FFFFFFFFTF	FT	0.42	0.402	-0.053	0.079	5.729	6.263
703	2453315	2453345	16	17	FFTFFFFFFF	FT	0.377	0.456	-0.133	-0.265	5.859	4.503
703	2453315	2453345	17	18	FFTFFFFFFF	FT	0.463	0.512	-0.175	-0.24	4.411	3.745
703	2453975	2454005	17	18	FFTFFFFFFF	FT	0.452	0.448	-0.168	0.125	4.618	5.74

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
703	2454005	2454035	16	17	FFTFFFFFF	FT	0.381	0.363	-0.129	0.081	6.241	8.109
703	2454215	2454245	18	19	FFTFFFFFF	FT	0.63	0.593	-0.247	0.063	3.093	3.505
703	2453885	2453915	17	18	FFTFFFFFF	FT	0.526	0.49	-0.23	0.134	3.732	4.532
703	2452985	2453015	8	16	FFTFFFFFF	FT	0.493	0.439	-0.15	0.091	4.77	5.294
703	2454965	2454995	17	18	FFTFFFFFF	FT	0.543	0.515	-0.25	0.177	3.445	4.194
703	2451065	2451515	15	16	FFFFFFFTF	FT	0.344	0.381	-0.044	0.096	9.875	8.749
703	2451515	2451635	15	16	FFFFFFFTF	FT	0.252	0.245	-0.019	0.053	13.921	14.137
703	2454155	2454185	16	17	FFTFFFFFF	FT	0.415	0.354	-0.184	0.021	5.266	8.451
703	2453075	2453105	16	17	FFTFFFFFF	FT	0.483	0.462	-0.082	0.143	4.81	5.325
703	2454155	2454185	17	18	FFTFFFFFF	FT	0.477	0.436	-0.21	0.037	4.197	5.699
703	2454665	2454725	16	17	FFTFFFFFF	FT	0.375	0.409	-0.035	0.177	7.159	6.396
703	2455025	2455055	17	18	FFTFFFFFF	FT	0.494	0.502	-0.219	0.224	4.071	4.336
703	2454335	2454365	16	17	FFTFFFFFF	FT	0.395	0.423	-0.122	0.225	5.369	4.892
703	2451515	2451575	16	17	FFFFFFFTF	FT	0.317	0.317	-0.04	0.047	9.162	9.661
703	2455055	2455085	17	18	FFTFFFFFF	FT	0.601	0.537	-0.342	0.216	3.212	4.026
703	2455055	2455085	16	17	FFTFFFFFF	FT	0.526	0.444	-0.278	0.203	3.88	5.354
703	2450975	2451335	17	18	FFFFFFFTF	FT	0.587	0.626	-0.089	0.024	3.869	3.683
703	2451485	2451515	18	19	FFFFFFFTF	FT	0.524	0.47	-0.115	0.07	4.15	4.185
703	2452985	2453015	17	18	FFTFFFFFF	FT	0.637	0.567	-0.231	0.053	3.162	3.893
703	2452985	2453015	18	19	FFTFFFFFF	FT	0.719	0.646	-0.231	0.072	2.873	3.223
703	2454245	2454275	17	18	FFTFFFFFF	FT	0.523	0.498	-0.199	0.096	4.056	4.615
703	2454245	2454275	18	19	FFTFFFFFF	FT	0.604	0.576	-0.218	0.075	3.172	3.564
703	2453045	2453075	16	17	FFTFFFFFF	FT	0.469	0.46	-0.1	0.08	5.18	5.719
703	2452955	2452985	18	19	FFTFFFFFF	FT	0.691	0.668	-0.225	-0.168	2.986	3.211
703	2453975	2454005	18	19	FFTFFFFFF	FT	0.551	0.548	-0.197	0.137	3.557	3.902
703	2454185	2454215	17	18	FFTFFFFFF	FT	0.495	0.447	-0.229	0.067	4.052	5.392

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
703	2453555	2453585	16	17	FFTFFFFFF	FT	0.479	0.468	-0.182	0.126	4.62	5.999
703	2451335	2451365	17	18	FFFFFFFTF	FT	0.581	0.645	-0.028	0.137	3.814	3.432
703	2453405	2453435	17	18	FFTFFFFFF	FT	0.436	0.429	-0.177	0.021	4.852	6.518
703	2451575	2451605	17	18	FFFFFFFTF	FT	0.427	0.387	-0.056	0.083	5.878	6.207
703	2454155	2454185	18	19	FFTFFFFFF	FT	0.58	0.549	-0.227	0.047	3.36	3.813
703	2454935	2454965	17	18	FFTFFFFFF	FT	0.505	0.483	-0.244	0.159	3.807	4.637
703	2453555	2453585	17	18	FFTFFFFFF	FT	0.552	0.522	-0.237	0.116	3.868	4.686
703	2454785	2454815	18	19	FFTFFFFFF	FT	0.555	0.573	-0.199	0.163	3.483	3.753
703	2453525	2453555	18	19	FFTFFFFFF	FT	0.642	0.583	-0.288	0.092	3.062	3.569
703	2452925	2452955	17	18	FFTFFFFFF	FT	0.638	0.53	-0.363	0.113	3.127	4.303
703	2452925	2452955	18	19	FFTFFFFFF	FT	0.756	0.581	-0.428	0.125	2.71	3.624
703	2453105	2453135	17	18	FFTFFFFFF	FT	0.589	0.596	-0.117	0.092	3.491	3.707
703	2455025	2455055	16	17	FFTFFFFFF	FT	0.414	0.446	-0.143	0.211	5.234	5.425
703	2454995	2455025	17	18	FFTFFFFFF	FT	0.539	0.523	-0.225	0.218	4.205	4.207
703	2451575	2451635	16	17	FFFFFFFTF	FT	0.315	0.302	-0.001	0.065	10.576	11.136
703	2452745	2452775	18	19	FFTFFFFFF	FT	0.804	0.754	-0.014	0.073	2.634	2.774
703	2454455	2454485	18	19	FFTFFFFFF	FT	0.566	0.535	-0.22	0.139	3.451	3.879
703	2451485	2451515	19	20	FFFFFFFTF	FT	0.641	0.593	-0.134	0.095	3.225	3.268
703	2453345	2453375	18	19	FFTFFFFFF	FT	0.613	0.582	-0.308	-0.228	3.114	3.399
703	2453825	2453855	18	19	FFTFFFFFF	FT	0.619	0.574	-0.26	0.108	3.151	3.532
703	2454095	2454125	18	19	FFTFFFFFF	FT	0.569	0.555	-0.198	0.012	3.492	3.916
703	2454515	2454545	18	19	FFTFFFFFF	FT	0.561	0.527	-0.228	0.134	3.365	3.886
703	2452775	2452805	18	19	FFTFFFFFF	FT	0.806	0.723	0.039	0.058	2.647	2.847
703	2452775	2452805	19	20	FFTFFFFFF	FT	0.855	0.773	0.006	0.02	2.485	2.778
703	2453825	2453855	17	18	FFTFFFFFF	FT	0.538	0.466	-0.261	0.087	3.677	4.837
703	2454875	2454905	17	18	FFTFFFFFF	FT	0.461	0.436	-0.205	0.075	4.279	5.749

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
703	2451455	2451485	16	17	FFFFFFFTF	FT	0.312	0.308	-0.069	0.103	10.179	10.999
703	2454005	2454035	18	19	FFTFFFFFF	FT	0.554	0.56	-0.178	0.116	3.581	3.896
703	2454485	2454515	18	19	FFTFFFFFF	FT	0.545	0.514	-0.216	0.117	3.441	4.087
703	2454485	2454515	17	18	FFTFFFFFF	FT	0.462	0.412	-0.207	0.069	4.407	6.197
703	2454275	2454305	18	19	FFTFFFFFF	FT	0.593	0.57	-0.219	0.083	3.281	3.718
703	2453075	2453105	17	18	FFTFFFFFF	FT	0.53	0.525	-0.118	0.168	4.057	4.133
703	2453285	2453315	16	17	FFTFFFFFF	FT	0.376	0.478	-0.092	-0.261	6.484	4.237
703	2453975	2455085	11	12	FFTFFFFFF	FT	0.673	0.68	0.067	-0.491	2.256	3.037
703	2454065	2454095	18	19	FFTFFFFFF	FT	0.574	0.569	-0.202	0.059	3.426	3.766
703	2450975	2451365	16	17	FFFFFFFTF	FT	0.534	0.586	-0.054	0.057	4.562	3.794
703	2454725	2454755	17	18	FFTFFFFFF	FT	0.469	0.578	0.044	0.285	4.518	3.828
703	2454785	2454815	17	18	FFTFFFFFF	FT	0.454	0.474	-0.162	0.125	4.355	4.879
703	2454875	2454905	18	19	FFTFFFFFF	FT	0.552	0.547	-0.223	0.107	3.405	3.934
703	2454605	2454635	18	19	FFTFFFFFF	FT	0.67	0.621	-0.332	0.25	2.856	3.22
703	2454155	2454185	19	20	FFTFFFFFF	FT	0.678	0.663	-0.226	0.056	2.951	3.074
703	2453795	2453825	17	18	FFTFFFFFF	FT	0.491	0.439	-0.224	0.047	4.12	5.523
703	2454095	2454125	19	20	FFTFFFFFF	FT	0.67	0.668	-0.219	0.034	2.974	3.131
703	2451395	2451455	16	17	FFFFFFFTF	FT	0.39	0.397	-0.061	0.102	7.386	5.791
703	2453525	2453555	17	18	FFTFFFFFF	FT	0.559	0.503	-0.246	0.119	3.681	4.403
703	2451335	2451395	18	19	FFFFFFFTF	FT	0.656	0.689	-0.076	0.11	3.081	2.983
703	2454755	2454785	18	19	FFTFFFFFF	FT	0.556	0.559	-0.058	0.15	3.442	3.703
703	2454545	2454575	18	19	FFTFFFFFF	FT	0.6	0.566	-0.255	0.169	3.176	3.616
703	2450945	2451335	18	19	FFFFFFFTF	FT	0.66	0.659	-0.082	0.032	3.32	3.414
703	2453645	2453675	18	19	FFTFFFFFF	FT	0.563	0.532	-0.215	0.07	3.387	3.922
703	2453885	2453915	18	19	FFTFFFFFF	FT	0.634	0.591	-0.265	0.136	3.086	3.423
703	2452235	2453945	11	12	FFTFFFFFF	FT	0.579	0.607	-0.002	-0.333	2.83	3.67

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
703	2454845	2454875	17	18	FFTFFFFFF	FT	0.459	0.442	-0.166	0.049	4.384	5.409
703	2453465	2453495	19	20	FFTFFFFFF	FT	0.688	0.678	-0.262	0.098	2.884	3.092
703	2453495	2453525	19	20	FFTFFFFFF	FT	0.697	0.686	-0.264	0.111	2.879	3.022
703	2453645	2453675	20	21	FFTFFFFFF	FT	0.769	0.756	-0.229	0.082	2.639	2.789
703	2453645	2453675	19	20	FFTFFFFFF	FT	0.672	0.647	-0.232	0.089	2.935	3.141
703	2454935	2454965	19	20	FFTFFFFFF	FT	0.682	0.698	-0.258	0.224	2.871	2.984
703	2454935	2454965	20	21	FFTFFFFFF	FT	0.747	0.774	-0.265	0.237	2.676	2.714
703	2454965	2454995	19	20	FFTFFFFFF	FT	0.712	0.708	-0.295	0.217	2.827	2.929
703	2454965	2455025	20	21	FFTFFFFFF	FT	0.784	0.792	-0.317	0.249	2.619	2.721
703	2454995	2455025	18	19	FFTFFFFFF	FT	0.645	0.651	-0.287	0.234	3.182	3.216
703	2452985	2453015	19	20	FFTFFFFFF	FT	0.778	0.721	-0.199	0.066	2.697	2.858
703	2453495	2453525	20	21	FFTFFFFFF	FT	0.773	0.768	-0.241	0.099	2.638	2.766
703	2453765	2453795	19	20	FFTFFFFFF	FT	0.646	0.638	-0.2	0.105	3.009	3.216
703	2453765	2453795	20	21	FFTFFFFFF	FT	0.754	0.741	-0.202	0.138	2.762	2.836
703	2453855	2453885	18	19	FFTFFFFFF	FT	0.62	0.564	-0.272	0.115	3.174	3.643
703	2454215	2454245	19	20	FFTFFFFFF	FT	0.715	0.687	-0.264	0.044	2.8	3.06
703	2454245	2454275	19	20	FFTFFFFFF	FT	0.691	0.667	-0.237	0.066	2.922	3.04
703	2454455	2454485	19	20	FFTFFFFFF	FT	0.667	0.64	-0.239	0.177	2.985	3.148
703	2454485	2454515	19	20	FFTFFFFFF	FT	0.634	0.621	-0.213	0.168	3.002	3.237
703	2454905	2454935	18	19	FFTFFFFFF	FT	0.605	0.593	-0.258	0.166	3.163	3.575
703	2454935	2454965	18	19	FFTFFFFFF	FT	0.604	0.606	-0.262	0.204	3.171	3.445
703	2452955	2452985	19	20	FFTFFFFFF	FT	0.761	0.757	-0.173	-0.189	2.735	2.85
703	2452925	2453015	20	21	FFTFFFFFF	FT	0.834	0.771	-0.187	-0.088	2.569	2.739
703	2453765	2453795	18	19	FFTFFFFFF	FT	0.563	0.53	-0.215	0.072	3.46	4.01
703	2454035	2454065	18	19	FFTFFFFFF	FT	0.534	0.544	-0.164	0.085	3.663	3.912
703	2453225	2453255	18	19	FFTFFFFFF	FT	0.694	0.666	-0.267	-0.054	2.891	3.182

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
703	2453225	2453255	17	18	FFTFFFFFF	FT	0.606	0.571	-0.239	-0.023	3.374	3.876
703	2453675	2453705	18	19	FFTFFFFFF	FT	0.551	0.533	-0.185	0.079	3.535	3.969
703	2453675	2453705	19	20	FFTFFFFFF	FT	0.664	0.654	-0.195	0.107	2.981	3.124
703	2453915	2453945	18	19	FFTFFFFFF	FT	0.637	0.597	-0.225	0.141	3.245	3.496
703	2454335	2454365	17	18	FFTFFFFFF	FT	0.47	0.516	-0.114	0.282	4.246	3.89
703	2454335	2454365	18	19	FFTFFFFFF	FT	0.577	0.613	-0.116	0.328	3.303	3.194
703	2454965	2454995	18	19	FFTFFFFFF	FT	0.637	0.634	-0.287	0.2	3.057	3.329
703	2451455	2451485	18	19	FFFFFFFTF	FT	0.561	0.48	-0.141	0.084	3.904	4.224
703	2451455	2451485	17	18	FFFFFFFTF	FT	0.423	0.373	-0.107	0.087	5.841	5.829
703	2453135	2453165	18	19	FFTFFFFFF	FT	0.663	0.665	-0.153	0.017	3.104	3.236
703	2452925	2452955	16	17	FFTFFFFFF	FT	0.573	0.477	-0.321	0.174	3.5	5.491
703	2453435	2453465	18	19	FFTFFFFFF	FT	0.567	0.555	-0.212	0.087	3.441	3.867
703	2454275	2454305	17	18	FFTFFFFFF	FT	0.534	0.513	-0.218	0.136	3.985	4.259
703	2453375	2453405	18	19	FFTFFFFFF	FT	0.654	0.573	-0.374	-0.076	2.919	3.517
703	2453615	2453645	18	19	FFTFFFFFF	FT	0.595	0.579	-0.185	0.119	3.338	3.652
703	2452235	2452355	18	19	FFTFFFFFF	FT	0.605	0.596	-0.067	0.185	3.523	3.477
703	2453975	2454005	19	20	FFTFFFFFF	FT	0.645	0.654	-0.199	0.153	3.03	3.128
703	2455025	2455055	18	19	FFTFFFFFF	FT	0.593	0.595	-0.242	0.221	3.25	3.391
703	2454065	2454095	19	20	FFTFFFFFF	FT	0.681	0.685	-0.228	0.079	2.963	3.099
703	2454665	2454695	18	19	FFTFFFFFF	FT	0.554	0.519	-0.183	0.083	3.59	4.088
703	2453135	2453165	19	20	FFTFFFFFF	FT	0.737	0.733	-0.142	-0.001	2.804	2.881
703	2453375	2453405	19	20	FFTFFFFFF	FT	0.709	0.652	-0.343	-0.029	2.784	3.104
703	2454845	2454875	18	19	FFTFFFFFF	FT	0.549	0.557	-0.179	0.091	3.595	3.934
703	2453405	2453435	18	19	FFTFFFFFF	FT	0.525	0.52	-0.17	0.047	3.797	4.262
703	2453015	2453045	20	21	FFTFFFFFF	FT	0.762	0.759	-0.201	0.073	2.775	2.777
703	2453015	2453045	19	20	FFTFFFFFF	FT	0.674	0.683	-0.176	0.054	2.943	3.119

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
703	2453345	2453375	19	20	FFTFFFFFF	FT	0.71	0.641	-0.35	-0.191	2.79	3.153
703	2453435	2453465	19	20	FFTFFFFFF	FT	0.656	0.647	-0.203	0.088	3.012	3.174
703	2453285	2453315	17	18	FFTFFFFFF	FT	0.482	0.527	-0.142	-0.229	4.54	3.757
703	2454635	2454665	17	18	FFTFFFFFF	FT	0.537	0.449	-0.225	0.067	3.845	4.493
703	2454425	2454455	19	20	FFTFFFFFF	FT	0.673	0.659	-0.204	0.19	2.941	3.083
703	2453045	2453075	19	20	FFTFFFFFF	FT	0.692	0.653	-0.152	0.067	2.972	3.183
703	2454005	2454035	19	20	FFTFFFFFF	FT	0.655	0.677	-0.184	0.133	3.073	3.109
703	2454035	2454065	19	20	FFTFFFFFF	FT	0.644	0.662	-0.173	0.106	3.069	3.125
703	2451395	2451455	17	18	FFFFFFFTF	FT	0.464	0.436	-0.081	0.082	5.172	5.267
703	2453915	2453945	17	18	FFTFFFFFF	FT	0.52	0.481	-0.222	0.097	3.825	5.052
703	2453915	2453945	19	20	FFTFFFFFF	FT	0.748	0.704	-0.28	0.125	2.733	2.885
703	2454725	2455025	16	17	FFTFFFFFF	TF	0.476	0.494	-0.118	0.078	5.226	5.264
703	2451515	2451545	18	19	FFFFFFFTF	FT	0.529	0.517	-0.088	0.059	3.867	3.987
703	2453285	2453315	18	19	FFTFFFFFF	FT	0.572	0.588	-0.184	-0.212	3.444	3.371
703	2453525	2453555	19	20	FFTFFFFFF	FT	0.74	0.68	-0.305	0.073	2.793	3.021
703	2454575	2454605	19	20	FFTFFFFFF	FT	0.722	0.698	-0.291	0.246	2.756	2.94
703	2453675	2453705	20	21	FFTFFFFFF	FT	0.776	0.766	-0.237	0.103	2.644	2.73
703	2453705	2453735	20	21	FFTFFFFFF	FT	0.776	0.757	-0.255	0.119	2.673	2.775
703	2453705	2453735	19	20	FFTFFFFFF	FT	0.679	0.664	-0.236	0.11	2.965	3.127
703	2453735	2453765	20	21	FFTFFFFFF	FT	0.763	0.749	-0.216	0.137	2.698	2.797
703	2453735	2453765	19	20	FFTFFFFFF	FT	0.662	0.653	-0.212	0.109	3.017	3.164
703	2454365	2454395	19	20	FFTFFFFFF	FT	0.646	0.683	-0.094	0.331	2.946	2.993
703	2454365	2454395	20	21	FFTFFFFFF	FT	0.733	0.776	-0.068	0.37	2.698	2.694
703	2454395	2454425	19	20	FFTFFFFFF	FT	0.66	0.648	-0.181	0.226	2.899	3.1
703	2454695	2454725	17	18	FFTFFFFFF	FT	0.44	0.537	0.043	0.279	4.898	3.962
703	2454905	2454935	19	20	FFTFFFFFF	FT	0.677	0.691	-0.247	0.191	2.907	3.019

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
703	2454905	2454935	20	21	FFTFFFFFF	FT	0.742	0.766	-0.237	0.224	2.72	2.735
703	2454335	2454365	19	20	FFTFFFFFF	FT	0.669	0.694	-0.098	0.363	2.845	2.851
703	2451575	2451605	18	19	FFFFFFFTF	FT	0.566	0.503	-0.103	0.086	3.822	4.172
703	2452235	2452355	19	20	FFTFFFFFF	FT	0.733	0.702	-0.051	0.186	2.891	2.856
703	2450975	2451395	19	20	FFFFFFFTF	FT	0.709	0.722	-0.066	0.052	2.83	3.081
703	2454725	2454815	17	18	FFTFFFFFF	TF	0.481	0.522	-0.133	0.098	4.135	4.68
703	2454815	2454845	18	19	FFTFFFFFF	FT	0.558	0.562	-0.21	0.13	3.469	3.815
703	2454845	2454875	19	20	FFTFFFFFF	FT	0.637	0.652	-0.194	0.129	3.094	3.186
703	2454035	2454065	20	21	FFTFFFFFF	FT	0.746	0.764	-0.175	0.105	2.752	2.766
703	2454875	2454905	19	20	FFTFFFFFF	FT	0.634	0.65	-0.22	0.156	3.026	3.183
703	2453315	2453345	18	19	FFTFFFFFF	FT	0.552	0.564	-0.199	-0.208	3.549	3.435
703	2451545	2451575	18	19	FFFFFFFTF	FT	0.501	0.432	-0.126	0.094	4.095	4.596
703	2453405	2453435	19	20	FFTFFFFFF	FT	0.628	0.614	-0.164	0.069	3.165	3.268
703	2453435	2453465	20	21	FFTFFFFFF	FT	0.731	0.731	-0.178	0.093	2.803	2.867
703	2453795	2453825	18	19	FFTFFFFFF	FT	0.58	0.547	-0.225	0.075	3.336	3.743
703	2454125	2454155	19	20	FFTFFFFFF	FT	0.657	0.656	-0.189	0.009	3.06	3.142
703	2454275	2454305	19	20	FFTFFFFFF	FT	0.67	0.653	-0.21	0.07	2.945	3.231
703	2454635	2454665	18	19	FFTFFFFFF	FT	0.603	0.544	-0.238	0.05	3.331	3.87
703	2453105	2453165	20	21	FFTFFFFFF	FT	0.815	0.783	-0.112	0.036	2.564	2.724
703	2454185	2454215	18	19	FFTFFFFFF	FT	0.596	0.561	-0.242	0.063	3.204	3.721
703	2454815	2454845	19	20	FFTFFFFFF	FT	0.655	0.654	-0.236	0.167	3.041	3.16
703	2451425	2451455	18	19	FFFFFFFTF	FT	0.557	0.495	-0.124	0.069	3.814	4.089
703	2454155	2454185	20	21	FFTFFFFFF	FT	0.771	0.755	-0.222	0.046	2.667	2.756
703	2454605	2454635	19	20	FFTFFFFFF	FT	0.75	0.7	-0.326	0.256	2.67	2.886
703	2454605	2454665	20	21	FFTFFFFFF	FT	0.797	0.777	-0.281	0.209	2.546	2.704
703	2453105	2453135	18	19	FFTFFFFFF	FT	0.684	0.679	-0.121	0.089	2.939	3.068

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
703	2453165	2453225	19	20	FFTFFFFFF	FT	0.784	0.745	-0.202	0.035	2.67	2.763
703	2454125	2454155	20	21	FFTFFFFFF	FT	0.758	0.757	-0.198	0.012	2.755	2.776
703	2454185	2454215	19	20	FFTFFFFFF	FT	0.689	0.679	-0.231	0.065	2.88	3.013
703	2454995	2455025	19	20	FFTFFFFFF	FT	0.712	0.737	-0.281	0.266	2.815	2.856
703	2453555	2453585	18	19	FFTFFFFFF	FT	0.64	0.589	-0.276	0.095	3.02	3.461
703	2452715	2452745	18	19	FFTFFFFFF	FT	0.773	0.861	-0.065	0.183	2.548	2.503
703	2454215	2454245	20	21	FFTFFFFFF	FT	0.813	0.774	-0.269	0.029	2.59	2.746
703	2453045	2453075	20	21	FFTFFFFFF	FT	0.764	0.723	-0.172	0.087	2.734	2.963
703	2454785	2454815	19	20	FFTFFFFFF	FT	0.655	0.67	-0.232	0.203	2.994	3.107
703	2454785	2454815	20	21	FFTFFFFFF	FT	0.742	0.755	-0.255	0.204	2.719	2.733
703	2453075	2453105	19	20	FFTFFFFFF	FT	0.706	0.688	-0.121	0.182	2.898	2.995
703	2453825	2453855	19	20	FFTFFFFFF	FT	0.703	0.684	-0.227	0.135	2.852	3.025
703	2453855	2453885	19	20	FFTFFFFFF	FT	0.708	0.663	-0.265	0.131	2.818	3.073
703	2453855	2453885	20	21	FFTFFFFFF	FT	0.814	0.768	-0.3	0.155	2.487	2.706
703	2451455	2451485	19	20	FFFFFFFTF	FT	0.682	0.598	-0.172	0.082	3.28	3.349
703	2454695	2454725	18	19	FFTFFFFFF	FT	0.545	0.637	0.075	0.327	3.45	3.171
703	2454725	2454755	18	19	FFTFFFFFF	FT	0.569	0.683	0.064	0.339	3.467	3.137
703	2455055	2455085	18	19	FFTFFFFFF	FT	0.707	0.643	-0.393	0.233	2.87	3.307
703	2453345	2453375	20	21	FFTFFFFFF	FT	0.804	0.703	-0.392	-0.165	2.598	2.889
703	2454455	2454485	20	21	FFTFFFFFF	FT	0.767	0.723	-0.255	0.204	2.707	2.823
703	2454485	2454515	20	21	FFTFFFFFF	FT	0.715	0.714	-0.21	0.202	2.715	2.824
703	2454515	2454545	20	21	FFTFFFFFF	FT	0.735	0.732	-0.2	0.206	2.716	2.807
703	2454545	2454575	20	21	FFTFFFFFF	FT	0.755	0.742	-0.225	0.22	2.693	2.704
703	2454545	2454575	19	20	FFTFFFFFF	FT	0.683	0.654	-0.245	0.192	2.862	3.047
703	2453105	2453135	19	20	FFTFFFFFF	FT	0.757	0.756	-0.127	0.088	2.742	2.772
703	2453975	2454005	20	21	FFTFFFFFF	FT	0.733	0.762	-0.183	0.162	2.818	2.725

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
703	2451545	2451575	19	20	FFFFFFFTF	FT	0.656	0.608	-0.165	0.134	3.148	3.365
703	2453885	2453915	19	20	FFTFFFFFF	FT	0.723	0.672	-0.265	0.111	2.822	2.946
703	2452925	2452955	19	20	FFTFFFFFF	FT	0.82	0.65	-0.42	0.118	2.512	3.178
703	2454815	2454845	20	21	FFTFFFFFF	FT	0.735	0.747	-0.264	0.2	2.726	2.768
703	2453315	2453345	19	20	FFTFFFFFF	FT	0.638	0.63	-0.215	-0.176	3.04	3.092
703	2453075	2453105	20	21	FFTFFFFFF	FT	0.789	0.77	-0.124	0.238	2.629	2.669
703	2454065	2454095	20	21	FFTFFFFFF	FT	0.778	0.788	-0.239	0.095	2.662	2.703
703	2451605	2451635	19	20	FFFFFFFTF	FT	0.675	0.601	-0.092	0.083	3.238	3.342
703	2452745	2452775	19	20	FFTFFFFFF	FT	0.824	0.779	-0.001	0.05	2.493	2.64
703	2454665	2454695	19	20	FFTFFFFFF	FT	0.656	0.61	-0.2	0.048	2.966	3.348
703	2452235	2452805	20	21	FFTFFFFFF	FT	0.86	0.835	0.002	0.065	2.463	2.565
703	2451605	2451635	19	20	FFTFFFFFF	FT	0.747	0.679	-0.114	0.063	2.942	2.974
703	2451545	2451935	18	19	FFTFFFFFF	FT	0.61	0.554	-0.089	0.083	3.49	3.836
703	2454755	2454785	19	20	FFTFFFFFF	FT	0.65	0.648	-0.045	0.183	3.021	3.125
703	2451515	2451545	19	20	FFFFFFFTF	FT	0.639	0.611	-0.104	0.042	3.174	3.332
703	2454515	2454545	19	20	FFTFFFFFF	FT	0.651	0.633	-0.225	0.178	2.96	3.184
703	2453165	2453255	20	21	FFTFFFFFF	FT	0.822	0.776	-0.219	-0.007	2.522	2.656
703	2454095	2454125	20	21	FFTFFFFFF	FT	0.779	0.769	-0.229	0.051	2.664	2.745
703	2454665	2454695	20	21	FFTFFFFFF	FT	0.745	0.696	-0.144	0.029	2.676	2.848
703	2454425	2454455	20	21	FFTFFFFFF	FT	0.768	0.743	-0.213	0.217	2.718	2.863
703	2454725	2454755	19	20	FFTFFFFFF	FT	0.664	0.772	0.061	0.374	2.989	2.789
703	2454575	2454605	20	21	FFTFFFFFF	FT	0.788	0.76	-0.301	0.235	2.598	2.691
703	2453375	2453405	20	21	FFTFFFFFF	FT	0.771	0.713	-0.32	0.004	2.695	2.886
703	2455025	2455055	19	20	FFTFFFFFF	FT	0.677	0.683	-0.258	0.226	2.838	2.986
703	2455055	2455085	19	20	FFTFFFFFF	FT	0.759	0.73	-0.371	0.234	2.7	2.874
703	2451395	2451455	19	20	FFFFFFFTF	FT	0.681	0.587	-0.151	0.084	3.225	3.259

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
703	2454755	2454785	20	21	FFTFFFFFF	FT	0.743	0.757	-0.035	0.239	2.72	2.756
703	2454875	2454905	20	21	FFTFFFFFF	FT	0.703	0.75	-0.211	0.209	2.813	2.836
703	2453795	2453825	19	20	FFTFFFFFF	FT	0.668	0.659	-0.183	0.099	2.993	3.073
703	2453795	2453825	20	21	FFTFFFFFF	FT	0.75	0.747	-0.182	0.117	2.784	2.723
703	2453285	2453315	19	20	FFTFFFFFF	FT	0.67	0.647	-0.188	-0.158	2.977	3.156
703	2453615	2453645	19	20	FFTFFFFFF	FT	0.705	0.684	-0.217	0.127	2.841	3.027
703	2454395	2454425	20	21	FFTFFFFFF	FT	0.746	0.724	-0.187	0.236	2.688	2.841
703	2452715	2452745	19	20	FFTFFFFFF	FT	0.84	0.839	0.003	0.091	2.453	2.555
703	2453465	2453495	20	21	FFTFFFFFF	FT	0.745	0.755	-0.246	0.099	2.615	2.775
703	2454815	2455025	17	18	FFTFFFFFF	TF	0.471	0.512	-0.184	0.119	4.528	4.943
703	2453885	2453945	20	21	FFTFFFFFF	FT	0.813	0.777	-0.269	0.091	2.581	2.703
703	2453555	2453585	19	20	FFTFFFFFF	FT	0.737	0.677	-0.31	0.072	2.782	3.026
703	2454635	2454665	19	20	FFTFFFFFF	FT	0.679	0.587	-0.269	0.078	2.92	3.295
703	2454005	2454035	20	21	FFTFFFFFF	FT	0.754	0.774	-0.181	0.132	2.735	2.768
703	2453975	2454215	17	18	FFTFFFFFF	TF	0.475	0.491	-0.158	0.015	4.441	5.705
703	2454335	2454485	21	22	FFTFFFFFF	FT	0.813	0.811	-0.174	0.267	2.54	2.655
703	2453405	2453435	20	21	FFTFFFFFF	FT	0.719	0.702	-0.168	0.111	2.829	2.871
703	2454725	2454755	20	21	FFTFFFFFF	FT	0.739	0.833	0.05	0.398	2.7	2.559
703	2451575	2451605	19	20	FFFFFFFTF	FT	0.7	0.623	-0.134	0.095	3.016	3.328
703	2454815	2455025	18	19	FFTFFFFFF	TF	0.528	0.558	-0.188	0.145	3.873	4.394
703	2453975	2454305	18	19	FFTFFFFFF	TF	0.531	0.546	-0.2	0.021	3.664	3.916
703	2454275	2454305	20	21	FFTFFFFFF	FT	0.769	0.701	-0.214	0.063	2.731	2.896
703	2454725	2454815	18	19	FFTFFFFFF	TF	0.491	0.547	-0.126	0.109	3.74	3.607
703	2453225	2453255	19	20	FFTFFFFFF	FT	0.763	0.716	-0.27	-0.025	2.64	2.89
703	2453825	2453855	20	21	FFTFFFFFF	FT	0.777	0.767	-0.205	0.162	2.555	2.739
703	2453615	2453855	17	18	FFTFFFFFF	TF	0.45	0.502	-0.155	0.073	4.478	5

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
703	2453525	2453585	20	21	FFTFFFFFF	FT	0.82	0.769	-0.316	0.064	2.491	2.726
703	2453615	2453645	20	21	FFTFFFFFF	FT	0.804	0.776	-0.21	0.116	2.59	2.73
703	2454845	2454875	20	21	FFTFFFFFF	FT	0.715	0.738	-0.201	0.183	2.813	2.875
703	2455025	2455055	20	21	FFTFFFFFF	FT	0.747	0.752	-0.248	0.227	2.682	2.699
703	2454095	2454305	21	22	FFTFFFFFF	FT	0.856	0.85	-0.24	0.045	2.51	2.633
703	2451065	2451635	20	21	FFFFFFFTF	FT	0.813	0.745	-0.156	0.111	2.773	2.812
703	2454245	2454275	20	21	FFTFFFFFF	FT	0.764	0.738	-0.237	0.033	2.705	2.875
703	2451245	2453585	21	22	FFTFFFFFF	FT	0.823	0.775	-0.252	0.033	2.554	2.74
703	2453285	2453345	20	21	FFTFFFFFF	FT	0.747	0.689	-0.229	-0.155	2.792	2.916
703	2453975	2454095	21	22	FFTFFFFFF	FT	0.837	0.865	-0.189	0.117	2.562	2.48
703	2453705	2453945	21	22	FFTFFFFFF	FT	0.859	0.83	-0.233	0.135	2.499	2.568
703	2454335	2454365	20	21	FFTFFFFFF	FT	0.746	0.785	-0.078	0.415	2.656	2.589
703	2451395	2451425	18	19	FFFFFFFTF	FT	0.646	0.624	-0.045	0.115	3.579	3.311
703	2454185	2454215	20	21	FFTFFFFFF	FT	0.786	0.794	-0.239	0.056	2.626	2.66
703	2454485	2454725	21	22	FFTFFFFFF	FT	0.81	0.814	-0.22	0.209	2.535	2.596
703	2455055	2455085	20	21	FFTFFFFFF	FT	0.811	0.828	-0.37	0.226	2.528	2.648
703	2453615	2453705	21	22	FFTFFFFFF	FT	0.868	0.837	-0.225	0.113	2.422	2.488
703	2454695	2454725	19	20	FFTFFFFFF	FT	0.652	0.736	0.095	0.357	3.038	2.835
703	2454695	2454725	20	21	FFTFFFFFF	FT	0.741	0.819	0.068	0.396	2.743	2.545
703	2451485	2451515	18	19	FFTFFFFFF	FT	0.587	0.514	-0.111	0.059	3.68	3.773
703	2454725	2454875	21	22	FFTFFFFFF	FT	0.811	0.846	-0.176	0.241	2.561	2.408
703	2454275	2454575	17	18	FFTFFFFFF	TF	0.465	0.486	-0.136	0.125	4.05	4.4
703	2454875	2455085	21	22	FFTFFFFFF	FT	0.814	0.844	-0.269	0.219	2.568	2.587
703	2454365	2454575	18	19	FFTFFFFFF	TF	0.517	0.559	-0.143	0.148	3.71	3.758
703	2450975	2453495	17	18	FFTFFFFFF	TF	0.563	0.606	-0.222	0.006	3.688	3.642
703	2451455	2451635	17	18	FFTFFFFFF	FT	0.497	0.459	-0.106	0.058	4.739	5.433

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
703	2453615	2453855	18	19	FFTFFFFFF	TF	0.49	0.537	-0.149	0.08	3.691	3.853
703	2451485	2451515	19	20	FFTFFFFFF	FT	0.685	0.619	-0.142	0.052	3.201	3.307
703	2450975	2453495	18	19	FFTFFFFFF	TF	0.591	0.632	-0.18	-0.002	3.362	3.79
703	2454365	2455025	19	20	FFTFFFFFF	TF	0.547	0.604	-0.131	0.181	3.176	3.08
703	2451515	2451575	19	20	FFTFFFFFF	FT	0.658	0.654	-0.112	0.047	3.118	3.353
703	2451455	2451485	18	19	FFTFFFFFF	FT	0.616	0.534	-0.131	0.074	3.493	3.911
703	2451515	2451545	18	19	FFTFFFFFF	FT	0.591	0.608	-0.101	0.032	3.618	3.764
703	2451395	2451455	18	19	FFTFFFFFF	FT	0.619	0.562	-0.119	0.054	3.638	3.783
703	2451575	2451605	19	20	FFTFFFFFF	FT	0.716	0.644	-0.093	0.064	3.027	2.953
703	2451065	2451455	17	18	FFTFFFFFF	FT	0.586	0.568	-0.115	0.029	4.013	4.234
703	2451455	2451485	19	20	FFTFFFFFF	FT	0.71	0.625	-0.14	0.092	2.974	3.166
703	2451395	2451455	19	20	FFTFFFFFF	FT	0.708	0.633	-0.119	0.063	3.011	3.17
703	2451065	2451365	18	19	FFTFFFFFF	FT	0.724	0.716	-0.132	0.015	2.838	3.023
703	2451065	2451365	19	20	FFTFFFFFF	FT	0.773	0.756	-0.126	0.011	2.705	2.818
703	2451065	2451635	20	21	FFTFFFFFF	FT	0.782	0.746	-0.125	0.096	2.617	2.647
703	2451575	2453795	16	17	FFTFFFFFF	TF	0.488	0.505	-0.159	-0.002	5.064	5.729
703	2454005	2454575	16	17	FFTFFFFFF	TF	0.457	0.478	-0.134	0.043	5.307	7.088
703	2451575	2455085	15	16	FFTFFFFFF	TF	0.459	0.492	-0.116	0.007	5.947	6.126
703	2450975	2454185	19	20	FFTFFFFFF	TF	0.585	0.607	-0.191	0.058	3.013	3.369
704	2451725	2451755	14	15	FFTFFFFFF	FT	0.579	0.587	0.015	0.077	4.256	3.953
704	2451875	2451905	14	15	FFTFFFFFF	FT	0.535	0.522	0.05	0.059	4.703	4.732
704	2451905	2451935	14	15	FFTFFFFFF	FT	0.541	0.516	0.037	0.076	4.972	4.379
704	2452205	2452235	14	15	FFTFFFFFF	FT	0.619	0.619	-0.012	0.069	3.669	3.639
704	2452235	2452535	13	14	FFTFFFFFF	FT	0.777	0.732	0.008	0.099	2.999	3.067
704	2452295	2452325	14	15	FFTFFFFFF	FT	0.657	0.608	0.005	0.061	3.472	3.742
704	2452385	2452415	15	16	FFTFFFFFF	FT	0.586	0.588	0.077	0.132	4.06	3.786

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2452385	2452415	14	15	FFTFFFFFF	FT	0.702	0.658	0.03	0.132	3.467	3.575
704	2452655	2452685	14	15	FFTFFFFFF	FT	0.694	0.637	-0.003	0.137	3.488	3.82
704	2452685	2452865	13	14	FFTFFFFFF	FT	0.832	0.764	0.108	0.146	2.954	2.895
704	2453315	2453345	14	15	FFTFFFFFF	FT	0.645	0.566	-0.011	0.069	3.889	4.416
704	2453585	2453615	15	16	FFTFFFFFF	FT	0.501	0.527	0	0.1	4.506	4.579
704	2453525	2453645	14	15	FFTFFFFFF	FT	0.702	0.631	0.044	0.1	3.566	3.683
704	2453765	2453795	14	15	FFTFFFFFF	FT	0.753	0.619	0.042	0.123	3.056	3.527
704	2454065	2454095	15	16	FFTFFFFFF	FT	0.602	0.569	0.059	0.078	4.164	4.291
704	2454065	2454305	13	14	FFTFFFFFF	FT	0.762	0.76	0.071	0.126	3.163	2.846
704	2451725	2451755	16	17	FFTFFFFFF	FT	0.47	0.536	-0.012	0.141	4.181	3.733
704	2451725	2451755	15	16	FFTFFFFFF	FT	0.489	0.528	0.033	0.146	4.596	3.93
704	2451695	2451905	12	13	FFTFFFFFF	FT	0.754	0.683	-0.012	-0.007	3.055	3.481
704	2451815	2451845	13	14	FFTFFFFFF	FT	0.637	0.55	-0.007	0.071	3.67	4.404
704	2451845	2451905	13	14	FFTFFFFFF	FT	0.644	0.586	0.033	0.065	3.538	3.545
704	2451845	2451875	14	15	FFTFFFFFF	FT	0.533	0.483	0.011	0.081	4.643	4.746
704	2454305	2454455	13	14	FFTFFFFFF	FT	0.792	0.743	0.003	0.036	3.03	2.811
704	2451905	2451965	13	14	FFTFFFFFF	FT	0.621	0.572	-0.03	0.075	4.028	3.715
704	2451905	2452115	12	13	FFTFFFFFF	FT	0.707	0.729	0.006	0.124	3.24	2.991
704	2451995	2452025	16	17	FFTFFFFFF	FT	0.453	0.474	0.02	0.12	4.501	4.162
704	2452865	2453045	13	14	FFTFFFFFF	FT	0.794	0.745	0.024	0.056	2.933	3.123
704	2453015	2453585	12	13	FFTFFFFFF	FT	0.8	0.852	0.058	0.044	2.936	2.715
704	2453375	2453525	14	15	FFTFFFFFF	FT	0.706	0.636	0.108	0.185	3.296	3.574
704	2453645	2453675	14	15	FFTFFFFFF	FT	0.686	0.583	-0.025	0.102	3.447	3.742
704	2453765	2453945	13	14	FFTFFFFFF	FT	0.825	0.728	0.061	0.162	2.925	3.119
704	2453825	2453855	14	15	FFTFFFFFF	FT	0.821	0.663	0.155	0.201	2.95	3.421
704	2454095	2454125	14	15	FFTFFFFFF	FT	0.706	0.624	0.081	0.045	3.281	3.688

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2451245	2451275	15	16	FFTFFFFFF	FT	0.705	0.665	0.017	0.123	2.917	3.164
704	2451275	2451305	15	16	FFTFFFFFF	FT	0.686	0.659	0.027	0.13	3.016	3.139
704	2451275	2451305	16	17	FFTFFFFFF	FT	0.652	0.671	0.027	0.079	3.207	3.244
704	2451275	2451305	17	18	FFTFFFFFF	FT	0.732	0.759	0.019	0.114	2.873	2.877
704	2451305	2451335	16	17	FFTFFFFFF	FT	0.663	0.668	-0.01	0.116	3.121	3.18
704	2451305	2451335	15	16	FFTFFFFFF	FT	0.719	0.694	-0.001	0.079	2.922	3.023
704	2451305	2451335	17	18	FFTFFFFFF	FT	0.726	0.772	-0.032	0.124	2.824	2.767
704	2451755	2451785	14	15	FFTFFFFFF	FT	0.483	0.502	-0.011	0.136	5.326	4.32
704	2451755	2451785	15	16	FFTFFFFFF	FT	0.414	0.487	-0.017	0.15	5.304	4.726
704	2451785	2451815	14	15	FFTFFFFFF	FT	0.542	0.5	0.023	0.105	4.801	4.594
704	2451815	2451845	14	15	FFTFFFFFF	FT	0.524	0.494	0.016	0.096	4.433	4.915
704	2451875	2451905	16	17	FFTFFFFFF	FT	0.408	0.442	0.01	0.044	4.943	4.628
704	2451905	2451935	17	18	FFTFFFFFF	FT	0.445	0.493	0.014	0.035	4.281	3.961
704	2452235	2452265	15	16	FFTFFFFFF	FT	0.593	0.6	0.049	0.059	3.895	3.855
704	2452265	2452295	16	17	FFTFFFFFF	FT	0.548	0.605	0.052	0.028	3.823	3.756
704	2452295	2452325	15	16	FFTFFFFFF	FT	0.583	0.582	0.035	0.074	4.014	3.992
704	2452325	2452355	15	16	FFTFFFFFF	FT	0.616	0.628	0.062	0.129	3.679	3.635
704	2452355	2452385	16	17	FFTFFFFFF	FT	0.569	0.569	0.064	0.116	3.927	3.968
704	2452355	2452385	17	18	FFTFFFFFF	FT	0.572	0.585	0.08	0.106	3.698	3.673
704	2452655	2452685	16	17	FFTFFFFFF	FT	0.528	0.554	0.043	0.095	4.296	4.043
704	2452685	2452715	15	16	FFTFFFFFF	FT	0.584	0.578	0.086	0.122	3.953	4.105
704	2452715	2452745	15	16	FFTFFFFFF	FT	0.65	0.61	0.117	0.129	3.581	3.936
704	2452745	2452775	15	16	FFTFFFFFF	FT	0.609	0.573	0.091	0.143	3.825	4.06
704	2452805	2452835	15	16	FFTFFFFFF	FT	0.656	0.643	0.104	0.1	3.572	3.59
704	2453225	2453255	16	17	FFTFFFFFF	FT	0.491	0.49	-0.023	0.092	4.676	4.678
704	2453225	2453285	14	15	FFTFFFFFF	FT	0.675	0.585	0.01	0.102	3.685	3.925

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2453255	2453285	15	16	FFTFFFFFF	FT	0.527	0.491	-0.037	0.122	4.674	4.957
704	2453285	2453315	15	16	FFTFFFFFF	FT	0.557	0.495	-0.02	0.108	4.273	4.866
704	2453315	2453345	15	16	FFTFFFFFF	FT	0.568	0.515	-0.01	0.101	4.566	5.084
704	2453645	2453675	17	18	FFTFFFFFF	FT	0.477	0.503	-0.002	0.101	4.291	4.19
704	2453735	2453765	16	17	FFTFFFFFF	FT	0.48	0.502	0.043	0.087	4.583	4.578
704	2453765	2453795	16	17	FFTFFFFFF	FT	0.504	0.502	0.091	0.125	4.25	4.44
704	2453795	2453825	16	17	FFTFFFFFF	FT	0.567	0.551	0.123	0.156	3.822	4.116
704	2453825	2453855	16	17	FFTFFFFFF	FT	0.572	0.525	0.136	0.153	3.952	4.275
704	2453825	2453855	17	18	FFTFFFFFF	FT	0.592	0.578	0.16	0.147	3.578	3.673
704	2454095	2454125	17	18	FFTFFFFFF	FT	0.556	0.586	0.06	0.093	3.819	3.831
704	2454125	2454155	17	18	FFTFFFFFF	FT	0.579	0.598	0.09	0.144	3.679	3.721
704	2454125	2454155	16	17	FFTFFFFFF	FT	0.575	0.553	0.086	0.126	4.047	4.166
704	2454155	2454185	16	17	FFTFFFFFF	FT	0.597	0.573	0.151	0.163	3.729	3.996
704	2454155	2454185	15	16	FFTFFFFFF	FT	0.71	0.624	0.171	0.165	3.344	3.636
704	2454665	2454695	16	17	FFTFFFFFF	FT	0.515	0.538	0.006	0.124	4.332	4.06
704	2454725	2454755	15	16	FFTFFFFFF	FT	0.569	0.536	-0.041	0.144	4.09	4.194
704	2454755	2454785	15	16	FFTFFFFFF	FT	0.606	0.541	0.007	0.123	3.846	3.841
704	2454785	2454815	15	16	FFTFFFFFF	FT	0.603	0.566	0.006	0.104	4.014	4.137
704	2454845	2454875	16	17	FFTFFFFFF	FT	0.547	0.516	0.09	0.11	4.447	4.579
704	2454875	2454905	17	18	FFTFFFFFF	FT	0.548	0.558	0.184	0.154	3.83	3.877
704	2451245	2451275	17	18	FFTFFFFFF	FT	0.708	0.745	0.006	0.078	2.949	2.882
704	2451695	2451725	14	15	FFTFFFFFF	FT	0.57	0.573	0.026	0.148	4.636	4.25
704	2451695	2451725	16	17	FFTFFFFFF	FT	0.491	0.579	0.007	0.148	4.044	3.685
704	2451695	2451785	13	14	FFTFFFFFF	FT	0.675	0.594	-0.007	0.106	3.794	3.88
704	2452115	2452325	12	13	FFTFFFFFF	FT	0.787	0.765	-0.029	-0.026	2.673	2.753
704	2452205	2452235	13	14	FFTFFFFFF	FT	0.701	0.672	-0.005	-0.018	3.153	3.149

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2452265	2452295	18	19	FFTFFFFFF	FT	0.582	0.646	0.032	0.017	3.429	3.271
704	2452325	2452355	14	15	FFTFFFFFF	FT	0.723	0.678	0.082	0.159	3.24	3.198
704	2452595	2452685	13	14	FFTFFFFFF	FT	0.751	0.713	-0.049	0.144	3.159	3.209
704	2452745	2452805	14	15	FFTFFFFFF	FT	0.768	0.696	0.094	0.135	3.01	3.209
704	2453015	2453045	14	15	FFTFFFFFF	FT	0.745	0.646	0.057	0.153	3.111	3.578
704	2453705	2453735	14	15	FFTFFFFFF	FT	0.724	0.613	0.036	0.122	3.548	3.392
704	2453735	2453765	14	15	FFTFFFFFF	FT	0.671	0.575	-0.026	0.114	3.966	4.338
704	2451545	2451575	15	16	FFTFFFFFF	FT	0.469	0.541	0.046	-0.108	4.607	4.217
704	2451575	2451605	14	15	FFTFFFFFF	FT	0.573	0.526	0.021	0.141	4.013	4.062
704	2451605	2451635	15	16	FFTFFFFFF	FT	0.521	0.547	0.038	0.158	4.487	4.108
704	2451635	2451665	15	16	FFTFFFFFF	FT	0.472	0.495	0.035	0.167	4.887	4.292
704	2452085	2452145	14	15	FFTFFFFFF	FT	0.602	0.592	0.012	0.086	4.177	3.7
704	2452235	2452265	14	15	FFTFFFFFF	FT	0.684	0.648	0.038	0.068	3.282	3.391
704	2452295	2452325	16	17	FFTFFFFFF	FT	0.548	0.57	0.028	0.063	4.072	3.904
704	2452595	2452625	15	16	FFTFFFFFF	FT	0.511	0.508	0.016	0.085	4.771	4.651
704	2452625	2452655	14	15	FFTFFFFFF	FT	0.665	0.643	0.018	0.098	3.751	3.726
704	2452655	2452685	15	16	FFTFFFFFF	FT	0.56	0.577	0.02	0.096	4.208	3.88
704	2453615	2453645	16	17	FFTFFFFFF	FT	0.483	0.497	-0.009	0.103	4.683	4.607
704	2453645	2453675	16	17	FFTFFFFFF	FT	0.466	0.472	-0.021	0.085	4.671	4.784
704	2453675	2453705	15	16	FFTFFFFFF	FT	0.498	0.481	-0.038	0.076	5.018	5.047
704	2453735	2453765	15	16	FFTFFFFFF	FT	0.552	0.511	0.04	0.087	4.612	4.759
704	2453795	2453825	14	15	FFTFFFFFF	FT	0.803	0.671	0.147	0.152	3.057	3.282
704	2453795	2453825	15	16	FFTFFFFFF	FT	0.669	0.575	0.139	0.154	3.643	4.081
704	2454125	2454155	15	16	FFTFFFFFF	FT	0.639	0.55	0.131	0.109	3.901	4.313
704	2454155	2454305	14	15	FFTFFFFFF	FT	0.815	0.725	0.125	0.135	2.926	3.034
704	2454815	2454845	14	15	FFTFFFFFF	FT	0.729	0.661	0.007	0.073	3.192	3.446

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2454845	2454875	14	15	FFTFFFFFF	FT	0.724	0.617	0.005	0.128	3.323	3.753
704	2454875	2454905	15	16	FFTFFFFFF	FT	0.661	0.574	0.151	0.157	3.392	3.743
704	2451755	2451785	16	17	FFTFFFFFF	FT	0.425	0.491	-0.022	0.139	4.59	4.054
704	2451755	2451785	17	18	FFTFFFFFF	FT	0.485	0.543	-0.013	0.098	3.941	3.604
704	2451785	2451815	13	14	FFTFFFFFF	FT	0.703	0.622	0.019	0.059	3.383	3.594
704	2451815	2451845	15	16	FFTFFFFFF	FT	0.437	0.438	-0.003	0.095	5.455	5.113
704	2452265	2452295	14	15	FFTFFFFFF	FT	0.627	0.632	0.009	0.017	3.426	3.603
704	2452265	2452295	15	16	FFTFFFFFF	FT	0.595	0.592	0.083	0.018	3.86	3.923
704	2452355	2452385	14	15	FFTFFFFFF	FT	0.739	0.671	0.11	0.147	3.18	3.492
704	2453135	2453345	13	14	FFTFFFFFF	FT	0.788	0.694	0.021	0.073	3.036	3.329
704	2453345	2453375	14	15	FFTFFFFFF	FT	0.685	0.628	0.004	0.038	3.689	3.899
704	2454725	2454785	14	15	FFTFFFFFF	FT	0.707	0.666	0.005	0.099	3.261	3.3
704	2454785	2454815	14	15	FFTFFFFFF	FT	0.692	0.655	-0.022	0.122	3.321	3.234
704	2454965	2455085	14	15	FFTFFFFFF	FT	0.72	0.659	0.02	0.133	3.14	3.188
704	2451095	2451125	16	17	FFTFFFFFF	FT	0.645	0.674	-0.032	0.016	3.147	3.167
704	2451455	2451485	17	18	FFTFFFFFF	FT	0.456	0.476	0.009	-0.003	4.147	4.116
704	2451515	2451545	15	16	FFTFFFFFF	FT	0.517	0.512	0.062	0.032	4.968	4.754
704	2451575	2451605	15	16	FFTFFFFFF	FT	0.466	0.491	0.016	0.11	5.296	4.938
704	2451635	2451665	17	18	FFTFFFFFF	FT	0.516	0.575	0.054	0.144	4.033	3.647
704	2451935	2451965	17	18	FFTFFFFFF	FT	0.466	0.503	0.02	0.057	4.248	3.897
704	2451965	2451995	16	17	FFTFFFFFF	FT	0.421	0.458	0.016	0.11	4.87	4.654
704	2452025	2452055	16	17	FFTFFFFFF	FT	0.449	0.501	0.012	0.136	4.73	4.141
704	2452055	2452085	16	17	FFTFFFFFF	FT	0.477	0.52	0.021	0.139	4.449	3.971
704	2452415	2452445	16	17	FFTFFFFFF	FT	0.59	0.616	0.049	0.12	3.633	3.639
704	2452475	2452505	14	15	FFTFFFFFF	FT	0.671	0.602	-0.02	0.111	3.655	3.96
704	2452505	2452535	15	16	FFTFFFFFF	FT	0.522	0.557	0.009	0.101	4.435	4.338

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2452505	2452535	14	15	FFTFFFFFF	FT	0.645	0.593	-0.011	0.093	3.911	3.671
704	2452535	2452565	14	15	FFTFFFFFF	FT	0.592	0.601	-0.026	0.084	3.933	4.149
704	2452535	2452565	15	16	FFTFFFFFF	FT	0.517	0.555	-0.018	0.09	4.425	4.36
704	2452565	2452595	16	17	FFTFFFFFF	FT	0.476	0.523	-0.016	0.059	4.495	4.16
704	2452595	2452625	17	18	FFTFFFFFF	FT	0.485	0.518	-0.007	0.074	4.399	4.064
704	2452925	2452955	17	18	FFTFFFFFF	FT	0.515	0.468	0.005	0.086	4.182	4.686
704	2452955	2452985	16	17	FFTFFFFFF	FT	0.483	0.505	0.008	0.072	4.831	4.859
704	2452985	2453015	15	16	FFTFFFFFF	FT	0.601	0.545	0.057	0.079	4.043	4.336
704	2453015	2453045	15	16	FFTFFFFFF	FT	0.625	0.544	0.063	0.085	3.966	4.597
704	2453045	2453075	16	17	FFTFFFFFF	FT	0.531	0.505	0.082	0.116	4.578	4.65
704	2453075	2453105	15	16	FFTFFFFFF	FT	0.631	0.554	0.139	0.167	3.768	4.211
704	2453105	2453135	16	17	FFTFFFFFF	FT	0.522	0.51	0.096	0.125	4.2	4.392
704	2453105	2453135	17	18	FFTFFFFFF	FT	0.498	0.528	0.089	0.124	4.116	4.071
704	2453135	2453165	17	18	FFTFFFFFF	FT	0.499	0.523	0.085	0.123	4.285	4.112
704	2453135	2453165	18	19	FFTFFFFFF	FT	0.552	0.598	0.091	0.125	3.673	3.541
704	2453375	2453405	18	19	FFTFFFFFF	FT	0.528	0.584	0.076	0.113	3.804	3.654
704	2453465	2453495	16	17	FFTFFFFFF	FT	0.503	0.51	0.137	0.146	4.135	4.49
704	2453885	2453915	16	17	FFTFFFFFF	FT	0.582	0.585	0.108	0.076	3.776	3.783
704	2453915	2453945	15	16	FFTFFFFFF	FT	0.59	0.604	0.027	0.089	4.009	4.051
704	2453915	2453975	14	15	FFTFFFFFF	FT	0.733	0.658	-0.034	0.121	3.308	3.602
704	2453975	2454005	14	15	FFTFFFFFF	FT	0.74	0.631	0.008	0.174	3.304	3.541
704	2454005	2454035	14	15	FFTFFFFFF	FT	0.746	0.596	-0.022	0.102	3.109	3.723
704	2454035	2454065	14	15	FFTFFFFFF	FT	0.734	0.648	0.019	0.119	3.26	3.455
704	2454035	2454065	15	16	FFTFFFFFF	FT	0.611	0.557	0.01	0.116	4.099	4.327
704	2454065	2454095	16	17	FFTFFFFFF	FT	0.527	0.549	0.023	0.091	4.216	4.202
704	2454395	2454425	17	18	FFTFFFFFF	FT	0.494	0.522	0.03	0.077	4.31	4.162

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
704	2454425	2454455	16	17	FFTFFFFFF	FT	0.545	0.554	0.084	0.092	4.187	4.268
704	2454455	2454485	15	16	FFTFFFFFF	FT	0.615	0.595	0.117	0.104	3.842	3.889
704	2454485	2454515	16	17	FFTFFFFFF	FT	0.534	0.523	0.117	0.114	4.222	4.422
704	2454515	2454545	16	17	FFTFFFFFF	FT	0.562	0.545	0.174	0.143	3.934	4.285
704	2454545	2454575	16	17	FFTFFFFFF	FT	0.544	0.535	0.173	0.151	3.929	4.238
704	2454545	2454575	15	16	FFTFFFFFF	FT	0.658	0.592	0.197	0.146	3.427	3.81
704	2454575	2454605	16	17	FFTFFFFFF	FT	0.575	0.523	0.178	0.147	3.908	4.316
704	2454845	2454875	18	19	FFTFFFFFF	FT	0.566	0.607	0.111	0.159	3.568	3.473
704	2451335	2451365	15	16	FFTFFFFFF	FT	0.535	0.51	0.039	0.125	4.301	4.176
704	2451545	2451695	13	14	FFTFFFFFF	FT	0.668	0.651	0.04	0.154	3.615	3.339
704	2451665	2451695	15	16	FFTFFFFFF	FT	0.482	0.502	0.031	0.2	5.371	4.339
704	2451695	2451725	15	16	FFTFFFFFF	FT	0.521	0.575	0.027	0.152	4.516	4.138
704	2452085	2452175	13	14	FFTFFFFFF	FT	0.702	0.668	-0.02	-0.02	3.153	3.217
704	2452175	2452205	13	14	FFTFFFFFF	FT	0.732	0.644	-0.054	0.013	2.871	3.173
704	2452925	2452955	16	17	FFTFFFFFF	FT	0.52	0.444	-0.001	0.091	4.458	5.37
704	2452955	2452985	15	16	FFTFFFFFF	FT	0.556	0.519	0.013	0.08	4.44	4.754
704	2453045	2453135	13	14	FFTFFFFFF	FT	0.82	0.775	0.116	0.191	3.003	2.717
704	2453165	2453225	14	15	FFTFFFFFF	FT	0.772	0.662	0.037	0.097	3.083	3.729
704	2453945	2454065	13	14	FFTFFFFFF	FT	0.796	0.741	0.004	0.131	2.96	2.994
704	2454095	2454125	15	16	FFTFFFFFF	FT	0.588	0.547	0.055	0.093	4.291	4.407
704	2454365	2454395	15	16	FFTFFFFFF	FT	0.632	0.548	0.012	0.129	3.734	4.03
704	2454395	2454425	15	16	FFTFFFFFF	FT	0.594	0.546	-0.01	0.097	3.989	4.394
704	2454395	2454455	14	15	FFTFFFFFF	FT	0.721	0.649	0.016	0.095	3.231	3.286
704	2454545	2454575	14	15	FFTFFFFFF	FT	0.754	0.72	0.14	0.185	2.935	3.103
704	2454575	2454725	14	15	FFTFFFFFF	FT	0.743	0.647	0.107	0.142	3.192	3.4
704	2454575	2454605	15	16	FFTFFFFFF	FT	0.663	0.57	0.187	0.139	3.497	4.128

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
704	2454845	2454875	15	16	FFTFFFFFF	FT	0.629	0.517	0.042	0.092	4.024	4.556
704	2451335	2451425	14	15	FFTFFFFFF	FT	0.572	0.529	0.002	0.1	4.535	4.276
704	2451335	2451365	16	17	FFTFFFFFF	FT	0.459	0.499	0.018	0.127	4.927	4.115
704	2451365	2451425	16	17	FFTFFFFFF	TF	0.393	0.447	-0.042	0.148	4.046	3.38
704	2451875	2451905	15	16	FFTFFFFFF	FT	0.424	0.46	0.03	0.049	5.475	5.246
704	2451905	2451935	15	16	FFTFFFFFF	FT	0.427	0.447	0.041	0.067	5.302	5.259
704	2452685	2452715	14	15	FFTFFFFFF	FT	0.704	0.623	0.08	0.14	3.459	3.514
704	2452715	2452745	14	15	FFTFFFFFF	FT	0.79	0.687	0.136	0.143	2.992	3.161
704	2452775	2452805	15	16	FFTFFFFFF	FT	0.639	0.622	0.093	0.142	3.859	3.837
704	2453015	2453045	16	17	FFTFFFFFF	FT	0.54	0.483	0.089	0.073	4.305	4.994
704	2453045	2453075	15	16	FFTFFFFFF	FT	0.606	0.536	0.092	0.134	4.124	4.377
704	2453075	2453105	14	15	FFTFFFFFF	FT	0.803	0.679	0.171	0.2	2.919	3.125
704	2453105	2453135	14	15	FFTFFFFFF	FT	0.801	0.677	0.123	0.166	3.118	3.301
704	2453135	2453165	14	15	FFTFFFFFF	FT	0.809	0.718	0.184	0.205	2.879	3.148
704	2453645	2453675	15	16	FFTFFFFFF	FT	0.532	0.509	0.002	0.096	4.356	4.523
704	2454785	2454815	16	17	FFTFFFFFF	FT	0.524	0.541	0.02	0.103	4.411	4.396
704	2454875	2454965	14	15	FFTFFFFFF	FT	0.765	0.679	0.127	0.206	3.069	3.127
704	2452325	2452355	17	18	FFTFFFFFF	FT	0.571	0.651	0.053	0.156	3.601	3.323
704	2452325	2452355	18	19	FFTFFFFFF	FT	0.622	0.706	0.081	0.171	3.296	3.042
704	2452595	2452805	12	13	FFTFFFFFF	FT	0.817	0.819	0.004	0.114	2.942	2.795
704	2453585	2454065	12	13	FFTFFFFFF	FT	0.803	0.858	0.013	0.106	2.881	2.667
704	2450495	2451035	14	15	FFTFFFFFF	FT	0.872	0.77	0.009	0.112	2.576	2.965
704	2451245	2451335	14	15	FFTFFFFFF	FT	0.791	0.759	0.037	0.108	2.743	2.828
704	2451815	2451845	16	17	FFTFFFFFF	FT	0.404	0.433	-0.01	0.066	5.13	4.641
704	2451845	2451875	15	16	FFTFFFFFF	FT	0.428	0.433	0.021	0.082	5.436	5.268
704	2452115	2452145	15	16	FFTFFFFFF	FT	0.514	0.559	-0.01	0.102	4.353	3.709

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2452145	2452175	15	16	FFTFFFFFF	FT	0.524	0.55	-0.008	0.095	4.351	4.025
704	2452145	2452175	14	15	FFTFFFFFF	FT	0.599	0.608	-0.04	0.066	3.612	3.678
704	2452175	2452205	14	15	FFTFFFFFF	FT	0.586	0.583	-0.019	0.08	3.746	3.906
704	2453495	2453525	15	16	FFTFFFFFF	FT	0.625	0.566	0.174	0.178	3.872	4.163
704	2454425	2454455	15	16	FFTFFFFFF	FT	0.623	0.586	0.084	0.067	3.859	4.2
704	2454455	2454545	13	14	FFTFFFFFF	FT	0.778	0.77	0.084	0.075	3.067	2.697
704	2454485	2454515	14	15	FFTFFFFFF	FT	0.742	0.676	0.075	0.135	3.064	2.963
704	2454515	2454545	14	15	FFTFFFFFF	FT	0.761	0.689	0.139	0.145	3.024	3.016
704	2454995	2455055	15	16	FFTFFFFFF	FT	0.631	0.605	0.073	0.14	3.817	3.811
704	2451155	2451215	15	16	FFTFFFFFF	FT	0.738	0.747	-0.026	0	2.828	2.843
704	2451605	2451635	14	15	FFTFFFFFF	FT	0.558	0.577	0.044	0.168	3.919	3.612
704	2451635	2451665	14	15	FFTFFFFFF	FT	0.57	0.562	0.053	0.157	4.081	4.113
704	2451935	2451965	15	16	FFTFFFFFF	FT	0.446	0.446	0.021	0.09	5.431	5.38
704	2451965	2451995	14	15	FFTFFFFFF	FT	0.572	0.542	0.048	0.13	4.01	4.005
704	2451965	2452085	13	14	FFTFFFFFF	FT	0.687	0.632	0.036	0.193	3.475	3.344
704	2452535	2452565	13	14	FFTFFFFFF	FT	0.708	0.692	-0.05	0.085	3.132	3.459
704	2452565	2452595	13	14	FFTFFFFFF	FT	0.694	0.648	-0.035	-0.004	3.353	3.655
704	2452895	2452925	16	17	FFTFFFFFF	FT	0.486	0.482	-0.047	0.092	4.671	4.939
704	2452925	2452955	15	16	FFTFFFFFF	FT	0.561	0.448	0.013	0.099	4.27	5.458
704	2452955	2452985	14	15	FFTFFFFFF	FT	0.704	0.642	0.03	0.085	3.367	3.805
704	2453045	2453075	14	15	FFTFFFFFF	FT	0.748	0.648	0.105	0.167	3.251	3.752
704	2453105	2453135	15	16	FFTFFFFFF	FT	0.637	0.558	0.136	0.144	3.692	4.147
704	2453345	2453375	15	16	FFTFFFFFF	FT	0.56	0.561	0.036	0.079	4.519	4.697
704	2453405	2453435	15	16	FFTFFFFFF	FT	0.545	0.542	0.08	0.107	4.411	4.841
704	2453435	2453465	15	16	FFTFFFFFF	FT	0.583	0.552	0.135	0.195	4.077	4.142
704	2454305	2454335	15	16	FFTFFFFFF	FT	0.584	0.557	-0.02	0.119	3.999	4.063

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2454485	2454515	15	16	FFTFFFFFF	FT	0.625	0.539	0.075	0.095	3.779	4.167
704	2454515	2454545	15	16	FFTFFFFFF	FT	0.65	0.572	0.177	0.159	3.453	3.931
704	2454815	2454845	15	16	FFTFFFFFF	FT	0.647	0.583	0.05	0.114	3.764	4.008
704	2451845	2451875	16	17	FFTFFFFFF	FT	0.419	0.44	0.008	0.05	5.055	4.836
704	2452205	2452235	16	17	FFTFFFFFF	FT	0.52	0.563	-0.028	0.041	4.145	4.002
704	2452355	2452385	15	16	FFTFFFFFF	FT	0.61	0.592	0.088	0.144	3.741	4.01
704	2452385	2452415	16	17	FFTFFFFFF	FT	0.541	0.574	0.041	0.115	3.989	3.746
704	2452685	2452715	16	17	FFTFFFFFF	FT	0.546	0.559	0.072	0.108	4.075	4.152
704	2452865	2452895	16	17	FFTFFFFFF	FT	0.49	0.513	-0.058	0.138	4.428	4.193
704	2453225	2453285	16	17	FFTFFFFFF	TF	0.504	0.509	0.012	0.053	4.176	4.51
704	2453195	2453315	15	16	FFTFFFFFF	TF	0.564	0.614	0.099	0.081	3.779	3.909
704	2453135	2453525	14	15	FFTFFFFFF	TF	0.63	0.627	0.05	0.061	3.425	4.032
704	2453735	2453765	17	18	FFTFFFFFF	FT	0.488	0.521	0.06	0.082	4.323	4.133
704	2453765	2453795	15	16	FFTFFFFFF	FT	0.579	0.526	0.104	0.154	4.089	4.596
704	2453825	2453855	15	16	FFTFFFFFF	FT	0.669	0.569	0.169	0.144	3.611	4.308
704	2453855	2453885	15	16	FFTFFFFFF	FT	0.621	0.574	0.155	0.168	3.867	4.127
704	2453885	2453915	15	16	FFTFFFFFF	FT	0.636	0.596	0.119	0.14	3.683	3.902
704	2453885	2453915	14	15	FFTFFFFFF	FT	0.763	0.661	0.1	0.107	3.08	3.925
704	2454275	2454305	15	16	FFTFFFFFF	FT	0.683	0.657	0.037	0.071	3.371	3.594
704	2454305	2454335	14	15	FFTFFFFFF	FT	0.716	0.623	-0.029	0.096	3.534	3.415
704	2454785	2454815	17	18	FFTFFFFFF	FT	0.512	0.557	0.031	0.127	4.121	3.939
704	2454815	2454845	16	17	FFTFFFFFF	FT	0.563	0.541	0.066	0.109	4.157	4.373
704	2454905	2454935	15	16	FFTFFFFFF	FT	0.634	0.581	0.192	0.14	3.494	4.209
704	2454935	2454995	15	16	FFTFFFFFF	FT	0.63	0.559	0.195	0.178	3.681	3.924
704	2452445	2452595	12	13	FFTFFFFFF	FT	0.807	0.788	-0.046	-0.008	2.764	2.877
704	2452865	2452895	14	15	FFTFFFFFF	FT	0.694	0.597	-0.035	0.093	3.611	3.964

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
704	2452805	2453015	12	13	FFTFFFFFF	FT	0.827	0.833	0.005	-0.002	2.838	2.788
704	2453345	2453585	13	14	FFTFFFFFF	FT	0.798	0.735	0.034	0.134	2.924	2.98
704	2452475	2452505	15	16	FFTFFFFFF	FT	0.539	0.577	-0.01	0.101	4.323	3.883
704	2453135	2453165	15	16	FFTFFFFFF	FT	0.651	0.574	0.158	0.132	3.72	4.22
704	2454335	2454365	14	15	FFTFFFFFF	FT	0.727	0.606	0.012	0.076	3.172	3.661
704	2451455	2451485	14	15	FFTFFFFFF	FT	0.552	0.469	-0.013	0.09	4.685	4.72
704	2451485	2451515	14	15	FFTFFFFFF	FT	0.573	0.549	0.01	0.066	4.208	4.553
704	2451995	2452025	14	15	FFTFFFFFF	FT	0.607	0.524	0.015	0.144	4.339	4.254
704	2452025	2452055	14	15	FFTFFFFFF	FT	0.584	0.531	0.033	0.15	4.387	4.399
704	2452325	2452445	12	13	FFTFFFFFF	FT	0.848	0.869	0.076	0.094	2.79	2.675
704	2452415	2452445	14	15	FFTFFFFFF	FT	0.704	0.679	0.066	0.162	3.373	3.479
704	2452415	2452445	17	18	FFTFFFFFF	FT	0.595	0.629	0.047	0.098	3.496	3.404
704	2452415	2452445	15	16	FFTFFFFFF	FT	0.627	0.638	0.08	0.129	3.728	3.625
704	2452445	2452475	14	15	FFTFFFFFF	FT	0.733	0.698	0.1	0.092	3.28	3.495
704	2452445	2452475	16	17	FFTFFFFFF	FT	0.56	0.594	0.008	0.075	3.735	3.711
704	2452445	2452475	15	16	FFTFFFFFF	FT	0.59	0.615	0.038	0.105	3.687	3.769
704	2454365	2454395	14	15	FFTFFFFFF	FT	0.763	0.656	0.056	0.104	3.142	3.227
704	2452565	2452595	14	15	FFTFFFFFF	FT	0.565	0.579	-0.046	0.063	4.284	3.961
704	2452595	2452625	14	15	FFTFFFFFF	FT	0.618	0.564	0.001	0.071	3.953	4.257
704	2452625	2452655	15	16	FFTFFFFFF	FT	0.555	0.552	0.054	0.068	4.405	4.576
704	2452985	2453015	14	15	FFTFFFFFF	FT	0.71	0.662	0.023	0.122	3.29	3.392
704	2453165	2453195	15	16	FFTFFFFFF	FT	0.671	0.614	0.145	0.137	3.508	3.955
704	2451425	2451455	14	15	FFTFFFFFF	FT	0.58	0.538	0.042	0.083	4.3	4.162
704	2451395	2451455	15	16	FFTFFFFFF	FT	0.46	0.48	0.028	0.103	4.867	4.732
704	2451485	2451515	15	16	FFTFFFFFF	FT	0.491	0.458	0.019	0.076	5.24	5.323
704	2451995	2452025	15	16	FFTFFFFFF	FT	0.482	0.474	0.042	0.132	4.793	4.775

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2452805	2452865	14	15	FFTFFFFFF	FT	0.765	0.701	0.098	0.046	3.145	3.44
704	2452895	2452925	14	15	FFTFFFFFF	FT	0.688	0.587	0.007	0.078	3.531	3.85
704	2452925	2452955	14	15	FFTFFFFFF	FT	0.717	0.582	0.025	0.088	3.319	4.335
704	2452985	2453015	16	17	FFTFFFFFF	FT	0.526	0.526	0.053	0.076	4.524	4.673
704	2453255	2453285	16	17	FFTFFFFFF	FT	0.476	0.47	-0.037	0.094	4.715	4.893
704	2453285	2453315	16	17	FFTFFFFFF	FT	0.48	0.476	-0.041	0.096	4.693	4.812
704	2454815	2455085	13	14	FFTFFFFFF	FT	0.764	0.739	0.027	0.064	2.985	2.968
704	2451125	2451155	16	17	FFTFFFFFF	FT	0.645	0.688	0.026	-0.052	3.199	3.189
704	2451215	2451245	15	16	FFTFFFFFF	FT	0.692	0.697	-0.018	0.069	2.883	2.941
704	2452175	2452205	16	17	FFTFFFFFF	FT	0.505	0.541	-0.036	0.049	4.265	4.162
704	2452205	2452235	15	16	FFTFFFFFF	FT	0.543	0.568	-0.024	0.069	4.129	3.977
704	2452625	2452655	16	17	FFTFFFFFF	FT	0.517	0.54	0.035	0.065	4.465	4.29
704	2453375	2453405	15	16	FFTFFFFFF	FT	0.515	0.499	0.071	0.084	4.775	5.064
704	2453375	2453405	16	17	FFTFFFFFF	FT	0.466	0.494	0.07	0.073	4.757	4.701
704	2453405	2453435	16	17	FFTFFFFFF	FT	0.462	0.493	0.098	0.117	4.839	4.785
704	2453675	2453705	16	17	FFTFFFFFF	FT	0.444	0.473	-0.019	0.073	4.912	5.03
704	2453705	2453735	16	17	FFTFFFFFF	FT	0.486	0.5	0.016	0.067	4.604	4.558
704	2453705	2453735	15	16	FFTFFFFFF	FT	0.55	0.515	0.031	0.088	4.451	4.784
704	2454605	2455085	14	15	FFTFFFFFF	TF	0.669	0.678	0.024	0.004	3.348	3.48
704	2451575	2451605	16	17	FFTFFFFFF	FT	0.44	0.478	0.04	0.113	5.259	4.568
704	2452535	2452565	16	17	FFTFFFFFF	FT	0.492	0.525	-0.027	0.065	4.295	4.216
704	2452565	2452595	15	16	FFTFFFFFF	FT	0.489	0.531	-0.033	0.074	4.598	4.431
704	2450795	2450855	16	17	FFTFFFFFF	FT	0.442	0.454	0.011	-0.105	5.021	4.558
704	2450495	2451425	13	14	FFTFFFFFF	FT	0.797	0.831	0.005	0.103	2.726	2.732
704	2452445	2452775	14	15	FFTFFFFFF	TF	0.644	0.643	0.06	0.055	3.518	3.579
704	2454065	2454095	14	15	FFTFFFFFF	FT	0.69	0.644	0.063	0.09	3.433	3.828

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2451095	2451245	14	15	FFTFFFFFF	FT	0.736	0.766	-0.051	0.117	2.889	2.739
704	2451665	2451695	14	15	FFTFFFFFF	FT	0.602	0.56	0.004	0.173	4.364	3.951
704	2452235	2452265	16	17	FFTFFFFFF	FT	0.561	0.595	0.015	0.057	3.94	3.709
704	2452475	2452505	16	17	FFTFFFFFF	FT	0.533	0.565	-0.027	0.093	3.99	3.795
704	2452505	2452535	16	17	FFTFFFFFF	FT	0.487	0.536	-0.017	0.081	4.394	4.298
704	2453135	2453165	16	17	FFTFFFFFF	FT	0.527	0.514	0.1	0.133	4.46	4.474
704	2454305	2454335	16	17	FFTFFFFFF	FT	0.524	0.527	-0.027	0.113	4.171	4.153
704	2454335	2454365	15	16	FFTFFFFFF	FT	0.624	0.54	-0.027	0.13	3.707	4.046
704	2454725	2454755	16	17	FFTFFFFFF	FT	0.481	0.505	-0.015	0.127	4.517	4.671
704	2454755	2454785	16	17	FFTFFFFFF	FT	0.517	0.509	-0.017	0.1	4.523	4.6
704	2451425	2451545	13	14	FFTFFFFFF	FT	0.656	0.645	0.02	0.022	3.51	3.511
704	2452325	2452355	16	17	FFTFFFFFF	FT	0.568	0.616	0.049	0.148	3.804	3.58
704	2453285	2453315	14	15	FFTFFFFFF	FT	0.686	0.575	-0.028	0.116	3.512	4.096
704	2453585	2453765	13	14	FFTFFFFFF	FT	0.796	0.731	-0.013	0.12	2.949	3.115
704	2454545	2454665	13	14	FFTFFFFFF	FT	0.785	0.764	0.08	0.063	2.93	2.76
704	2451545	2451575	14	15	FFTFFFFFF	FT	0.588	0.605	0.044	-0.067	4.12	3.787
704	2451935	2451965	14	15	FFTFFFFFF	FT	0.558	0.489	0.007	0.097	4.622	4.167
704	2452295	2452325	17	18	FFTFFFFFF	FT	0.544	0.58	0.032	0.053	3.851	3.683
704	2451815	2451845	17	18	FFTFFFFFF	FT	0.442	0.472	-0.012	0.042	4.312	4.04
704	2452265	2452295	17	18	FFTFFFFFF	FT	0.552	0.604	0.034	0.015	3.71	3.555
704	2453855	2453885	14	15	FFTFFFFFF	FT	0.782	0.66	0.153	0.199	3.071	3.474
704	2451935	2451965	16	17	FFTFFFFFF	FT	0.408	0.435	0.01	0.071	5.227	4.811
704	2451695	2451725	17	18	FFTFFFFFF	FT	0.547	0.624	-0.001	0.147	3.69	3.349
704	2452115	2452145	16	17	FFTFFFFFF	FT	0.514	0.558	-0.029	0.108	4.178	3.914
704	2452775	2453135	14	15	FFTFFFFFF	TF	0.671	0.643	0.034	0.036	3.507	3.533
704	2454665	2454815	13	14	FFTFFFFFF	FT	0.773	0.795	0.018	-0.021	2.982	2.934

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
704	2451005	2451065	16	17	FFTFFFFFF	FT	0.695	0.728	-0.013	0.064	3.113	2.942
704	2451005	2451065	15	16	FFTFFFFFF	FT	0.713	0.769	-0.093	0.133	2.862	2.752
704	2451095	2451125	15	16	FFTFFFFFF	FT	0.672	0.706	-0.089	0.107	2.914	2.897
704	2451125	2451155	15	16	FFTFFFFFF	FT	0.677	0.706	0.01	0.024	3.151	3.096
704	2451185	2451215	16	17	FFTFFFFFF	FT	0.682	0.756	-0.044	0.081	3.069	2.918
704	2451485	2451515	17	18	FFTFFFFFF	FT	0.467	0.498	0.017	0.017	4.283	4.067
704	2451515	2451545	16	17	FFTFFFFFF	FT	0.481	0.514	0.038	-0.001	4.741	4.282
704	2452745	2452775	16	17	FFTFFFFFF	FT	0.551	0.561	0.071	0.148	4.046	3.896
704	2452745	2452775	17	18	FFTFFFFFF	FT	0.578	0.612	0.095	0.143	3.633	3.477
704	2453315	2453345	16	17	FFTFFFFFF	FT	0.526	0.494	-0.026	0.096	4.552	4.618
704	2453615	2453645	17	18	FFTFFFFFF	FT	0.49	0.526	0.013	0.113	4.199	4.039
704	2453735	2453945	15	16	FFTFFFFFF	TF	0.571	0.556	0.016	0.084	4.099	3.996
704	2453795	2453885	16	17	FFTFFFFFF	TF	0.544	0.537	0.04	0.09	4.324	4.493
704	2454695	2454725	16	17	FFTFFFFFF	FT	0.464	0.493	-0.02	0.13	4.562	4.431
704	2454875	2454905	16	17	FFTFFFFFF	FT	0.558	0.537	0.157	0.135	3.881	4.491
704	2454905	2454935	17	18	FFTFFFFFF	FT	0.558	0.571	0.221	0.165	3.578	3.793
704	2451515	2451545	14	15	FFTFFFFFF	FT	0.594	0.56	0.057	0.059	4.259	4.043
704	2451395	2451455	17	18	FFTFFFFFF	FT	0.47	0.52	0.001	0.057	4.045	3.741
704	2451395	2451455	16	17	FFTFFFFFF	FT	0.432	0.475	0.004	0.083	4.708	4.319
704	2451995	2452445	14	15	FFTFFFFFF	TF	0.604	0.642	0.05	0.081	3.464	3.48
704	2452325	2452415	16	17	FFTFFFFFF	TF	0.569	0.628	0.002	0.046	3.675	3.493
704	2453345	2453375	16	17	FFTFFFFFF	FT	0.513	0.535	0.003	0.089	4.497	4.425
704	2454365	2454395	16	17	FFTFFFFFF	FT	0.553	0.514	-0.006	0.098	4.216	4.401
704	2454395	2454425	16	17	FFTFFFFFF	FT	0.5	0.502	0.007	0.077	4.448	4.707
704	2454935	2454965	16	17	FFTFFFFFF	FT	0.596	0.564	0.234	0.199	3.639	3.905
704	2450915	2450945	17	18	FFTFFFFFF	FT	0.612	0.661	0.019	0.008	3.278	3.139

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2451245	2451275	16	17	FFTFFFFFF	FT	0.677	0.677	0.027	0.086	3.139	3.142
704	2451785	2451815	16	17	FFTFFFFFF	FT	0.424	0.446	-0.017	0.08	5.532	4.63
704	2451815	2451875	15	16	FFTFFFFFF	TF	0.45	0.476	0.075	0.03	4.98	4.709
704	2451875	2451905	15	16	FFTFFFFFF	TF	0.337	0.316	-0.015	0.016	7.867	5.866
704	2451875	2451905	16	17	FFTFFFFFF	TF	0.358	0.384	-0.006	0.009	5.053	5.273
704	2451875	2451905	17	18	FFTFFFFFF	TF	0.433	0.476	0.003	-0.006	4.488	4.257
704	2451965	2451995	17	18	FFTFFFFFF	FT	0.475	0.518	0.02	0.102	3.914	3.811
704	2452235	2452265	18	19	FFTFFFFFF	FT	0.598	0.646	0.001	0.041	3.434	3.291
704	2452235	2452265	17	18	FFTFFFFFF	FT	0.567	0.606	0.004	0.042	3.665	3.561
704	2452835	2452865	15	16	FFTFFFFFF	FT	0.568	0.533	0.022	0.123	4.312	4.213
704	2453015	2453045	17	18	FFTFFFFFF	FT	0.532	0.499	0.094	0.086	4.032	4.222
704	2453045	2453075	17	18	FFTFFFFFF	FT	0.5	0.517	0.079	0.118	4.334	4.257
704	2453345	2453375	17	18	FFTFFFFFF	FT	0.518	0.561	0.007	0.099	4.151	3.987
704	2453435	2453465	16	17	FFTFFFFFF	FT	0.489	0.495	0.138	0.141	4.353	4.579
704	2453495	2453525	17	18	FFTFFFFFF	FT	0.527	0.534	0.143	0.116	3.972	3.979
704	2453795	2453885	17	18	FFTFFFFFF	TF	0.527	0.559	0.022	0.066	3.816	3.788
704	2453975	2454005	15	16	FFTFFFFFF	FT	0.577	0.529	-0.005	0.132	4.242	4.606
704	2454005	2454035	16	17	FFTFFFFFF	FT	0.558	0.514	-0.011	0.104	4.093	4.369
704	2454035	2454065	16	17	FFTFFFFFF	FT	0.551	0.551	0	0.119	4.184	4.264
704	2454035	2454065	17	18	FFTFFFFFF	FT	0.562	0.591	0.011	0.14	3.854	3.792
704	2454365	2454395	18	19	FFTFFFFFF	FT	0.557	0.579	0.023	0.101	3.751	3.631
704	2454365	2454395	17	18	FFTFFFFFF	FT	0.531	0.523	0.007	0.086	4.204	4.103
704	2454455	2454485	16	17	FFTFFFFFF	FT	0.552	0.564	0.102	0.103	4.101	4.095
704	2454575	2454605	17	18	FFTFFFFFF	FT	0.583	0.566	0.213	0.152	3.567	3.774
704	2454575	2454605	18	19	FFTFFFFFF	FT	0.638	0.635	0.226	0.153	3.194	3.26
704	2454845	2454875	17	18	FFTFFFFFF	FT	0.527	0.54	0.102	0.135	4.085	4.096

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2451905	2451935	16	17	FFTFFFFFFF	FT	0.398	0.446	0.016	0.051	5.094	4.873
704	2451965	2451995	15	16	FFTFFFFFFF	FT	0.463	0.484	0.051	0.113	4.792	4.745
704	2452475	2452565	16	17	FFTFFFFFFF	TF	0.52	0.573	0.025	0.023	4.156	3.778
704	2454605	2454635	16	17	FFTFFFFFFF	FT	0.595	0.565	0.163	0.123	3.914	4.246
704	2452865	2452895	15	16	FFTFFFFFFF	FT	0.527	0.521	-0.047	0.137	4.711	4.437
704	2454125	2454155	14	15	FFTFFFFFFF	FT	0.756	0.673	0.051	0.149	3.105	3.297
704	2451215	2451245	16	17	FFTFFFFFFF	FT	0.621	0.65	0.033	0.051	3.488	3.16
704	2451725	2451815	16	17	FFTFFFFFFF	TF	0.449	0.527	-0.001	0.174	4.173	3.638
704	2451755	2451815	17	18	FFTFFFFFFF	TF	0.452	0.519	-0.015	0.107	4.391	4.124
704	2451725	2451995	14	15	FFTFFFFFFF	TF	0.488	0.503	0.031	0.065	4.728	4.709
704	2451935	2452055	15	16	FFTFFFFFFF	TF	0.472	0.513	0.046	0.085	4.522	4.551
704	2451965	2452025	16	17	FFTFFFFFFF	TF	0.4	0.455	0.006	0.08	4.854	4.38
704	2453495	2453525	16	17	FFTFFFFFFF	FT	0.509	0.507	0.131	0.137	4.589	4.477
704	2454005	2454035	15	16	FFTFFFFFFF	FT	0.623	0.518	0.003	0.124	3.763	4.492
704	2454455	2454485	14	15	FFTFFFFFFF	FT	0.73	0.701	0.106	0.112	3.202	3.26
704	2454515	2454635	16	17	FFTFFFFFFF	TF	0.527	0.573	0.038	0.054	3.974	4.03
704	2454965	2454995	16	17	FFTFFFFFFF	FT	0.46	0.493	0.165	0.173	4.281	4.226
704	2454275	2454695	12	13	FFTFFFFFFF	FT	0.767	0.856	0.071	-0.006	2.877	2.518
704	2454695	2455085	12	13	FFTFFFFFFF	FT	0.803	0.851	0.002	-0.056	2.787	2.588
704	2451665	2451815	15	16	FFTFFFFFFF	TF	0.457	0.555	0	0.182	4.37	3.477
704	2452595	2452625	16	17	FFTFFFFFFF	FT	0.472	0.501	-0.006	0.072	4.82	4.609
704	2453525	2453555	15	16	FFTFFFFFFF	FT	0.659	0.64	0.134	0.126	3.498	3.552
704	2453705	2453735	17	18	FFTFFFFFFF	FT	0.487	0.527	0.025	0.081	4.291	4.101
704	2453945	2453975	16	17	FFTFFFFFFF	FT	0.516	0.502	-0.002	0.09	4.346	4.5
704	2453975	2454005	16	17	FFTFFFFFFF	FT	0.532	0.511	0.002	0.065	4.213	4.46
704	2453915	2454005	16	17	FFTFFFFFFF	TF	0.556	0.525	-0.007	0.07	4.135	4.426

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
704	2453945	2454065	15	16	FFTFFFFFF	TF	0.616	0.585	0.018	0.029	3.669	4.313
704	2454185	2454245	17	18	FFTFFFFFF	TF	0.54	0.593	-0.001	0.048	4.237	3.896
704	2454635	2454755	16	17	FFTFFFFFF	TF	0.483	0.527	0.008	0.07	4.377	4.568
704	2450495	2450915	15	16	FFTFFFFFF	FT	0.781	0.611	-0.017	0.021	3.008	3.554
704	2450885	2450915	17	18	FFTFFFFFF	FT	0.62	0.649	-0.009	0.009	3.324	3.261
704	2450885	2450915	16	17	FFTFFFFFF	FT	0.556	0.553	-0.027	0.007	3.719	3.621
704	2450915	2450945	15	16	FFTFFFFFF	FT	0.697	0.648	-0.043	0.127	3.133	3.133
704	2450945	2450975	16	17	FFTFFFFFF	FT	0.645	0.681	-0.042	0.107	3.281	3.087
704	2452715	2452775	16	17	FFTFFFFFF	TF	0.539	0.619	-0.016	0.084	3.723	3.789
704	2452685	2452865	15	16	FFTFFFFFF	TF	0.568	0.655	-0.001	0.09	3.703	3.358
704	2453165	2453195	16	17	FFTFFFFFF	FT	0.553	0.563	0.076	0.111	4.012	4.084
704	2453195	2453225	15	16	FFTFFFFFF	FT	0.586	0.556	0.025	0.122	3.958	4.096
704	2454215	2454245	15	16	FFTFFFFFF	FT	0.727	0.595	0.203	0.142	3.015	3.948
704	2454665	2454695	15	16	FFTFFFFFF	FT	0.576	0.527	0.014	0.115	3.961	4.383
704	2454695	2454725	15	16	FFTFFFFFF	FT	0.535	0.506	-0.019	0.107	4.319	4.492
704	2450495	2451695	12	13	FFTFFFFFF	FT	0.743	0.811	0.019	0.085	3.067	2.816
704	2452355	2452775	13	14	FFTFFFFFF	TF	0.748	0.724	0.012	0.105	2.943	3.104
704	2451455	2451485	15	16	FFTFFFFFF	FT	0.459	0.435	0.013	0.075	5.14	5.515
704	2451845	2451875	16	17	FFTFFFFFF	TF	0.424	0.452	0.015	0.026	4.938	4.672
704	2451905	2451935	16	17	FFTFFFFFF	TF	0.365	0.412	0.001	0.016	5.113	4.952
704	2453375	2453405	17	18	FFTFFFFFF	FT	0.475	0.515	0.075	0.09	4.488	4.31
704	2453585	2453615	16	17	FFTFFFFFF	FT	0.478	0.501	-0.004	0.097	4.631	4.537
704	2453615	2453645	15	16	FFTFFFFFF	FT	0.581	0.544	0.052	0.114	4.161	4.459
704	2453795	2453825	17	18	FFTFFFFFF	FT	0.575	0.58	0.129	0.161	3.616	3.656
704	2454065	2454095	16	17	FFTFFFFFF	TF	0.468	0.5	-0.01	0.026	4.383	4.748
704	2452085	2452115	15	16	FFTFFFFFF	FT	0.626	0.643	0.056	0.14	3.73	3.344

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2452085	2452115	16	17	FFTFFFFFF	FT	0.606	0.656	-0.026	0.12	3.42	3.539
704	2452085	2452115	17	18	FFTFFFFFF	FT	0.619	0.633	-0.019	0.093	3.611	3.378
704	2451395	2451515	15	16	FFTFFFFFF	TF	0.501	0.55	0.054	0.045	4.302	4.394
704	2451605	2451635	17	18	FFTFFFFFF	FT	0.469	0.511	0.031	0.097	4.378	4.07
704	2452835	2452865	16	17	FFTFFFFFF	FT	0.514	0.53	-0.043	0.145	4.179	4.128
704	2453285	2453315	17	18	FFTFFFFFF	FT	0.463	0.48	-0.04	0.088	4.509	4.442
704	2453855	2453885	16	17	FFTFFFFFF	FT	0.547	0.541	0.157	0.129	4.07	4.265
704	2454815	2455085	15	16	FFTFFFFFF	TF	0.543	0.541	0.039	0.037	4.269	4.809
704	2454875	2455085	16	17	FFTFFFFFF	TF	0.526	0.581	0.082	0.1	4.322	4.071
704	2454905	2454995	17	18	FFTFFFFFF	TF	0.489	0.536	0.043	0.081	4.313	4.315
704	2452265	2452295	15	16	FFTFFFFFF	TF	0.507	0.574	0.012	-0.041	4.12	3.934
704	2452295	2452385	15	16	FFTFFFFFF	TF	0.581	0.621	0.078	0.011	3.707	3.512
704	2452295	2452325	17	18	FFTFFFFFF	TF	0.549	0.642	0.029	0.009	3.567	3.457
704	2450915	2450945	16	17	FFTFFFFFF	FT	0.59	0.591	0.014	0.041	3.438	3.515
704	2451365	2451395	15	16	FFTFFFFFF	FT	0.434	0.451	0.017	0.106	4.961	4.47
704	2451455	2451485	16	17	FFTFFFFFF	FT	0.43	0.429	0.013	0.02	5	4.914
704	2451485	2451515	16	17	FFTFFFFFF	FT	0.433	0.452	0.018	0.034	5.076	4.786
704	2452025	2452055	17	18	FFTFFFFFF	FT	0.517	0.57	0.012	0.119	3.818	3.497
704	2454245	2454275	15	16	FFTFFFFFF	FT	0.716	0.637	0.192	0.16	3.223	3.47
704	2451785	2451815	15	16	FFTFFFFFF	FT	0.443	0.457	0.002	0.104	5.606	5.008
704	2454065	2454275	12	13	FFTFFFFFF	FT	0.74	0.819	0.047	0.028	2.933	2.713
704	2452175	2452205	15	16	FFTFFFFFF	FT	0.524	0.54	-0.03	0.085	4.303	4.273
704	2454065	2454095	15	16	FFTFFFFFF	TF	0.487	0.481	-0.039	0.072	4.338	4.528
704	2454095	2454335	15	16	FFTFFFFFF	TF	0.596	0.593	0.039	0.042	3.767	3.992
704	2454605	2454635	15	16	FFTFFFFFF	FT	0.669	0.626	0.17	0.134	3.575	3.674
704	2452025	2452055	15	16	FFTFFFFFF	FT	0.476	0.487	0.029	0.144	4.654	4.364

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2452055	2452085	15	16	FFTFFFFFF	FT	0.508	0.52	0.059	0.135	4.782	4.332
704	2453465	2453495	15	16	FFTFFFFFF	FT	0.637	0.568	0.16	0.214	3.533	3.833
704	2450975	2451005	15	16	FFTFFFFFF	FT	0.732	0.758	-0.03	0.058	3.015	2.86
704	2451035	2451095	14	15	FFTFFFFFF	FT	0.813	0.815	-0.054	0.28	2.459	2.517
704	2451425	2451485	16	17	FFTFFFFFF	TF	0.444	0.49	0.003	0.018	4.37	4.365
704	2453555	2453585	15	16	FFTFFFFFF	FT	0.616	0.583	0.081	0.089	4.093	3.959
704	2454005	2454035	17	18	FFTFFFFFF	FT	0.576	0.57	0	0.106	3.759	3.844
704	2451155	2451185	17	18	FFTFFFFFF	FT	0.7	0.8	0.046	-0.16	2.957	2.664
704	2451545	2451665	15	16	FFTFFFFFF	TF	0.448	0.517	0.039	-0.01	4.956	4.414
704	2452505	2452535	17	18	FFTFFFFFF	FT	0.502	0.54	-0.027	0.049	4.07	3.913
704	2452685	2452715	17	18	FFTFFFFFF	FT	0.566	0.594	0.084	0.11	3.808	3.61
704	2452985	2453015	17	18	FFTFFFFFF	FT	0.515	0.539	0.045	0.095	4.108	4.133
704	2453555	2453585	17	18	FFTFFFFFF	FT	0.534	0.573	0.042	0.077	3.964	3.726
704	2454185	2454215	15	16	FFTFFFFFF	FT	0.729	0.61	0.2	0.126	3.212	3.848
704	2454185	2454215	16	17	FFTFFFFFF	FT	0.597	0.589	0.146	0.155	3.623	3.83
704	2454215	2454245	16	17	FFTFFFFFF	FT	0.635	0.557	0.147	0.156	3.697	4.036
704	2454215	2454245	17	18	FFTFFFFFF	FT	0.58	0.58	0.186	0.157	3.699	3.789
704	2454815	2454845	17	18	FFTFFFFFF	FT	0.543	0.576	0.063	0.143	3.93	3.888
704	2452145	2452175	16	17	FFTFFFFFF	FT	0.502	0.539	-0.029	0.047	4.246	4.106
704	2451545	2451575	16	17	FFTFFFFFF	FT	0.451	0.539	0.024	-0.109	4.52	3.889
704	2452385	2452565	15	16	FFTFFFFFF	TF	0.564	0.596	-0.006	0.112	3.747	3.567
704	2452835	2452895	17	18	FFTFFFFFF	TF	0.535	0.6	-0.001	0.142	4.137	3.771
704	2452895	2452925	17	18	FFTFFFFFF	TF	0.464	0.504	-0.007	0.074	4.404	4.596
704	2452895	2452925	17	18	FFTFFFFFF	FT	0.5	0.503	-0.024	0.102	4.223	4.308
704	2453015	2453135	15	16	FFTFFFFFF	TF	0.61	0.573	0.101	0.021	3.805	4.141
704	2453075	2453135	16	17	FFTFFFFFF	TF	0.496	0.506	0.031	0.064	4.587	4.712

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2454155	2454185	17	18	FFTFFFFFF	FT	0.587	0.602	0.16	0.157	3.56	3.587
704	2455025	2455055	16	17	FFTFFFFFF	FT	0.551	0.549	0.054	0.174	4.067	3.934
704	2451065	2451095	15	16	FFTFFFFFF	FT	0.708	0.741	-0.071	0.209	2.834	2.85
704	2451575	2451605	18	19	FFTFFFFFF	FT	0.582	0.628	0.071	0.069	3.42	3.279
704	2451665	2451695	16	17	FFTFFFFFF	FT	0.441	0.488	0.026	0.181	5.242	4.114
704	2452475	2452505	17	18	FFTFFFFFF	FT	0.57	0.603	-0.031	0.075	3.709	3.557
704	2452535	2452565	17	18	FFTFFFFFF	FT	0.511	0.542	-0.03	0.053	4.07	3.889
704	2453915	2454005	17	18	FFTFFFFFF	TF	0.538	0.539	0.033	0.051	4.044	4.199
704	2454005	2454035	16	17	FFTFFFFFF	TF	0.587	0.568	0.016	0.078	3.722	4.239
704	2452895	2452925	15	16	FFTFFFFFF	FT	0.534	0.502	-0.02	0.097	4.498	4.864
704	2451365	2451395	16	17	FFTFFFFFF	FT	0.419	0.454	-0.012	0.093	4.769	4.295
704	2451995	2452025	17	18	FFTFFFFFF	FT	0.549	0.564	0.022	0.098	3.762	3.608
704	2452865	2452895	17	18	FFTFFFFFF	FT	0.519	0.537	-0.034	0.135	4.116	3.848
704	2452835	2452925	16	17	FFTFFFFFF	TF	0.525	0.56	-0.014	0.089	4.19	3.954
704	2453075	2453105	17	18	FFTFFFFFF	TF	0.472	0.483	0.04	0.048	4.524	4.262
704	2453105	2453165	18	19	FFTFFFFFF	TF	0.563	0.597	-0.009	0.101	3.671	3.598
704	2453885	2453915	17	18	FFTFFFFFF	FT	0.598	0.607	0.141	0.073	3.527	3.49
704	2453915	2453945	16	17	FFTFFFFFF	FT	0.527	0.566	0.027	0.047	4.048	3.88
704	2454065	2454095	17	18	FFTFFFFFF	FT	0.543	0.58	0.029	0.112	3.921	3.778
704	2454425	2454455	18	19	FFTFFFFFF	FT	0.551	0.614	0.087	0.147	3.63	3.507
704	2451515	2451545	15	16	FFTFFFFFF	TF	0.339	0.397	-0.057	0.018	4.703	4.601
704	2453225	2453255	15	16	FFTFFFFFF	FT	0.566	0.522	0.015	0.097	4.026	4.483
704	2451125	2451155	17	18	FFTFFFFFF	FT	0.706	0.802	0.045	-0.128	2.901	2.738
704	2451335	2451365	17	18	FFTFFFFFF	FT	0.488	0.561	-0.009	0.128	4.039	3.694
704	2452655	2452685	17	18	FFTFFFFFF	FT	0.538	0.569	0.058	0.085	3.933	3.787
704	2453225	2453285	17	18	FFTFFFFFF	TF	0.504	0.481	0.005	0.06	4.739	4.735

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2453345	2453375	15	16	FFTFFFFFF	TF	0.434	0.479	-0.027	0.039	4.946	4.884
704	2453375	2453585	15	16	FFTFFFFFF	TF	0.515	0.548	0.03	0.059	4.339	4.265
704	2453405	2453525	17	18	FFTFFFFFF	TF	0.487	0.532	0.009	0.069	4.297	3.914
704	2454515	2454545	17	18	FFTFFFFFF	FT	0.544	0.559	0.179	0.144	3.78	3.87
704	2451905	2451935	15	16	FFTFFFFFF	TF	0.357	0.402	0.007	0.019	5.912	5.418
704	2453675	2453705	14	15	FFTFFFFFF	FT	0.63	0.557	-0.069	0.075	3.804	4.237
704	2454425	2454455	17	18	FFTFFFFFF	FT	0.524	0.565	0.069	0.112	4.022	3.899
704	2452715	2452745	16	17	FFTFFFFFF	FT	0.57	0.579	0.072	0.14	3.868	3.907
704	2452775	2452805	17	18	FFTFFFFFF	FT	0.621	0.642	0.071	0.172	3.55	3.309
704	2453675	2453705	17	18	FFTFFFFFF	FT	0.457	0.495	-0.004	0.084	4.582	4.438
704	2454575	2454815	15	16	FFTFFFFFF	TF	0.549	0.547	0.009	0.06	4.021	4.299
704	2452385	2452415	17	18	FFTFFFFFF	FT	0.569	0.598	0.045	0.093	3.66	3.514
704	2454635	2454665	15	16	FFTFFFFFF	FT	0.625	0.568	0.102	0.108	3.881	3.585
704	2455055	2455085	15	16	FFTFFFFFF	FT	0.611	0.599	0.037	0.141	3.762	3.495
704	2453945	2454275	14	15	FFTFFFFFF	TF	0.697	0.631	0.05	0.089	3.206	3.755
704	2451875	2451905	17	18	FFTFFFFFF	FT	0.472	0.504	0.005	0.02	4.133	3.986
704	2454245	2454275	16	17	FFTFFFFFF	FT	0.614	0.603	0.136	0.15	3.427	3.607
704	2452115	2452145	17	18	FFTFFFFFF	FT	0.554	0.596	-0.014	0.083	3.727	3.55
704	2452145	2452175	17	18	FFTFFFFFF	FT	0.513	0.561	-0.033	0.032	3.992	3.854
704	2452805	2452835	16	17	FFTFFFFFF	FT	0.564	0.604	0.01	0.095	3.698	3.541
704	2454755	2454785	17	18	FFTFFFFFF	FT	0.486	0.516	-0.004	0.108	4.3	4.152
704	2454935	2454965	17	18	FFTFFFFFF	FT	0.599	0.608	0.256	0.21	3.339	3.568
704	2451605	2451635	16	17	FFTFFFFFF	FT	0.442	0.481	0.03	0.115	5.15	4.453
704	2454335	2454365	16	17	FFTFFFFFF	FT	0.548	0.516	-0.015	0.12	4.039	4.262
704	2452055	2452205	15	16	FFTFFFFFF	TF	0.527	0.6	0.012	0.1	3.829	3.764
704	2453525	2453555	16	17	FFTFFFFFF	FT	0.565	0.59	0.087	0.087	3.825	3.888

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2453525	2453765	14	15	FFTFFFFFF	TF	0.592	0.573	0.024	0.046	3.744	3.993
704	2451305	2451335	18	19	FFTFFFFFF	FT	0.855	0.906	-0.046	0.119	2.411	2.352
704	2451785	2451815	17	18	FFTFFFFFF	FT	0.475	0.497	-0.016	0.061	4.28	3.891
704	2452775	2452805	16	17	FFTFFFFFF	FT	0.601	0.607	0.061	0.171	3.98	3.618
704	2451065	2451095	16	17	FFTFFFFFF	FT	0.644	0.682	-0.042	0.12	3.109	3.023
704	2451635	2451665	16	17	FFTFFFFFF	FT	0.446	0.499	0.035	0.164	4.885	4.242
704	2452565	2452595	17	18	FFTFFFFFF	FT	0.501	0.551	-0.013	0.046	4.062	3.828
704	2453285	2453315	16	17	FFTFFFFFF	TF	0.5	0.542	0.019	0.05	3.998	4.381
704	2453315	2453345	15	16	FFTFFFFFF	TF	0.504	0.53	0.045	0.016	4.892	4.45
704	2455055	2455085	17	18	FFTFFFFFF	FT	0.549	0.621	0.079	0.245	3.897	3.52
704	2452775	2453945	13	14	FFTFFFFFF	TF	0.761	0.774	0.014	0.04	2.934	2.953
704	2450945	2450975	15	16	FFTFFFFFF	FT	0.678	0.684	-0.124	0.166	2.928	3.065
704	2453855	2453885	17	18	FFTFFFFFF	FT	0.574	0.569	0.171	0.125	3.621	3.759
704	2453945	2453975	15	16	FFTFFFFFF	FT	0.555	0.524	-0.006	0.127	4.258	4.398
704	2454905	2454935	16	17	FFTFFFFFF	FT	0.551	0.551	0.193	0.172	4.063	4.248
704	2455055	2455085	16	17	FFTFFFFFF	FT	0.536	0.571	0.034	0.206	4.11	3.794
704	2452055	2452085	14	15	FFTFFFFFF	FT	0.602	0.564	0.072	0.157	4.023	4.058
704	2453555	2453585	16	17	FFTFFFFFF	FT	0.535	0.539	0.044	0.073	4.272	4.236
704	2451035	2451155	17	18	FFTFFFFFF	TF	0.723	0.857	0.015	-0.105	2.615	2.614
704	2451155	2451185	16	17	FFTFFFFFF	FT	0.662	0.716	0.012	-0.102	3.199	3.057
704	2452565	2452595	16	17	FFTFFFFFF	TF	0.506	0.576	0.01	0.036	3.986	3.785
704	2452595	2452625	16	17	FFTFFFFFF	TF	0.397	0.446	-0.04	0.048	4.988	4.762
704	2452625	2452655	16	17	FFTFFFFFF	TF	0.46	0.493	-0.035	0.018	4.765	4.623
704	2452685	2452715	16	17	FFTFFFFFF	TF	0.538	0.611	0.034	0.09	3.898	3.553
704	2453975	2454005	17	18	FFTFFFFFF	FT	0.552	0.563	0.045	0.041	3.787	3.786
704	2454185	2454215	17	18	FFTFFFFFF	FT	0.572	0.614	0.155	0.159	3.525	3.541

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2452595	2452625	15	16	FFTFFFFFF	TF	0.376	0.406	-0.027	0.041	5.528	5.404
704	2452625	2452655	15	16	FFTFFFFFF	TF	0.475	0.487	-0.027	0.051	5.049	4.569
704	2451815	2451845	18	19	FFTFFFFFF	FT	0.528	0.56	0	0.033	3.628	3.53
704	2454095	2454125	16	17	FFTFFFFFF	FT	0.547	0.559	0.054	0.085	4.098	4.248
704	2452955	2452985	17	18	FFTFFFFFF	FT	0.486	0.513	0.011	0.085	4.508	4.341
704	2453765	2453795	17	18	FFTFFFFFF	FT	0.522	0.538	0.12	0.147	3.91	4.032
704	2454155	2454275	16	17	FFTFFFFFF	TF	0.538	0.583	0.018	0.11	3.933	3.795
704	2451185	2451215	17	18	FFTFFFFFF	FT	0.71	0.777	-0.011	0.068	2.967	2.711
704	2451515	2451545	17	18	FFTFFFFFF	FT	0.509	0.569	0.033	-0.027	4.026	3.721
704	2451575	2451605	17	18	FFTFFFFFF	FT	0.478	0.527	0.054	0.081	4.349	3.971
704	2451665	2451695	17	18	FFTFFFFFF	FT	0.502	0.56	0.028	0.155	4.169	3.704
704	2452655	2452685	16	17	FFTFFFFFF	TF	0.557	0.583	0.051	0.04	3.697	3.862
704	2452715	2452775	17	18	FFTFFFFFF	TF	0.534	0.558	0.009	0.091	3.885	3.829
704	2452715	2452745	17	18	FFTFFFFFF	FT	0.58	0.602	0.093	0.136	3.715	3.617
704	2452745	2452775	18	19	FFTFFFFFF	FT	0.639	0.685	0.112	0.128	3.227	3.1
704	2452985	2453015	18	19	FFTFFFFFF	FT	0.554	0.601	0.047	0.109	3.689	3.636
704	2453075	2453105	16	17	FFTFFFFFF	FT	0.522	0.515	0.117	0.138	4.305	4.59
704	2453585	2453615	17	18	FFTFFFFFF	FT	0.473	0.514	0.006	0.096	4.267	4.249
704	2453765	2453795	18	19	FFTFFFFFF	FT	0.61	0.619	0.156	0.162	3.329	3.369
704	2453795	2453825	18	19	FFTFFFFFF	FT	0.654	0.643	0.137	0.149	3.214	3.267
704	2454005	2454035	18	19	FFTFFFFFF	FT	0.626	0.642	0.029	0.112	3.328	3.37
704	2454035	2454065	18	19	FFTFFFFFF	FT	0.612	0.656	0.049	0.162	3.405	3.342
704	2452205	2452235	17	18	FFTFFFFFF	FT	0.534	0.587	-0.03	0.023	3.895	3.682
704	2452625	2452655	17	18	FFTFFFFFF	FT	0.524	0.556	0.034	0.067	4.174	3.877
704	2454455	2454485	17	18	FFTFFFFFF	FT	0.559	0.599	0.12	0.134	3.741	3.645
704	2454665	2454695	17	18	FFTFFFFFF	FT	0.508	0.552	-0.001	0.147	4.115	3.771

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2452535	2452565	18	19	FFTFFFFFF	FT	0.57	0.611	-0.016	0.059	3.562	3.461
704	2454275	2454605	14	15	FFTFFFFFF	TF	0.694	0.665	0.071	0.045	3.269	3.356
704	2451545	2451575	16	17	FFTFFFFFF	TF	0.373	0.495	-0.009	-0.083	4.96	4.287
704	2451905	2451935	18	19	FFTFFFFFF	FT	0.528	0.585	0.023	0.028	3.601	3.447
704	2452445	2452475	17	18	FFTFFFFFF	FT	0.577	0.615	-0.002	0.052	3.585	3.46
704	2452685	2452715	18	19	FFTFFFFFF	FT	0.629	0.661	0.126	0.125	3.332	3.195
704	2452955	2452985	18	19	FFTFFFFFF	FT	0.528	0.575	0.016	0.104	3.854	3.755
704	2454485	2454515	18	19	FFTFFFFFF	FT	0.562	0.582	0.158	0.138	3.61	3.575
704	2455055	2455085	18	19	FFTFFFFFF	FT	0.582	0.678	0.101	0.266	3.502	3.172
704	2452085	2452205	16	17	FFTFFFFFF	TF	0.552	0.618	0.042	0.053	3.736	3.654
704	2452205	2452235	15	16	FFTFFFFFF	TF	0.566	0.616	0.08	0.05	3.663	3.538
704	2452235	2452265	15	16	FFTFFFFFF	TF	0.51	0.547	-0.034	0.003	3.852	3.735
704	2452265	2452295	16	17	FFTFFFFFF	TF	0.501	0.576	-0.011	-0.02	3.933	3.828
704	2452295	2452325	16	17	FFTFFFFFF	TF	0.552	0.597	0.013	0.043	3.821	3.567
704	2452325	2452415	17	18	FFTFFFFFF	TF	0.58	0.658	0.008	0.051	3.583	3.251
704	2450855	2450885	16	17	FFTFFFFFF	FT	0.73	0.534	-0.173	-0.014	4.364	4.009
704	2451275	2451365	16	17	FFTFFFFFF	TF	0.534	0.611	-0.052	0.086	4.683	3.801
704	2451245	2451395	15	16	FFTFFFFFF	TF	0.443	0.513	-0.059	0.142	4.844	4.376
704	2452175	2452205	17	18	FFTFFFFFF	FT	0.527	0.563	-0.027	0.035	3.953	3.817
704	2452805	2452835	17	18	FFTFFFFFF	FT	0.581	0.629	-0.004	0.09	3.526	3.417
704	2453135	2453195	15	16	FFTFFFFFF	TF	0.557	0.568	0.047	0.144	3.812	3.816
704	2451965	2452055	17	18	FFTFFFFFF	TF	0.466	0.535	0.009	0.094	3.893	3.728
704	2452025	2452055	16	17	FFTFFFFFF	TF	0.466	0.542	-0.023	0.164	4.128	3.648
704	2454245	2454275	17	18	FFTFFFFFF	FT	0.598	0.617	0.129	0.147	3.421	3.419
704	2452055	2452085	17	18	FFTFFFFFF	FT	0.529	0.582	0.013	0.122	3.767	3.502
704	2451845	2451875	17	18	FFTFFFFFF	FT	0.471	0.496	0.005	0.032	4.216	3.978

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
704	2453225	2453255	17	18	FFTFFFFFF	FT	0.477	0.482	-0.039	0.084	4.426	4.507
704	2453405	2453435	17	18	FFTFFFFFF	FT	0.48	0.52	0.113	0.104	4.363	4.279
704	2454485	2454515	17	18	FFTFFFFFF	FT	0.523	0.532	0.143	0.113	3.999	4.116
704	2453195	2453225	16	17	FFTFFFFFF	FT	0.519	0.526	0.008	0.102	4.169	4.28
704	2450975	2451005	16	17	FFTFFFFFF	FT	0.713	0.771	-0.034	0.07	2.996	2.808
704	2453915	2453945	17	18	FFTFFFFFF	FT	0.566	0.6	0.047	0.029	3.704	3.583
704	2454155	2454185	18	19	FFTFFFFFF	FT	0.641	0.658	0.189	0.158	3.197	3.204
704	2454605	2454635	17	18	FFTFFFFFF	FT	0.568	0.578	0.177	0.138	3.625	3.743
704	2450615	2451725	14	15	FFTFFFFFF	TF	0.598	0.621	0.019	0.039	3.913	3.833
704	2452415	2452445	16	17	FFTFFFFFF	TF	0.558	0.626	-0.002	0.133	3.693	3.529
704	2452835	2452865	17	18	FFTFFFFFF	FT	0.528	0.556	-0.032	0.137	3.97	3.819
704	2453075	2453105	17	18	FFTFFFFFF	FT	0.498	0.516	0.109	0.126	4.145	4.267
704	2454275	2454305	17	18	FFTFFFFFF	FT	0.586	0.626	0.023	0.141	3.613	3.478
704	2450615	2452355	13	14	FFTFFFFFF	TF	0.665	0.664	0.014	0.098	3.327	3.696
704	2451605	2451695	16	17	FFTFFFFFF	TF	0.529	0.533	0.004	0.072	4.338	4.297
704	2452865	2452955	15	16	FFTFFFFFF	TF	0.65	0.624	0.088	0.066	3.633	3.819
704	2450945	2450975	17	18	FFTFFFFFF	FT	0.716	0.774	-0.044	0.088	2.891	2.768
704	2452475	2452565	17	18	FFTFFFFFF	TF	0.531	0.59	0.034	0.039	3.809	3.699
704	2452265	2452295	17	18	FFTFFFFFF	TF	0.512	0.584	0.003	-0.031	3.857	3.588
704	2452355	2452385	18	19	FFTFFFFFF	FT	0.622	0.645	0.109	0.1	3.341	3.296
704	2453585	2453735	15	16	FFTFFFFFF	TF	0.476	0.516	0.011	0.074	4.463	5.161
704	2453765	2453945	14	15	FFTFFFFFF	TF	0.738	0.698	0.003	0.158	2.965	3.295
704	2451725	2451755	17	18	FFTFFFFFF	FT	0.535	0.617	-0.012	0.13	3.559	3.401
704	2453285	2453315	18	19	FFTFFFFFF	FT	0.527	0.555	-0.039	0.101	3.734	3.687
704	2453315	2453345	17	18	FFTFFFFFF	FT	0.529	0.536	-0.026	0.091	4.117	3.978
704	2454305	2454365	17	18	FFTFFFFFF	TF	0.458	0.506	0.011	0.11	4.955	4.416

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2454275	2454395	16	17	FFTFFFFFF	TF	0.55	0.532	0.013	0.06	4.067	4.195
704	2454395	2454425	16	17	FFTFFFFFF	TF	0.525	0.539	0.036	0.057	4.061	4.287
704	2454425	2454485	15	16	FFTFFFFFF	TF	0.447	0.518	-0.045	-0.02	4.863	4.594
704	2454545	2454575	17	18	FFTFFFFFF	TF	0.477	0.519	0.005	0.041	4.654	4.473
704	2454545	2454575	18	19	FFTFFFFFF	FT	0.614	0.632	0.224	0.163	3.266	3.31
704	2454815	2454845	18	19	FFTFFFFFF	FT	0.585	0.633	0.079	0.168	3.51	3.352
704	2451605	2451695	17	18	FFTFFFFFF	TF	0.538	0.56	-0.002	0.074	4.106	3.855
704	2451875	2451905	18	19	FFTFFFFFF	FT	0.564	0.589	0.012	0.028	3.586	3.446
704	2452925	2452955	18	19	FFTFFFFFF	FT	0.582	0.551	0.012	0.101	3.649	3.767
704	2454125	2454155	16	17	FFTFFFFFF	TF	0.611	0.651	0.032	0.057	3.434	3.867
704	2454155	2454185	17	18	FFTFFFFFF	TF	0.492	0.528	0.024	0.073	4.134	3.947
704	2454185	2454245	18	19	FFTFFFFFF	TF	0.55	0.591	0.057	0.062	3.703	3.357
704	2454545	2454575	17	18	FFTFFFFFF	FT	0.556	0.558	0.198	0.154	3.694	3.819
704	2450885	2450915	18	19	FFTFFFFFF	FT	0.814	0.851	-0.004	0.018	2.61	2.523
704	2451215	2451365	17	18	FFTFFFFFF	TF	0.568	0.628	-0.027	0.108	3.913	3.524
704	2454755	2454785	17	18	FFTFFFFFF	TF	0.515	0.593	0.084	0.079	3.854	3.773
704	2453555	2453675	16	17	FFTFFFFFF	TF	0.493	0.518	0.022	0.068	4.229	4.153
704	2452655	2452685	15	16	FFTFFFFFF	TF	0.576	0.574	0.078	0.043	3.864	4.147
704	2454335	2454425	15	16	FFTFFFFFF	TF	0.611	0.628	0.103	0.085	3.517	3.838
704	2454635	2454665	16	17	FFTFFFFFF	FT	0.57	0.583	0.097	0.142	4.024	3.959
704	2452985	2453015	16	17	FFTFFFFFF	TF	0.462	0.463	0.003	-0.006	4.816	4.6
704	2453015	2453045	16	17	FFTFFFFFF	TF	0.537	0.502	0.05	0.02	3.929	4.674
704	2454335	2454365	17	18	FFTFFFFFF	FT	0.551	0.549	-0.003	0.131	3.977	3.885
704	2451575	2451605	16	17	FFTFFFFFF	TF	0.423	0.487	0.036	0.063	4.469	4.214
704	2453165	2453195	18	19	FFTFFFFFF	FT	0.582	0.62	0.057	0.101	3.58	3.46
704	2453705	2453735	18	19	FFTFFFFFF	FT	0.545	0.592	0.025	0.092	3.701	3.557

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2453735	2453765	18	19	FFTFFFFFFF	FT	0.541	0.584	0.061	0.101	3.688	3.59
704	2452055	2452085	16	17	FFTFFFFFFF	TF	0.47	0.526	-0.034	0.168	3.712	3.656
704	2453015	2453045	18	19	FFTFFFFFFF	FT	0.566	0.565	0.101	0.105	3.649	3.706
704	2454455	2454485	18	19	FFTFFFFFFF	FT	0.596	0.659	0.127	0.158	3.383	3.24
704	2452115	2452205	17	18	FFTFFFFFFF	TF	0.546	0.597	0.038	0.027	3.743	3.451
704	2450555	2452445	11	12	FFTFFFFFFF	FT	0.793	0.848	-0.028	0.015	2.98	2.748
704	2451275	2451305	18	19	FFTFFFFFFF	FT	0.859	0.896	0.01	0.129	2.433	2.408
704	2453975	2455085	13	14	FFTFFFFFFF	TF	0.774	0.786	0.055	0.003	2.776	2.867
704	2452265	2452295	19	20	FFTFFFFFFF	FT	0.651	0.721	0.053	0.031	3.043	3.025
704	2451815	2451845	16	17	FFTFFFFFFF	TF	0.41	0.49	0.038	-0.001	4.83	4.966
704	2452295	2452325	18	19	FFTFFFFFFF	FT	0.583	0.631	0.043	0.048	3.48	3.354
704	2453405	2453525	16	17	FFTFFFFFFF	TF	0.519	0.529	0.015	0.102	4.255	3.889
704	2452295	2452325	18	19	FFTFFFFFFF	TF	0.608	0.694	0.041	0.04	3.204	2.992
704	2453555	2453645	17	18	FFTFFFFFFF	TF	0.455	0.479	0.012	0.092	4.564	4.569
704	2451365	2451395	17	18	FFTFFFFFFF	FT	0.447	0.5	-0.024	0.073	3.891	3.848
704	2452895	2455085	12	13	FFTFFFFFFF	TF	0.844	0.888	0.024	-0.017	2.591	2.563
704	2453435	2453465	17	18	FFTFFFFFFF	FT	0.504	0.528	0.163	0.139	4.02	4.193
704	2451545	2451575	17	18	FFTFFFFFFF	FT	0.492	0.6	0.009	-0.13	3.89	3.439
704	2453195	2453255	18	19	FFTFFFFFFF	TF	0.53	0.572	0	0.096	4.193	3.768
704	2453255	2453285	18	19	FFTFFFFFFF	FT	0.534	0.547	-0.04	0.084	3.833	3.765
704	2453255	2453285	17	18	FFTFFFFFFF	FT	0.481	0.483	-0.042	0.077	4.431	4.415
704	2453465	2453495	17	18	FFTFFFFFFF	FT	0.534	0.548	0.159	0.121	3.806	3.832
704	2454275	2454305	16	17	FFTFFFFFFF	FT	0.586	0.616	0.011	0.134	3.605	3.626
704	2454665	2454695	18	19	FFTFFFFFFF	FT	0.552	0.608	0.011	0.153	3.623	3.423
704	2454695	2454725	17	18	FFTFFFFFFF	FT	0.46	0.511	-0.005	0.133	4.401	4.09
704	2454905	2454995	18	19	FFTFFFFFFF	TF	0.543	0.597	0.083	0.102	3.681	3.634

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2454215	2454245	18	19	FFTFFFFFF	FT	0.592	0.638	0.216	0.179	3.373	3.21
704	2454605	2454635	18	19	FFTFFFFFF	FT	0.608	0.647	0.191	0.135	3.249	3.273
704	2450615	2452895	12	13	FFTFFFFFF	TF	0.761	0.806	0.033	0.079	3.021	2.78
704	2452145	2452175	19	20	FFTFFFFFF	FT	0.65	0.707	-0.005	0.065	3.192	3.035
704	2452655	2452685	18	19	FFTFFFFFF	FT	0.589	0.632	0.062	0.093	3.469	3.336
704	2455025	2455055	17	18	FFTFFFFFF	FT	0.528	0.572	0.061	0.197	3.979	3.587
704	2451605	2451635	18	19	FFTFFFFFF	FT	0.555	0.592	0.053	0.086	3.574	3.44
704	2454725	2454755	17	18	FFTFFFFFF	FT	0.463	0.505	-0.016	0.117	4.382	4.254
704	2450795	2450825	17	18	FFTFFFFFF	FT	0.518	0.516	0.035	-0.072	4.258	3.851
704	2452445	2452475	16	17	FFTFFFFFF	TF	0.549	0.581	-0.002	0.144	3.836	3.461
704	2451845	2451875	18	19	FFTFFFFFF	FT	0.558	0.595	0.015	0.031	3.538	3.393
704	2452325	2452415	18	19	FFTFFFFFF	TF	0.615	0.729	0.018	0.06	3.264	2.914
704	2453645	2453675	18	19	FFTFFFFFF	FT	0.55	0.591	0.02	0.12	3.651	3.531
704	2454395	2454425	18	19	FFTFFFFFF	FT	0.532	0.577	0.052	0.104	3.821	3.68
704	2454755	2454785	16	17	FFTFFFFFF	TF	0.551	0.59	0.108	0.052	3.881	4.087
704	2454785	2454815	16	17	FFTFFFFFF	TF	0.424	0.465	-0.009	0.046	4.9	5.106
704	2451755	2451785	18	19	FFTFFFFFF	FT	0.589	0.644	0.019	0.086	3.435	3.171
704	2453975	2454005	18	19	FFTFFFFFF	FT	0.632	0.646	0.054	0.043	3.305	3.262
704	2454125	2454155	18	19	FFTFFFFFF	FT	0.62	0.648	0.13	0.15	3.352	3.289
704	2451785	2451815	18	19	FFTFFFFFF	FT	0.57	0.596	0.006	0.053	3.469	3.383
704	2451935	2451965	18	19	FFTFFFFFF	FT	0.574	0.615	0.042	0.056	3.406	3.279
704	2452385	2452415	18	19	FFTFFFFFF	FT	0.625	0.669	0.06	0.074	3.285	3.184
704	2453945	2453975	17	18	FFTFFFFFF	FT	0.533	0.534	0.043	0.078	3.987	3.896
704	2450975	2451035	17	18	FFTFFFFFF	FT	0.783	0.853	-0.021	0.043	2.625	2.57
704	2453375	2453405	16	17	FFTFFFFFF	TF	0.441	0.485	0.032	-0.001	4.579	4.997
704	2453465	2453495	18	19	FFTFFFFFF	FT	0.619	0.631	0.176	0.1	3.31	3.334

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2452565	2452595	15	16	FFTFFFFFF	TF	0.549	0.58	0.016	0.063	3.568	4.19
704	2454305	2454335	17	18	FFTFFFFFF	FT	0.526	0.552	-0.012	0.122	4.031	3.748
704	2454845	2454875	16	17	FFTFFFFFF	TF	0.474	0.501	0.023	0.071	4.632	4.511
704	2453045	2453075	16	17	FFTFFFFFF	TF	0.547	0.559	0.086	0.012	3.741	4.058
704	2451815	2451845	17	18	FFTFFFFFF	TF	0.446	0.527	0.016	0.014	3.997	3.819
704	2453075	2453105	18	19	FFTFFFFFF	FT	0.561	0.572	0.133	0.121	3.611	3.669
704	2451215	2451245	17	18	FFTFFFFFF	FT	0.639	0.694	0.04	0.057	3.132	3.128
704	2453795	2453825	18	19	FFTFFFFFF	TF	0.587	0.622	0.057	0.066	3.446	3.437
704	2453315	2453345	18	19	FFTFFFFFF	FT	0.57	0.606	-0.011	0.107	3.567	3.448
704	2453495	2453525	18	19	FFTFFFFFF	FT	0.6	0.623	0.169	0.121	3.366	3.391
704	2454785	2454815	18	19	FFTFFFFFF	FT	0.558	0.613	0.041	0.156	3.646	3.399
704	2454965	2454995	17	18	FFTFFFFFF	FT	0.499	0.557	0.222	0.187	3.908	3.691
704	2452235	2452265	16	17	FFTFFFFFF	TF	0.513	0.559	0.005	-0.001	3.855	3.839
704	2451095	2451185	16	17	FFTFFFFFF	TF	0.628	0.732	0.085	-0.131	3.181	3.099
704	2451185	2451275	16	17	FFTFFFFFF	TF	0.691	0.734	0.063	0.004	2.928	2.995
704	2452895	2452925	18	19	FFTFFFFFF	FT	0.57	0.584	-0.013	0.122	3.623	3.633
704	2454755	2454785	18	19	FFTFFFFFF	FT	0.537	0.586	0.008	0.138	3.773	3.565
704	2454485	2454575	15	16	FFTFFFFFF	TF	0.63	0.637	0.058	0.04	3.471	3.75
704	2453735	2453765	16	17	FFTFFFFFF	TF	0.433	0.483	-0.013	0.022	4.205	5.109
704	2453285	2453315	17	18	FFTFFFFFF	TF	0.511	0.554	0.047	0.059	4.042	3.947
704	2452955	2452985	15	16	FFTFFFFFF	TF	0.478	0.494	0.021	0.06	5.311	5.178
704	2452985	2453015	15	16	FFTFFFFFF	TF	0.47	0.474	-0.001	0.008	4.255	5.395
704	2452925	2452955	16	17	FFTFFFFFF	TF	0.572	0.565	0.09	0.043	3.685	4.223
704	2454815	2454845	16	17	FFTFFFFFF	TF	0.409	0.436	-0.012	0.012	5.035	5.469
704	2452445	2453405	11	12	FFTFFFFFF	FT	0.806	0.898	-0.018	-0.028	2.812	2.483
704	2453435	2455085	11	12	FFTFFFFFF	FT	0.784	0.892	-0.01	-0.001	3.153	2.459

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
704	2450735	2450765	16	17	FFTFFFFFF	FT	0.897	0.805	0.018	-0.082	2.324	2.744
704	2450765	2450795	16	17	FFTFFFFFF	FT	0.831	0.752	-0.083	-0.115	2.686	2.823
704	2453105	2453135	17	18	FFTFFFFFF	TF	0.509	0.577	0.04	0.077	3.776	4.558
704	2453495	2453525	19	20	FFTFFFFFF	FT	0.666	0.695	0.168	0.12	2.943	2.962
704	2453525	2453555	19	20	FFTFFFFFF	FT	0.65	0.712	0.11	0.072	3.155	3.105
704	2453165	2453195	17	18	FFTFFFFFF	FT	0.536	0.572	0.055	0.101	3.911	3.794
704	2452475	2452505	18	19	FFTFFFFFF	FT	0.629	0.661	-0.006	0.061	3.284	3.164
704	2452715	2452775	18	19	FFTFFFFFF	TF	0.569	0.627	0.049	0.152	3.46	3.296
704	2451095	2451125	18	19	FFTFFFFFF	FT	0.841	0.887	-0.045	0.008	2.511	2.419
704	2452175	2452205	18	19	FFTFFFFFF	TF	0.576	0.653	0.036	-0.002	3.332	3.175
704	2452205	2452235	17	18	FFTFFFFFF	TF	0.543	0.617	0.003	-0.01	3.658	3.459
704	2452775	2452805	16	17	FFTFFFFFF	TF	0.572	0.635	-0.023	0.179	3.872	3.78
704	2452805	2452835	16	17	FFTFFFFFF	TF	0.549	0.63	-0.021	0.121	3.968	3.667
704	2453225	2453255	18	19	FFTFFFFFF	FT	0.522	0.536	-0.034	0.082	3.942	3.834
704	2453375	2453405	19	20	FFTFFFFFF	FT	0.627	0.691	0.092	0.126	3.178	3.078
704	2453405	2453435	19	20	FFTFFFFFF	FT	0.655	0.687	0.157	0.162	3.077	3.114
704	2453705	2453735	19	20	FFTFFFFFF	FT	0.635	0.676	0.031	0.097	3.208	3.15
704	2453885	2453915	18	19	FFTFFFFFF	FT	0.644	0.656	0.148	0.092	3.21	3.244
704	2454275	2454305	18	19	FFTFFFFFF	FT	0.612	0.67	0.025	0.164	3.311	3.162
704	2454725	2454755	19	20	FFTFFFFFF	FT	0.608	0.663	0.015	0.17	3.294	3.133
704	2454935	2454965	18	19	FFTFFFFFF	FT	0.64	0.65	0.264	0.19	3.147	3.282
704	2452235	2452265	17	18	FFTFFFFFF	TF	0.525	0.586	-0.005	0.011	3.75	3.721
704	2452565	2452595	17	18	FFTFFFFFF	TF	0.526	0.607	0.013	0.032	3.664	3.552
704	2451185	2451215	18	19	FFTFFFFFF	FT	0.769	0.884	-0.002	0.062	2.63	2.419
704	2452415	2452445	18	19	FFTFFFFFF	FT	0.651	0.683	0.055	0.104	3.188	3.147
704	2452205	2452235	18	19	FFTFFFFFF	FT	0.574	0.633	-0.011	0.031	3.518	3.359

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
704	2451935	2451965	16	17	FFTFFFFFF	TF	0.474	0.479	0.069	0.043	4.474	4.111
704	2451095	2451125	17	18	FFTFFFFFF	FT	0.71	0.749	-0.045	-0.006	2.94	2.856
704	2452055	2452085	18	19	FFTFFFFFF	FT	0.613	0.655	0.003	0.125	3.283	3.16
704	2452145	2452175	18	19	FFTFFFFFF	FT	0.568	0.614	-0.024	0.044	3.586	3.445
704	2451485	2451515	16	17	FFTFFFFFF	TF	0.44	0.476	0.011	0.022	4.427	4.206
704	2451515	2451545	16	17	FFTFFFFFF	TF	0.359	0.436	-0.021	-0.006	5.133	4.807
704	2453765	2453795	16	17	FFTFFFFFF	TF	0.555	0.575	0.048	0.05	3.531	3.773
704	2454995	2455025	16	17	FFTFFFFFF	FT	0.556	0.564	0.177	0.172	3.663	4.007
704	2451035	2451065	17	18	FFTFFFFFF	FT	0.732	0.785	-0.031	0.036	2.834	2.738
704	2451155	2451185	17	18	FFTFFFFFF	TF	0.67	0.775	0.085	-0.193	2.888	2.774
704	2450945	2451185	18	19	FFTFFFFFF	TF	0.789	0.923	0.063	-0.156	2.523	2.344
704	2451455	2451485	18	19	FFTFFFFFF	FT	0.552	0.57	0.013	-0.008	3.552	3.51
704	2452955	2452985	19	20	FFTFFFFFF	FT	0.622	0.676	0.027	0.131	3.307	3.164
704	2452625	2452655	18	19	FFTFFFFFF	FT	0.563	0.607	0.036	0.072	3.6	3.469
704	2452835	2452895	18	19	FFTFFFFFF	TF	0.537	0.553	-0.031	0.148	3.698	3.381
704	2452955	2452985	16	17	FFTFFFFFF	TF	0.423	0.491	-0.007	0.031	4.656	5.078
704	2451155	2451185	18	19	FFTFFFFFF	FT	0.803	0.924	0.015	-0.133	2.518	2.333
704	2451335	2451365	18	19	FFTFFFFFF	FT	0.565	0.642	-0.007	0.137	3.592	3.26
704	2453255	2453285	18	19	FFTFFFFFF	TF	0.506	0.533	0.012	0.047	4.26	3.938
704	2454305	2454335	18	19	FFTFFFFFF	FT	0.576	0.614	0.011	0.142	3.513	3.352
704	2454515	2454545	18	19	FFTFFFFFF	FT	0.603	0.623	0.196	0.156	3.324	3.394
704	2454545	2454665	19	20	FFTFFFFFF	TF	0.568	0.628	0.066	0.045	3.483	3.224
704	2454815	2454845	19	20	FFTFFFFFF	FT	0.656	0.704	0.056	0.176	3.136	3.017
704	2452385	2452415	19	20	FFTFFFFFF	FT	0.685	0.744	0.081	0.08	3.031	2.917
704	2454665	2454755	17	18	FFTFFFFFF	TF	0.471	0.535	0.011	0.035	4.282	4.357
704	2451425	2451485	17	18	FFTFFFFFF	TF	0.473	0.54	0.012	-0.018	3.852	3.685

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
704	2451515	2451545	17	18	FFTFFFFFF	TF	0.423	0.506	-0.007	-0.054	4.512	4.157
704	2452595	2452625	18	19	FFTFFFFFF	FT	0.543	0.59	-0.002	0.075	3.696	3.578
704	2453105	2453135	18	19	FFTFFFFFF	FT	0.56	0.598	0.1	0.112	3.608	3.528
704	2453135	2453165	19	20	FFTFFFFFF	FT	0.637	0.677	0.102	0.128	3.162	3.121
704	2453915	2454005	18	19	FFTFFFFFF	TF	0.575	0.599	0.058	0.026	3.423	3.323
704	2454005	2454035	18	19	FFTFFFFFF	TF	0.582	0.654	0.069	0.085	3.207	3.322
704	2454065	2454095	17	18	FFTFFFFFF	TF	0.501	0.55	-0.003	0.046	4.122	4.149
704	2454095	2454125	17	18	FFTFFFFFF	TF	0.535	0.591	-0.006	0.04	3.805	3.87
704	2454155	2454185	18	19	FFTFFFFFF	TF	0.527	0.588	0.046	0.097	3.747	3.503
704	2454425	2454455	19	20	FFTFFFFFF	FT	0.622	0.68	0.082	0.168	3.267	3.073
704	2454455	2454485	19	20	FFTFFFFFF	FT	0.652	0.721	0.11	0.154	3.084	2.899
704	2452535	2452565	18	19	FFTFFFFFF	TF	0.587	0.645	0.056	0.038	3.548	3.24
704	2453675	2453705	16	17	FFTFFFFFF	TF	0.443	0.489	0.015	0.067	4.577	4.487
704	2453825	2453855	18	19	FFTFFFFFF	FT	0.662	0.648	0.168	0.133	3.148	3.248
704	2452205	2452235	16	17	FFTFFFFFF	TF	0.524	0.595	0.002	-0.001	3.721	3.641
704	2450915	2450945	18	19	FFTFFFFFF	FT	0.816	0.87	0.015	0.014	2.555	2.429
704	2452895	2452925	18	19	FFTFFFFFF	TF	0.525	0.554	0.038	0.084	3.774	3.783
704	2452955	2452985	17	18	FFTFFFFFF	TF	0.445	0.519	0.009	0.035	4.483	4.61
704	2452985	2453015	17	18	FFTFFFFFF	TF	0.476	0.485	0.028	0.015	4.567	4.66
704	2453075	2453105	18	19	FFTFFFFFF	TF	0.492	0.525	0.03	0.056	4.111	3.925
704	2454065	2454095	18	19	FFTFFFFFF	FT	0.588	0.637	0.049	0.141	3.534	3.371
704	2450825	2450915	19	20	FFTFFFFFF	FT	0.93	0.947	-0.015	0.018	2.27	2.261
704	2450915	2450945	19	20	FFTFFFFFF	FT	0.909	0.958	0.019	0.048	2.304	2.274
704	2452355	2452385	19	20	FFTFFFFFF	FT	0.698	0.731	0.141	0.101	2.946	2.88
704	2452835	2452865	18	19	FFTFFFFFF	FT	0.605	0.634	-0.006	0.134	3.438	3.335
704	2453015	2453045	19	20	FFTFFFFFF	FT	0.63	0.669	0.107	0.133	3.229	3.191

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
704	2453045	2453075	20	21	FFTFFFFFF	FT	0.702	0.733	0.122	0.093	2.868	2.983
704	2453405	2453435	18	19	FFTFFFFFF	FT	0.544	0.581	0.136	0.136	3.613	3.648
704	2453435	2453465	19	20	FFTFFFFFF	FT	0.691	0.704	0.206	0.134	2.974	2.986
704	2453855	2453885	18	19	FFTFFFFFF	FT	0.649	0.65	0.181	0.143	3.163	3.273
704	2454305	2454365	19	20	FFTFFFFFF	TF	0.562	0.616	0.08	0.144	3.431	3.145
704	2454365	2454395	19	20	FFTFFFFFF	TF	0.623	0.662	0.07	0.091	3.245	3.194
704	2454395	2454425	18	19	FFTFFFFFF	TF	0.526	0.61	0.057	0.077	3.632	3.482
704	2454425	2454455	18	19	FFTFFFFFF	TF	0.474	0.558	0.048	0.073	4.062	3.823
704	2454455	2454485	17	18	FFTFFFFFF	TF	0.479	0.537	0.004	0.036	4.258	4.25
704	2454455	2454485	18	19	FFTFFFFFF	TF	0.553	0.63	0.041	0.09	3.642	3.351
704	2454515	2454545	18	19	FFTFFFFFF	TF	0.54	0.621	0.026	0.093	3.577	3.579
704	2454485	2454545	19	20	FFTFFFFFF	TF	0.614	0.667	0.052	0.062	3.219	3.312
704	2454905	2454935	19	20	FFTFFFFFF	FT	0.713	0.73	0.276	0.181	2.863	2.894
704	2454935	2455025	19	20	FFTFFFFFF	FT	0.657	0.69	0.222	0.141	3.067	3.046
704	2451965	2451995	18	19	FFTFFFFFF	FT	0.596	0.627	0.046	0.111	3.31	3.212
704	2453675	2453705	18	19	FFTFFFFFF	FT	0.524	0.568	0.021	0.109	3.793	3.681
704	2453615	2453645	18	19	FFTFFFFFF	TF	0.501	0.543	0.052	0.094	3.804	3.971
704	2453675	2453705	17	18	FFTFFFFFF	TF	0.46	0.512	0.025	0.059	4.243	4.082
704	2453705	2453735	17	18	FFTFFFFFF	TF	0.439	0.482	0.002	0.02	4.671	4.686
704	2453735	2453765	17	18	FFTFFFFFF	TF	0.459	0.521	-0.01	0.032	4.348	4.365
704	2453765	2453795	17	18	FFTFFFFFF	TF	0.546	0.585	0.059	0.071	3.613	3.646
704	2453825	2453915	18	19	FFTFFFFFF	TF	0.595	0.625	0.016	0.124	3.512	3.44
704	2450975	2455085	10	12	FFTFFFFFF	TF	0.817	0.953	0.06	-0.022	2.64	2.324
704	2451995	2452025	18	19	FFTFFFFFF	FT	0.656	0.663	0.029	0.093	3.23	3.123
704	2453885	2453915	16	17	FFTFFFFFF	TF	0.543	0.585	0.012	0.177	3.9	3.801
704	2451125	2451155	18	19	FFTFFFFFF	FT	0.829	0.909	0.02	-0.158	2.484	2.378

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2454095	2454125	16	17	FFTFFFFFF	TF	0.499	0.547	0.007	0.011	4.099	4.148
704	2451905	2451935	19	20	FFTFFFFFF	FT	0.629	0.693	0.048	0.013	3.082	2.997
704	2452565	2452595	18	19	FFTFFFFFF	FT	0.567	0.619	-0.001	0.044	3.537	3.41
704	2453915	2453945	18	19	FFTFFFFFF	FT	0.614	0.653	0.023	0.061	3.26	3.193
704	2453525	2453555	16	17	FFTFFFFFF	TF	0.575	0.596	-0.002	0.141	3.725	3.85
704	2454185	2454215	18	19	FFTFFFFFF	FT	0.628	0.679	0.179	0.133	3.196	3.107
704	2454095	2454125	18	19	FFTFFFFFF	FT	0.582	0.61	0.12	0.113	3.466	3.506
704	2450975	2451095	16	17	FFTFFFFFF	TF	0.709	0.828	-0.046	0.025	2.817	2.589
704	2451545	2451575	18	19	FFTFFFFFF	FT	0.569	0.684	0	-0.147	3.433	3.058
704	2452985	2453015	19	20	FFTFFFFFF	FT	0.635	0.668	0.035	0.103	3.212	3.202
704	2453045	2453075	18	19	FFTFFFFFF	FT	0.544	0.567	0.092	0.124	3.792	3.719
704	2454005	2454035	19	20	FFTFFFFFF	FT	0.717	0.716	0.065	0.136	2.979	2.912
704	2451365	2451425	17	18	FFTFFFFFF	TF	0.454	0.525	-0.027	0.084	4.181	3.84
704	2454005	2454035	17	18	FFTFFFFFF	TF	0.58	0.584	0.032	0.071	3.57	3.832
704	2453345	2453375	18	19	FFTFFFFFF	FT	0.567	0.617	0.018	0.115	3.674	3.5
704	2453195	2453225	17	18	FFTFFFFFF	FT	0.502	0.523	-0.026	0.083	4.21	4.102
704	2454635	2454665	17	18	FFTFFFFFF	FT	0.553	0.609	0.06	0.166	3.866	3.422
704	2454365	2454395	17	18	FFTFFFFFF	TF	0.522	0.547	0.046	0.078	4.166	3.879
704	2454425	2454455	16	17	FFTFFFFFF	TF	0.426	0.471	-0.045	-0.003	4.398	4.633
704	2454455	2454485	16	17	FFTFFFFFF	TF	0.459	0.494	-0.018	0.009	4.696	4.241
704	2454485	2454515	16	17	FFTFFFFFF	TF	0.528	0.578	0.079	0.061	3.948	4.063
704	2454515	2454545	17	18	FFTFFFFFF	TF	0.49	0.543	0.042	0.07	3.979	4.227
704	2454545	2454695	18	19	FFTFFFFFF	TF	0.506	0.596	0.062	0.096	4.046	3.814
704	2452865	2452895	18	19	FFTFFFFFF	FT	0.593	0.618	-0.01	0.153	3.445	3.302
704	2453945	2453975	18	19	FFTFFFFFF	FT	0.608	0.623	0.081	0.1	3.373	3.316
704	2451245	2451275	18	19	FFTFFFFFF	FT	0.824	0.857	0.005	0.08	2.531	2.475

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
704	2452805	2452835	18	19	FFTFFFFFF	FT	0.633	0.668	0.001	0.095	3.215	3.113
704	2453315	2453345	19	20	FFTFFFFFF	FT	0.628	0.687	0.009	0.131	3.28	3.048
704	2453345	2453375	19	20	FFTFFFFFF	FT	0.642	0.698	0.033	0.118	3.157	3.06
704	2453375	2453435	18	19	FFTFFFFFF	TF	0.529	0.586	0.035	0.047	3.634	3.599
704	2453435	2453465	18	19	FFTFFFFFF	TF	0.516	0.591	0.08	0.047	3.801	3.743
704	2454395	2454425	19	20	FFTFFFFFF	TF	0.596	0.691	0.072	0.089	3.203	2.993
704	2454035	2454065	16	17	FFTFFFFFF	TF	0.548	0.573	0.047	0.06	3.96	4.05
704	2454695	2454725	18	19	FFTFFFFFF	TF	0.441	0.511	0.021	0.034	4.916	4.451
704	2451485	2451515	18	19	FFTFFFFFF	FT	0.566	0.587	0.028	0.015	3.568	3.401
704	2451665	2451695	18	19	FFTFFFFFF	FT	0.588	0.65	0.044	0.133	3.395	3.19
704	2452715	2452745	18	19	FFTFFFFFF	FT	0.65	0.662	0.145	0.132	3.204	3.162
704	2453645	2453675	17	18	FFTFFFFFF	TF	0.504	0.574	0.058	0.061	3.824	3.736
704	2454875	2454905	18	19	FFTFFFFFF	FT	0.601	0.622	0.2	0.167	3.359	3.379
704	2453315	2453345	16	17	FFTFFFFFF	TF	0.467	0.482	0.012	0.042	4.861	4.713
704	2453345	2453375	16	17	FFTFFFFFF	TF	0.449	0.478	-0.004	0.018	5.077	4.964
704	2453195	2453225	18	19	FFTFFFFFF	FT	0.543	0.563	-0.027	0.08	3.716	3.687
704	2454335	2454365	18	19	FFTFFFFFF	FT	0.588	0.613	0.015	0.166	3.54	3.411
704	2454905	2454935	18	19	FFTFFFFFF	FT	0.64	0.649	0.271	0.183	3.131	3.259
704	2453705	2453735	16	17	FFTFFFFFF	TF	0.416	0.441	-0.026	0.043	4.786	4.613
704	2451845	2451875	19	20	FFTFFFFFF	FT	0.649	0.687	0.024	0.034	3.063	3.042
704	2452235	2452355	20	21	FFTFFFFFF	FT	0.739	0.794	0.083	0.052	2.728	2.666
704	2452835	2452985	20	21	FFTFFFFFF	FT	0.701	0.73	0.042	0.08	2.948	2.838
704	2453135	2453255	19	20	FFTFFFFFF	TF	0.534	0.607	-0.008	0.065	3.698	3.56
704	2453255	2453345	19	20	FFTFFFFFF	TF	0.574	0.632	0.037	0.054	3.355	3.243
704	2453345	2453375	17	18	FFTFFFFFF	TF	0.458	0.502	-0.001	0.028	4.567	4.531
704	2453345	2453375	18	19	FFTFFFFFF	TF	0.501	0.559	0.029	0.062	3.918	3.803

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2454395	2454425	19	20	FFTFFFFFF	FT	0.621	0.678	0.084	0.138	3.238	3.094
704	2454845	2454875	19	20	FFTFFFFFF	FT	0.64	0.698	0.115	0.177	3.107	3.009
704	2452235	2452265	19	20	FFTFFFFFF	FT	0.653	0.717	0.003	0.054	3.085	2.941
704	2453525	2453555	17	18	FFTFFFFFF	FT	0.569	0.608	0.114	0.092	3.626	3.605
704	2451965	2452145	18	19	FFTFFFFFF	TF	0.545	0.61	0.036	0.082	3.376	3.402
704	2450855	2450885	17	18	FFTFFFFFF	FT	0.835	0.656	-0.185	-0.022	3.301	3.253
704	2454995	2455025	17	18	FFTFFFFFF	FT	0.563	0.595	0.22	0.196	3.565	3.476
704	2451185	2451215	17	18	FFTFFFFFF	TF	0.741	0.862	0.034	-0.026	2.712	2.573
704	2452115	2452145	18	19	FFTFFFFFF	FT	0.6	0.659	-0.002	0.082	3.41	3.238
704	2454725	2454755	18	19	FFTFFFFFF	TF	0.525	0.596	0.062	0.071	3.909	3.561
704	2454785	2454815	17	18	FFTFFFFFF	TF	0.455	0.506	0.011	0.057	4.36	4.319
704	2450615	2450975	16	17	FFTFFFFFF	TF	0.644	0.643	-0.06	-0.031	3.635	3.855
704	2452565	2452595	18	19	FFTFFFFFF	TF	0.587	0.661	-0.007	0.027	3.258	3.183
704	2451215	2451245	18	19	FFTFFFFFF	FT	0.764	0.835	0.013	0.089	2.626	2.539
704	2453615	2453645	18	19	FFTFFFFFF	FT	0.561	0.606	0.028	0.138	3.582	3.467
704	2453195	2453225	16	17	FFTFFFFFF	TF	0.497	0.566	-0.011	0.126	4.207	4.044
704	2451695	2451725	18	19	FFTFFFFFF	FT	0.606	0.678	0.012	0.156	3.311	3.078
704	2453135	2453165	16	17	FFTFFFFFF	TF	0.544	0.569	0.008	0.139	4.023	4.1
704	2453165	2453195	16	17	FFTFFFFFF	TF	0.518	0.576	0.048	0.14	4.703	3.987
704	2451905	2451935	17	18	FFTFFFFFF	TF	0.427	0.473	0.018	0.015	4.335	4.095
704	2453315	2453345	17	18	FFTFFFFFF	TF	0.464	0.509	-0.001	0.032	4.483	4.313
704	2453465	2453585	18	19	FFTFFFFFF	TF	0.535	0.59	0.04	0.097	3.705	3.363
704	2452085	2452115	18	19	FFTFFFFFF	FT	0.665	0.656	-0.018	0.083	3.369	3.172
704	2452655	2452685	17	18	FFTFFFFFF	TF	0.565	0.613	0.018	0.05	3.478	3.484
704	2452505	2452535	18	19	FFTFFFFFF	FT	0.562	0.594	-0.015	0.038	3.609	3.481
704	2452805	2452835	19	20	FFTFFFFFF	FT	0.71	0.729	0.01	0.077	3.014	3.01

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
704	2453195	2453225	19	20	FFTFFFFFF	FT	0.612	0.627	-0.041	0.07	3.261	3.423
704	2453225	2453255	19	20	FFTFFFFFF	FT	0.595	0.614	-0.029	0.088	3.366	3.343
704	2453285	2453315	18	19	FFTFFFFFF	TF	0.536	0.605	0.063	0.043	3.687	3.417
704	2454605	2454635	19	20	FFTFFFFFF	FT	0.692	0.707	0.173	0.157	2.918	2.981
704	2454635	2454665	18	19	FFTFFFFFF	FT	0.572	0.64	0.036	0.177	3.511	3.281
704	2454875	2454905	19	20	FFTFFFFFF	FT	0.684	0.708	0.19	0.19	2.963	2.964
704	2451005	2451065	18	19	FFTFFFFFF	FT	0.853	0.899	-0.037	0.04	2.43	2.379
704	2453585	2453615	18	19	FFTFFFFFF	FT	0.542	0.588	0.021	0.101	3.624	3.554
704	2453435	2453465	18	19	FFTFFFFFF	FT	0.589	0.604	0.188	0.149	3.477	3.521
704	2452415	2452445	17	18	FFTFFFFFF	TF	0.594	0.653	0.01	0.141	3.496	3.304
704	2452445	2452475	17	18	FFTFFFFFF	TF	0.586	0.592	-0.009	0.12	3.579	3.578
704	2451695	2451725	16	17	FFTFFFFFF	TF	0.447	0.521	-0.069	0.177	4.311	3.677
704	2453825	2453855	19	20	FFTFFFFFF	FT	0.693	0.697	0.142	0.097	2.969	3.048
704	2454815	2454845	17	18	FFTFFFFFF	TF	0.437	0.478	0.022	0.043	4.999	4.711
704	2454845	2454875	17	18	FFTFFFFFF	TF	0.486	0.524	0.027	0.077	4.35	4.188
704	2454875	2454905	17	18	FFTFFFFFF	TF	0.527	0.582	0.075	0.086	3.692	3.784
704	2454875	2455085	19	20	FFTFFFFFF	TF	0.609	0.668	0.079	0.11	3.253	3.156
704	2450015	2450645	16	17	FFTFFFFFF	FT	0.938	0.53	0.569	0.115	1.98	4.556
704	2452775	2452805	18	19	FFTFFFFFF	FT	0.683	0.7	0.075	0.172	3.099	2.997
704	2453585	2453615	18	19	FFTFFFFFF	TF	0.471	0.537	0.037	0.076	4.173	3.866
704	2452655	2452865	19	20	FFTFFFFFF	TF	0.641	0.706	0.09	0.141	2.978	2.979
704	2449985	2450555	17	18	FFTFFFFFF	FT	1.096	0.659	0.886	0.167	2.021	3.559
704	2451695	2451755	17	18	FFTFFFFFF	TF	0.518	0.598	-0.057	0.198	3.665	3.149
704	2451215	2451365	18	19	FFTFFFFFF	TF	0.616	0.719	-0.052	0.106	3.492	3.025
704	2454725	2454755	18	19	FFTFFFFFF	FT	0.51	0.563	-0.002	0.141	3.837	3.674
704	2450735	2450765	17	18	FFTFFFFFF	FT	0.892	0.827	0.036	-0.085	2.437	2.613

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2454515	2454545	19	20	FFTFFFFFF	FT	0.685	0.706	0.189	0.154	2.981	2.993
704	2453645	2453675	18	19	FFTFFFFFF	TF	0.559	0.621	0.072	0.101	3.381	3.27
704	2450975	2451005	18	19	FFTFFFFFF	FT	0.882	0.943	-0.005	0.051	2.398	2.276
704	2451065	2451095	17	18	FFTFFFFFF	FT	0.664	0.695	-0.031	0.018	3.001	3.013
704	2452925	2452955	19	20	FFTFFFFFF	FT	0.656	0.655	0.012	0.124	3.145	3.169
704	2454785	2454815	19	20	FFTFFFFFF	FT	0.643	0.706	0.055	0.172	3.148	2.988
704	2452445	2452475	18	19	FFTFFFFFF	FT	0.635	0.659	0	0.027	3.244	3.149
704	2451605	2451635	19	20	FFTFFFFFF	FT	0.643	0.681	0.078	0.091	3.138	3.038
704	2451875	2451905	19	20	FFTFFFFFF	FT	0.626	0.657	0.028	0.04	3.217	3.119
704	2452655	2452685	19	20	FFTFFFFFF	FT	0.649	0.704	0.053	0.094	3.12	2.986
704	2453735	2453765	19	20	FFTFFFFFF	FT	0.626	0.672	0.06	0.115	3.222	3.119
704	2454035	2454065	19	20	FFTFFFFFF	FT	0.685	0.729	0.078	0.149	3.001	2.928
704	2451725	2451875	19	20	FFTFFFFFF	TF	0.533	0.607	0.012	0.008	3.421	3.242
704	2451665	2451815	18	19	FFTFFFFFF	TF	0.491	0.55	-0.011	0.075	4.047	3.482
704	2451845	2451875	17	18	FFTFFFFFF	TF	0.475	0.505	0.007	0.018	4.147	3.785
704	2451875	2451905	18	19	FFTFFFFFF	TF	0.513	0.572	0.032	0.004	3.781	3.641
704	2451905	2451935	18	19	FFTFFFFFF	TF	0.53	0.577	0.031	0.009	3.597	3.476
704	2451935	2451965	18	19	FFTFFFFFF	TF	0.559	0.608	0.031	0.041	3.511	3.488
704	2452295	2452325	19	20	FFTFFFFFF	FT	0.653	0.715	0.077	0.067	3.082	2.981
704	2452865	2452895	19	20	FFTFFFFFF	FT	0.686	0.699	0.033	0.149	3.046	3.09
704	2453045	2453075	19	20	FFTFFFFFF	FT	0.633	0.654	0.114	0.137	3.255	3.209
704	2453075	2453225	20	21	FFTFFFFFF	FT	0.693	0.688	0.055	0.082	3.008	2.938
704	2454095	2454125	19	20	FFTFFFFFF	FT	0.645	0.673	0.143	0.123	3.121	3.162
704	2454395	2454425	20	21	FFTFFFFFF	FT	0.719	0.768	0.103	0.132	2.763	2.796
704	2450615	2451215	15	16	FFTFFFFFF	TF	0.656	0.715	0.005	-0.002	3.17	3.171
704	2451545	2451575	17	18	FFTFFFFFF	TF	0.417	0.557	-0.004	-0.129	4.209	3.571

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2451575	2451605	17	18	FFTFFFFFF	TF	0.485	0.556	0.007	0.033	3.72	3.704
704	2454035	2454065	17	18	FFTFFFFFF	TF	0.533	0.593	0.041	0.093	3.891	3.831
704	2451935	2451965	19	20	FFTFFFFFF	FT	0.677	0.711	0.052	0.056	3.044	2.961
704	2452685	2452715	19	20	FFTFFFFFF	FT	0.688	0.732	0.168	0.131	2.967	2.882
704	2452715	2452745	19	20	FFTFFFFFF	FT	0.718	0.73	0.163	0.143	2.9	2.86
704	2452745	2452775	19	20	FFTFFFFFF	FT	0.684	0.722	0.097	0.091	2.945	2.851
704	2453375	2453405	17	18	FFTFFFFFF	TF	0.461	0.515	0.015	0.03	4.547	4.37
704	2453405	2453525	19	20	FFTFFFFFF	TF	0.577	0.643	0.091	0.031	3.339	2.898
704	2454155	2454185	19	20	FFTFFFFFF	FT	0.691	0.704	0.173	0.125	2.985	2.988
704	2454185	2454215	19	20	FFTFFFFFF	FT	0.692	0.734	0.131	0.094	2.9	2.819
704	2452175	2452205	18	19	FFTFFFFFF	FT	0.583	0.626	-0.02	0.031	3.484	3.38
704	2453765	2453795	19	20	FFTFFFFFF	FT	0.691	0.694	0.143	0.145	2.987	2.995
704	2452055	2452115	17	18	FFTFFFFFF	TF	0.539	0.576	-0.033	0.146	3.779	3.712
704	2454755	2454785	19	20	FFTFFFFFF	FT	0.628	0.685	0.035	0.161	3.202	3.086
704	2451365	2451425	18	19	FFTFFFFFF	FT	0.545	0.585	-0.007	0.06	3.41	3.367
704	2454245	2454365	18	19	FFTFFFFFF	TF	0.492	0.54	0.066	0.125	3.908	3.788
704	2454365	2454395	18	19	FFTFFFFFF	TF	0.554	0.607	0.074	0.083	3.616	3.455
704	2454395	2454425	17	18	FFTFFFFFF	TF	0.503	0.562	0.059	0.059	3.934	3.893
704	2454575	2454605	19	20	FFTFFFFFF	FT	0.7	0.706	0.185	0.134	2.936	2.982
704	2452685	2452715	17	18	FFTFFFFFF	TF	0.545	0.602	0.022	0.081	3.756	3.526
704	2453465	2453495	19	20	FFTFFFFFF	FT	0.706	0.698	0.192	0.09	2.976	2.927
704	2454125	2454155	19	20	FFTFFFFFF	FT	0.69	0.718	0.142	0.16	2.984	3.025
704	2454245	2454395	20	21	FFTFFFFFF	FT	0.706	0.743	0.06	0.106	2.806	2.848
704	2454485	2454515	19	20	FFTFFFFFF	FT	0.643	0.687	0.153	0.169	3.089	3.079
704	2451425	2451455	18	19	FFTFFFFFF	FT	0.575	0.633	0.003	0.042	3.361	3.209
704	2452325	2452355	19	20	FFTFFFFFF	FT	0.689	0.773	0.127	0.17	3	2.768

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2451245	2451305	19	20	FFTFFFFFF	FT	0.916	0.931	-0.052	0.101	2.334	2.242
704	2452025	2452055	18	19	FFTFFFFFF	FT	0.627	0.677	0.019	0.116	3.176	3.061
704	2453855	2453915	19	20	FFTFFFFFF	FT	0.735	0.722	0.18	0.117	2.776	3.014
704	2451065	2451125	19	20	FFTFFFFFF	FT	0.91	0.929	-0.06	0.053	2.333	2.267
704	2451695	2451815	19	20	FFTFFFFFF	FT	0.632	0.661	0.021	0.055	3.219	3.137
704	2451815	2451845	19	20	FFTFFFFFF	FT	0.615	0.648	0.023	0.04	3.285	3.134
704	2454335	2454365	19	20	FFTFFFFFF	FT	0.651	0.686	0.02	0.171	3.13	3.018
704	2455055	2455085	19	20	FFTFFFFFF	FT	0.611	0.718	0.08	0.293	3.224	2.86
704	2450945	2450975	18	19	FFTFFFFFF	FT	0.836	0.908	-0.047	0.058	2.477	2.347
704	2451155	2451215	19	20	FFTFFFFFF	FT	0.829	0.939	0.052	-0.064	2.484	2.366
704	2451635	2451665	18	19	FFTFFFFFF	FT	0.589	0.646	0.075	0.117	3.455	3.267
704	2452145	2452175	18	19	FFTFFFFFF	TF	0.592	0.64	-0.036	0.008	3.208	3.043
704	2451485	2451515	17	18	FFTFFFFFF	TF	0.465	0.52	0.004	0.01	4.131	3.809
704	2453015	2453045	17	18	FFTFFFFFF	TF	0.549	0.525	0.061	0.037	3.771	3.895
704	2453045	2453075	17	18	FFTFFFFFF	TF	0.539	0.553	0.075	0.061	3.845	3.868
704	2454995	2455085	17	18	FFTFFFFFF	TF	0.494	0.553	0.022	0.134	3.995	3.768
704	2451395	2451485	18	19	FFTFFFFFF	TF	0.52	0.594	0.008	-0.017	3.587	3.343
704	2451515	2451545	18	19	FFTFFFFFF	TF	0.485	0.589	0.002	-0.062	3.804	3.548
704	2452535	2452565	19	20	FFTFFFFFF	FT	0.653	0.693	0.005	0.095	3.083	3.045
704	2452565	2452595	19	20	FFTFFFFFF	FT	0.649	0.718	0.008	0.073	3.085	2.949
704	2453165	2453195	19	20	FFTFFFFFF	FT	0.649	0.68	0.036	0.098	3.114	3.033
704	2454305	2454335	19	20	FFTFFFFFF	FT	0.637	0.678	0.032	0.157	3.18	3.034
704	2452475	2452535	18	19	FFTFFFFFF	TF	0.495	0.564	0.029	0.042	3.928	3.631
704	2453285	2453315	19	20	FFTFFFFFF	FT	0.626	0.669	-0.025	0.124	3.147	3.108
704	2454425	2454455	17	18	FFTFFFFFF	TF	0.426	0.482	0.01	0.022	4.549	4.26
704	2453945	2454035	19	20	FFTFFFFFF	TF	0.656	0.696	0.096	0.022	3.044	3.009

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2455025	2455055	18	19	FFTFFFFFF	FT	0.569	0.614	0.061	0.207	3.58	3.383
704	2451455	2451485	19	20	FFTFFFFFF	FT	0.653	0.661	0.031	0.006	3.058	3.116
704	2451515	2451545	18	19	FFTFFFFFF	FT	0.56	0.633	0.009	-0.057	3.572	3.286
704	2451545	2451605	18	19	FFTFFFFFF	TF	0.524	0.673	0.004	-0.187	3.555	3.069
704	2451995	2452085	19	20	FFTFFFFFF	FT	0.725	0.718	-0.001	0.058	3.094	2.972
704	2453075	2453105	19	20	FFTFFFFFF	FT	0.66	0.661	0.161	0.131	3.141	3.171
704	2452265	2452295	18	19	FFTFFFFFF	TF	0.548	0.633	0.01	-0.03	3.466	3.226
704	2451065	2451095	18	19	FFTFFFFFF	FT	0.81	0.844	-0.046	0.001	2.567	2.508
704	2453555	2453585	18	19	FFTFFFFFF	FT	0.586	0.61	0.039	0.096	3.589	3.334
704	2451935	2451965	17	18	FFTFFFFFF	TF	0.509	0.54	0.054	0.04	3.804	3.738
704	2452205	2452235	19	20	FFTFFFFFF	FT	0.635	0.704	0.01	0.05	3.208	3.043
704	2453255	2453285	19	20	FFTFFFFFF	FT	0.63	0.644	-0.041	0.097	3.245	3.191
704	2454545	2454575	19	20	FFTFFFFFF	FT	0.69	0.708	0.217	0.146	2.984	2.966
704	2452355	2452835	20	21	FFTFFFFFF	FT	0.694	0.737	0.038	0.079	2.942	2.809
704	2453675	2453705	19	20	FFTFFFFFF	FT	0.625	0.679	0.039	0.134	3.196	3.083
704	2454695	2454725	18	19	FFTFFFFFF	FT	0.516	0.578	0.006	0.15	3.783	3.518
704	2452175	2452205	19	20	FFTFFFFFF	FT	0.659	0.715	0	0.044	3.111	2.967
704	2454125	2454155	17	18	FFTFFFFFF	TF	0.574	0.611	0.031	0.063	3.473	3.631
704	2454245	2454275	18	19	FFTFFFFFF	FT	0.626	0.663	0.118	0.149	3.22	3.111
704	2453525	2453555	18	19	FFTFFFFFF	FT	0.594	0.642	0.132	0.1	3.281	3.263
704	2454965	2454995	18	19	FFTFFFFFF	FT	0.579	0.639	0.237	0.176	3.447	3.303
704	2454755	2454785	20	21	FFTFFFFFF	FT	0.715	0.743	0.018	0.086	2.839	2.839
704	2452595	2452625	19	20	FFTFFFFFF	FT	0.619	0.666	0.017	0.092	3.287	3.163
704	2452625	2452655	19	20	FFTFFFFFF	FT	0.633	0.685	0.042	0.086	3.212	3.057
704	2453105	2453135	19	20	FFTFFFFFF	FT	0.649	0.68	0.093	0.102	3.146	3.091
704	2454125	2454275	19	20	FFTFFFFFF	TF	0.626	0.653	0.061	0.101	3.145	3.088

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
704	2452925	2452955	17	18	FFTFFFFFF	TF	0.566	0.591	0.079	0.055	3.79	3.949
704	2451605	2451665	18	19	FFTFFFFFF	TF	0.567	0.631	0.017	0.072	3.644	3.268
704	2454365	2454395	19	20	FFTFFFFFF	FT	0.632	0.662	0.039	0.116	3.184	3.119
704	2453135	2453165	17	18	FFTFFFFFF	TF	0.566	0.589	0.008	0.171	3.825	3.614
704	2453525	2453675	19	20	FFTFFFFFF	TF	0.585	0.657	0.075	0.097	3.224	3.239
704	2452985	2453015	20	21	FFTFFFFFF	FT	0.721	0.736	0.009	0.069	2.923	2.88
704	2453975	2454005	19	20	FFTFFFFFF	FT	0.703	0.71	0.057	0.044	2.927	2.953
704	2454575	2454665	17	18	FFTFFFFFF	TF	0.547	0.642	0.081	0.16	3.607	3.463
704	2453885	2453915	17	18	FFTFFFFFF	TF	0.592	0.655	0.001	0.142	3.288	3.353
704	2450525	2450555	18	19	FFTFFFFFF	FT	1.151	0.71	0.94	0.16	2.021	3.213
704	2453195	2453225	17	18	FFTFFFFFF	TF	0.551	0.6	0.043	0.124	4	3.589
704	2454035	2454065	18	19	FFTFFFFFF	TF	0.56	0.638	0.037	0.127	3.49	3.302
704	2454065	2454095	18	19	FFTFFFFFF	TF	0.532	0.605	0.034	0.09	3.673	3.642
704	2454095	2454125	18	19	FFTFFFFFF	TF	0.572	0.617	0.05	0.034	3.352	3.394
704	2452595	2452625	17	18	FFTFFFFFF	TF	0.435	0.489	-0.026	0.028	4.533	4.502
704	2452625	2452655	17	18	FFTFFFFFF	TF	0.471	0.518	-0.011	0.018	4.272	3.983
704	2452835	2452865	19	20	FFTFFFFFF	FT	0.698	0.691	0.047	0.105	2.999	3.069
704	2453705	2453735	18	19	FFTFFFFFF	TF	0.512	0.57	0.025	0.043	3.839	3.793
704	2453795	2453825	19	20	FFTFFFFFF	FT	0.722	0.705	0.139	0.089	2.933	2.976
704	2453765	2453795	18	19	FFTFFFFFF	TF	0.584	0.638	0.041	0.097	3.257	3.422
704	2452265	2452295	19	20	FFTFFFFFF	TF	0.61	0.712	0.041	-0.011	3.102	3.043
704	2453045	2453075	18	19	FFTFFFFFF	TF	0.528	0.573	0.049	0.051	3.81	3.743
704	2452625	2452655	18	19	FFTFFFFFF	TF	0.523	0.57	0.016	0.046	3.834	3.665
704	2452625	2452655	19	20	FFTFFFFFF	TF	0.607	0.663	0.058	0.046	3.214	3.153
704	2453525	2453555	17	18	FFTFFFFFF	TF	0.509	0.618	0.02	0.172	3.744	3.558
704	2454485	2454515	17	18	FFTFFFFFF	TF	0.502	0.57	0.073	0.074	3.871	3.795

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2455025	2455055	19	20	FFTFFFFFF	FT	0.625	0.677	0.049	0.207	3.297	3.054
704	2453675	2453705	18	19	FFTFFFFFF	TF	0.512	0.601	0.036	0.076	3.618	3.633
704	2454515	2454665	20	21	FFTFFFFFF	FT	0.711	0.76	0.09	0.08	2.865	2.818
704	2450765	2450795	17	18	FFTFFFFFF	FT	0.875	0.822	-0.112	-0.138	2.443	2.549
704	2454665	2454695	19	20	FFTFFFFFF	FT	0.592	0.658	0.003	0.155	3.43	3.121
704	2454875	2454905	18	19	FFTFFFFFF	TF	0.557	0.628	0.057	0.115	3.399	3.35
704	2453585	2453615	19	20	FFTFFFFFF	FT	0.623	0.684	0.033	0.124	3.206	3.139
704	2452925	2452955	18	19	FFTFFFFFF	TF	0.602	0.652	0.055	0.063	3.529	3.34
704	2453015	2453045	18	19	FFTFFFFFF	TF	0.552	0.595	0.038	0.051	3.583	3.549
704	2450615	2450855	17	18	FFTFFFFFF	TF	0.647	0.641	-0.072	-0.045	3.542	3.715
704	2453735	2453765	18	19	FFTFFFFFF	TF	0.523	0.58	0.023	0.05	3.789	3.695
704	2453315	2453345	18	19	FFTFFFFFF	TF	0.517	0.614	0.006	0.046	3.772	3.473
704	2454485	2454515	18	19	FFTFFFFFF	TF	0.573	0.624	0.08	0.084	3.368	3.359
704	2450945	2451035	17	18	FFTFFFFFF	TF	0.82	0.903	-0.026	0.087	2.469	2.356
704	2452865	2452895	19	20	FFTFFFFFF	TF	0.613	0.635	-0.013	0.168	2.916	2.99
704	2452895	2452925	19	20	FFTFFFFFF	FT	0.662	0.67	0.013	0.125	3.119	3.134
704	2452505	2452535	19	20	FFTFFFFFF	FT	0.637	0.678	0.002	0.049	3.274	3.051
704	2451485	2451515	18	19	FFTFFFFFF	TF	0.542	0.593	0.005	-0.023	3.557	3.457
704	2452805	2452835	17	18	FFTFFFFFF	TF	0.566	0.658	-0.002	0.093	3.295	3.61
704	2454065	2454095	19	20	FFTFFFFFF	FT	0.673	0.717	0.057	0.159	3.111	3.011
704	2450555	2450645	17	18	FFTFFFFFF	FT	0.889	0.467	0.493	0.082	1.873	4.525
704	2451365	2451395	18	19	FFTFFFFFF	TF	0.57	0.575	-0.026	0.022	3.922	3.237
704	2453765	2453915	19	20	FFTFFFFFF	TF	0.665	0.704	0.072	0.073	3.079	3.108
704	2452685	2452715	18	19	FFTFFFFFF	TF	0.612	0.665	0.064	0.087	3.212	3.142
704	2453165	2453195	17	18	FFTFFFFFF	TF	0.549	0.606	0.023	0.162	3.785	3.601
704	2450765	2450855	18	19	FFTFFFFFF	FT	0.892	0.856	-0.12	-0.071	2.323	2.549

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2454245	2454305	17	18	FFTFFFFFFF	TF	0.577	0.627	0.027	0.148	3.818	3.737
704	2452235	2452265	18	19	FFTFFFFFFF	TF	0.557	0.623	0.013	0.017	3.539	3.349
704	2452775	2452805	17	18	FFTFFFFFFF	TF	0.59	0.706	-0.026	0.123	3.544	3.222
704	2454815	2454845	18	19	FFTFFFFFFF	TF	0.503	0.55	0.068	0.084	3.926	3.849
704	2452445	2452535	19	20	FFTFFFFFFF	TF	0.585	0.629	0.059	0.078	3.417	3.12
704	2450855	2450885	18	19	FFTFFFFFFF	FT	1.003	0.872	-0.251	-0.017	2.205	2.456
704	2451335	2451365	19	20	FFTFFFFFFF	FT	0.659	0.711	-0.007	0.113	3.181	2.927
704	2451485	2451515	19	20	FFTFFFFFFF	FT	0.655	0.682	0.042	0.018	3.088	3.004
704	2452655	2452685	18	19	FFTFFFFFFF	TF	0.606	0.675	0.037	0.027	3.267	3.159
704	2450615	2451305	19	20	FFTFFFFFFF	TF	0.825	0.959	0.008	-0.153	2.418	2.273
704	2452205	2452235	18	19	FFTFFFFFFF	TF	0.575	0.662	0.006	-0.009	3.395	3.249
704	2451395	2451455	19	20	FFTFFFFFFF	FT	0.667	0.725	0.017	0.015	2.967	2.858
704	2453615	2453645	19	20	FFTFFFFFFF	FT	0.652	0.701	0.031	0.142	3.157	3.017
704	2451365	2451395	19	20	FFTFFFFFFF	FT	0.66	0.646	0.02	0.021	3.138	3.029
704	2452595	2452625	18	19	FFTFFFFFFF	TF	0.507	0.569	0.008	0.047	3.835	3.737
704	2454125	2454155	18	19	FFTFFFFFFF	TF	0.575	0.651	0.054	0.102	3.422	3.291
704	2452475	2452505	19	20	FFTFFFFFFF	FT	0.699	0.717	0.041	0.035	2.916	2.999
704	2453165	2453195	18	19	FFTFFFFFFF	TF	0.589	0.619	-0.002	0.15	3.733	3.389
704	2454755	2454785	18	19	FFTFFFFFFF	TF	0.547	0.64	0.073	0.092	3.729	3.305
704	2452085	2452145	19	20	FFTFFFFFFF	FT	0.66	0.711	0.034	0.055	3.089	2.982
704	2453015	2453135	19	20	FFTFFFFFFF	TF	0.571	0.609	0.047	0.063	3.51	3.36
704	2453645	2453675	19	20	FFTFFFFFFF	FT	0.647	0.696	0.054	0.142	3.069	3.032
704	2452025	2452205	19	20	FFTFFFFFFF	TF	0.608	0.72	-0.014	-0.011	2.944	3.18
704	2451215	2451245	19	20	FFTFFFFFFF	FT	0.862	0.939	0.014	0.113	2.434	2.355
704	2451725	2451755	18	19	FFTFFFFFFF	FT	0.63	0.683	-0.024	0.107	3.086	2.984
704	2453225	2453255	20	21	FFTFFFFFFF	FT	0.639	0.672	-0.042	0.061	3.093	3.054

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2454815	2454845	19	20	FFTFFFFFF	TF	0.577	0.639	0.07	0.139	3.414	3.443
704	2454845	2454875	18	19	FFTFFFFFF	TF	0.527	0.6	0.033	0.1	3.765	3.514
704	2454095	2454245	20	21	FFTFFFFFF	FT	0.721	0.729	0.098	0.07	2.895	2.759
704	2452985	2453015	18	19	FFTFFFFFF	TF	0.502	0.55	0.043	0.042	3.972	3.903
704	2453945	2453975	19	20	FFTFFFFFF	FT	0.684	0.709	0.089	0.122	2.989	2.928
704	2451635	2451665	19	20	FFTFFFFFF	FT	0.67	0.703	0.139	0.098	3.066	2.946
704	2451845	2451875	18	19	FFTFFFFFF	TF	0.522	0.592	0.014	-0.005	3.696	3.418
704	2449955	2450555	19	20	FFTFFFFFF	FT	1.076	0.767	0.751	0.219	2.255	3.061
704	2451545	2451575	19	20	FFTFFFFFF	FT	0.66	0.758	0.006	-0.12	2.976	2.841
704	2451575	2451605	19	20	FFTFFFFFF	FT	0.687	0.736	0.087	0.05	2.952	2.851
704	2452955	2452985	18	19	FFTFFFFFF	TF	0.501	0.584	0.013	0.043	3.869	3.793
704	2454725	2454785	19	20	FFTFFFFFF	TF	0.59	0.666	0.067	0.097	3.184	3.052
704	2454995	2455025	18	19	FFTFFFFFF	FT	0.609	0.636	0.195	0.17	3.308	3.499
704	2452895	2452955	19	20	FFTFFFFFF	TF	0.62	0.656	0.05	0.077	3.187	3.213
704	2453915	2453945	19	20	FFTFFFFFF	FT	0.71	0.706	-0.016	0.076	2.906	3.054
704	2452535	2452595	19	20	FFTFFFFFF	TF	0.653	0.72	0.052	0.037	3.085	2.957
704	2452445	2452475	19	20	FFTFFFFFF	FT	0.728	0.722	0.032	0.022	2.949	2.962
704	2451815	2451845	18	19	FFTFFFFFF	TF	0.504	0.584	-0.03	0.071	3.807	3.37
704	2454455	2454515	20	21	FFTFFFFFF	FT	0.723	0.749	0.105	0.138	2.918	2.758
704	2453465	2453945	20	21	FFTFFFFFF	FT	0.686	0.714	0.065	0.1	3.063	2.967
704	2450735	2450765	18	19	FFTFFFFFF	FT	0.938	0.866	-0.023	-0.049	2.257	2.48
704	2451185	2451215	18	19	FFTFFFFFF	TF	0.814	0.935	0.06	0.017	2.393	2.234
704	2454425	2454455	20	21	FFTFFFFFF	FT	0.711	0.758	0.054	0.118	2.905	2.818
704	2450825	2450855	17	18	FFTFFFFFF	FT	0.493	0.543	-0.073	-0.106	4.047	3.913
704	2450555	2450645	18	19	FFTFFFFFF	FT	0.888	0.524	0.547	0.09	2.07	3.676
704	2452955	2452985	19	20	FFTFFFFFF	TF	0.602	0.678	0.051	0.093	3.214	3.048

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2450945	2451005	19	20	FFTFFFFFF	FT	0.895	0.946	-0.001	0.03	2.331	2.255
704	2454245	2454305	19	20	FFTFFFFFF	FT	0.663	0.677	0.05	0.136	3.044	3.015
704	2453555	2453585	19	20	FFTFFFFFF	FT	0.641	0.67	0.022	0.111	3.212	3.093
704	2452415	2452445	19	20	FFTFFFFFF	FT	0.68	0.752	0.08	0.089	2.852	2.975
704	2453345	2453375	19	26	FFTFFFFFF	TF	0.584	0.662	0.059	0.086	3.357	3.281
704	2452775	2452835	18	19	FFTFFFFFF	TF	0.605	0.688	0.02	0.118	3.397	3.154
704	2454785	2454815	19	20	FFTFFFFFF	TF	0.583	0.674	0.06	0.128	3.313	3.167
704	2454845	2455085	20	21	FFTFFFFFF	FT	0.716	0.756	0.079	0.138	2.836	2.781
704	2454995	2455085	18	19	FFTFFFFFF	TF	0.52	0.609	0.076	0.195	4.263	3.381
704	2451665	2451695	19	20	FFTFFFFFF	FT	0.661	0.699	0.091	0.082	3.23	2.925
704	2450555	2450645	19	20	FFTFFFFFF	FT	0.973	0.676	0.501	0.121	2.054	2.781
704	2451305	2451335	19	20	FFTFFFFFF	FT	0.873	0.944	-0.037	0.149	2.357	2.253
704	2452235	2452265	19	20	FFTFFFFFF	TF	0.614	0.693	0.044	0.028	3.215	3.128
704	2451965	2451995	19	20	FFTFFFFFF	FT	0.696	0.724	0.064	0.09	2.952	2.967
704	2454665	2454725	19	20	FFTFFFFFF	TF	0.49	0.599	0.054	0.101	3.456	3.402
704	2451035	2451065	19	20	FFTFFFFFF	FT	0.899	0.923	-0.034	0.055	2.328	2.284
704	2454785	2454815	18	19	FFTFFFFFF	TF	0.501	0.574	0.032	0.084	3.841	3.617
704	2451905	2451995	19	20	FFTFFFFFF	TF	0.624	0.635	0.023	0.021	3.188	3.078
704	2454695	2454725	19	20	FFTFFFFFF	FT	0.614	0.669	0.025	0.155	3.318	3.071
704	2454425	2454455	19	20	FFTFFFFFF	TF	0.559	0.653	0.089	0.139	3.397	3.176
704	2451125	2451155	19	20	FFTFFFFFF	FT	0.871	0.943	0	-0.137	2.421	2.252
704	2449955	2450525	18	19	FFTFFFFFF	FT	1.01	0.751	0.728	0.175	2.198	2.909
704	2453315	2453465	20	21	FFTFFFFFF	FT	0.67	0.706	0.054	0.06	3.003	2.934
704	2454785	2454815	20	21	FFTFFFFFF	FT	0.729	0.749	0.042	0.116	2.763	2.729
704	2453705	2453735	19	20	FFTFFFFFF	TF	0.599	0.668	0.052	0.085	3.231	3.131
704	2452115	2452235	20	21	FFTFFFFFF	FT	0.715	0.801	0.02	0.062	2.825	2.798

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
704	2454065	2454125	19	20	FFTFFFFFF	TF	0.608	0.696	0.049	0.148	3.269	3.003
704	2452415	2452475	18	19	FFTFFFFFF	TF	0.625	0.652	0.033	0.125	3.487	3.132
704	2451335	2451545	19	20	FFTFFFFFF	TF	0.598	0.698	-0.013	-0.055	3.28	2.95
704	2451545	2451725	19	20	FFTFFFFFF	TF	0.625	0.724	0.014	-0.129	3.115	2.899
704	2454815	2454845	20	21	FFTFFFFFF	FT	0.715	0.743	0.051	0.117	2.905	2.86
704	2452985	2453015	19	20	FFTFFFFFF	TF	0.574	0.66	0.061	0.09	3.295	3.305
704	2451515	2451545	19	20	FFTFFFFFF	FT	0.635	0.728	0.011	-0.075	3.136	2.832
704	2454035	2454065	19	20	FFTFFFFFF	TF	0.633	0.732	0.038	0.19	3.091	2.921
704	2453735	2453765	19	20	FFTFFFFFF	TF	0.617	0.666	0.047	0.049	3.272	3.247
704	2453015	2453045	20	21	FFTFFFFFF	FT	0.663	0.716	0.091	0.107	3.319	2.86
704	2452595	2452625	19	20	FFTFFFFFF	TF	0.578	0.659	0.033	0.056	3.291	3.25
704	2453255	2453315	20	21	FFTFFFFFF	FT	0.688	0.712	0.024	0.075	2.986	2.978
704	2454665	2454725	20	21	FFTFFFFFF	FT	0.689	0.725	0.041	0.154	2.893	2.863
704	2454635	2454665	19	20	FFTFFFFFF	FT	0.639	0.696	0	0.159	3.342	3.031
704	2452775	2452805	19	20	FFTFFFFFF	FT	0.71	0.708	0.014	0.093	2.894	2.836
704	2453675	2453705	19	20	FFTFFFFFF	TF	0.61	0.682	0.079	0.061	3.223	3.105
704	2454215	2454245	19	20	FFTFFFFFF	FT	0.653	0.712	0.198	0.178	3.061	2.859
704	2450735	2450825	19	20	FFTFFFFFF	FT	0.97	0.928	-0.095	-0.024	2.147	2.269
704	2453375	2453405	19	20	FFTFFFFFF	TF	0.632	0.66	0.067	0.046	3.106	3.234
704	2452205	2452235	19	20	FFTFFFFFF	TF	0.632	0.709	0.014	-0.034	3.136	2.958
704	2454845	2454875	19	20	FFTFFFFFF	TF	0.611	0.681	0.035	0.16	3.29	3.026
704	2450615	2450855	18	19	FFTFFFFFF	TF	0.727	0.745	-0.063	-0.024	2.892	3.009
704	2453945	2454095	20	21	FFTFFFFFF	FT	0.736	0.717	0.041	0.05	2.822	2.735
704	2454455	2454485	19	20	FFTFFFFFF	TF	0.626	0.714	0.051	0.141	2.994	3.037
704	2451875	2451905	19	20	FFTFFFFFF	TF	0.549	0.634	0.01	0.039	3.115	3.407
704	2452295	2452445	19	20	FFTFFFFFF	TF	0.671	0.792	0.034	0.068	3.029	2.643

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
704	2454725	2454755	20	21	FFTFFFFFF	FT	0.687	0.719	0.035	0.168	3.017	3.057
704	2450045	2452085	20	21	FFTFFFFFF	FT	0.731	0.739	0.101	0.031	3.148	3.083
704	2454335	2455085	20	21	FFTFFFFFF	TF	0.655	0.715	0.091	0.136	3.158	2.946
704	2452805	2454215	20	21	FFTFFFFFF	TF	0.666	0.727	0.077	0.104	3.01	2.924
704	2450255	2452775	20	21	FFTFFFFFF	TF	0.655	0.735	0.053	0.022	3.057	2.928
705	2454035	2454455	17	18	FFTFFFFFF	FT	0.153	0.13	0.007	0.008	3.314	3.655
705	2454035	2454455	18	19	FFTFFFFFF	FT	0.164	0.139	0.032	0.01	3.396	4.435
705	2451095	2453735	17	18	FFTFFFFFF	FT	0.187	0.164	0.046	0.031	14.479	12.447
705	2452055	2453735	16	17	FFTFFFFFF	FT	0.168	0.172	-0.012	0.037	16.616	20.749
705	2453675	2453735	18	19	FFTFFFFFF	FT	0.162	0.141	0.02	-0.005	2.874	3.988
705	2453945	2454455	16	17	FFTFFFFFF	FT	0.14	0.134	0.001	0.046	4.198	3.478
705	2453945	2454035	17	18	FFTFFFFFF	FT	0.178	0.195	0.113	0.135	3.735	2.757
705	2453645	2453675	18	19	FFTFFFFFF	FT	0.193	0.153	0.155	0.086	2.245	2.65
705	2452895	2453645	18	19	FFTFFFFFF	FT	0.214	0.212	0.112	0.112	13.743	12.207
705	2450975	2453645	19	20	FFTFFFFFF	FT	0.218	0.22	0.123	0.128	8.823	9.056
705	2453945	2454005	18	19	FFTFFFFFF	FT	0.173	0.19	0.097	0.127	2.526	2.488
705	2454005	2454035	18	19	FFTFFFFFF	FT	0.207	0.191	0.164	0.13	2.88	3.762
705	2454035	2454455	19	20	FFTFFFFFF	FT	0.177	0.153	0.07	0.053	3.204	4.386
705	2453675	2453735	19	20	FFTFFFFFF	FT	0.175	0.146	0.034	0.023	3.125	3.811
705	2450975	2453645	20	21	FFTFFFFFF	FT	0.228	0.249	0.102	0.146	5.494	4.823
705	2453945	2454005	19	20	FFTFFFFFF	FT	0.191	0.203	0.108	0.136	2.544	2.64
705	2454005	2454035	19	20	FFTFFFFFF	FT	0.208	0.205	0.156	0.141	3.435	5.097
705	2453645	2453675	19	20	FFTFFFFFF	FT	0.197	0.165	0.153	0.108	2.313	2.744
705	2453645	2453675	20	21	FFTFFFFFF	FT	0.177	0.172	0.127	0.12	2.765	2.803
705	2454035	2454455	20	21	FFTFFFFFF	FT	0.175	0.168	0.071	0.083	3.405	3.778
705	2454005	2454035	20	24	FFTFFFFFF	FT	0.188	0.214	0.113	0.15	4.655	4.279

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
705	2453675	2453735	20	21	FFTFFFFFF	FT	0.181	0.152	0.029	0.05	8.171	3.417
705	2453945	2454005	20	21	FFTFFFFFF	FT	0.188	0.225	0.093	0.157	2.853	2.433
705	2451545	2454425	21	22	FFTFFFFFF	FT	0.187	0.205	0.072	0.121	5.536	4.339
710	2450405	2451005	13	17	FFTFFFFFF	FT	0.674	0.71	-0.113	-0.234	5.012	3.971
711	2449445	2454935	18	19	FFTFFFFFF	FT	0.602	0.534	0.002	-0.05	5.428	4.87
711	2449835	2454725	19	20	FFTFFFFFF	FT	0.613	0.544	0.024	-0.029	5.482	6.246
711	2449805	2454935	20	22	FFTFFFFFF	FT	0.717	0.661	-0.024	-0.059	4.103	4.238
732	2450405	2452355	18	19	FFTFFFFFF	FT	0.754	0.64	-0.085	0.105	3.845	4.175
732	2450375	2452355	16	18	FFTFFFFFF	FT	0.741	0.644	-0.17	0.004	4.065	4.888
734	2450705	2454635	18	19	FFTFFFFFF	FT	0.704	0.643	0.054	-0.074	4.377	4.301
734	2450825	2454635	19	20	FFTFFFFFF	FT	0.752	0.667	0.047	-0.048	3.757	4.373
734	2450675	2454335	17	18	FFTFFFFFF	FT	0.634	0.567	0.007	-0.069	4.037	5.447
734	2450825	2454635	20	21	FFTFFFFFF	FT	0.754	0.74	0.023	-0.005	4.007	4.672
735	2450255	2455085	18	19	FFTFFFFFF	FT	0.525	0.456	-0.017	0.038	5.492	6.176
735	2450165	2455085	17	18	FFTFFFFFF	FT	0.47	0.396	-0.034	0.025	6.921	9.054
735	2450255	2453015	19	20	FFTFFFFFF	FT	0.667	0.592	-0.009	0.008	4.1	4.355
735	2453015	2455085	19	20	FFTFFFFFF	FT	0.508	0.532	-0.004	0.016	3.835	4.051
735	2450345	2455085	20	21	FFTFFFFFF	FT	0.676	0.69	0.034	0.014	3.509	3.535
739	2451065	2452235	15	16	FFTFFFFFF	FT	0.579	0.556	0.021	0.088	4.491	4.886
739	2451095	2452325	17	18	FFTFFFFFF	FT	0.78	0.693	-0.034	-0.043	3.646	4.434
739	2451065	2452235	16	17	FFTFFFFFF	FT	0.668	0.596	-0.021	0.04	4.441	4.302
739	2451125	2452295	18	19	FFTFFFFFF	FT	0.905	0.804	-0.003	-0.01	3.517	3.533
758	2450705	2451305	15	17	FFTFFFFFF	FT	0.672	0.641	-0.023	0.216	4.044	4.534
760	2432945	2437085	15	16	TFFFFFFFF	FT	1.369	1.183	-0.026	-0.112	5.202	6.624
760	2432975	2439275	14	15	TFFFFFFFF	FT	1.3	1.129	-0.117	-0.096	4.182	7.874
760	2437235	2442005	15	16	TFFFFFFFF	FT	1.249	1.119	-0.208	0.036	3.174	7.377

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
760	2432945	2439185	16	17	TFFFFFFFF	FT	1.273	1.177	0.022	-0.072	2.651	3.085
801	2441615	2447915	16	17	TFFFFFFFF	FT	1.029	0.906	0.104	0.205	3.046	3.383
801	2441615	2448995	15	16	TFFFFFFFF	FT	0.827	0.736	-0.04	0.076	3.956	4.482
801	2447915	2448965	16	17	TFFFFFFFF	FT	0.478	0.513	-0.054	-0.1	5.334	5.554
801	2448095	2449355	16	17	FFTFFFFFF	FT	0.516	0.57	-0.056	-0.139	4.962	4.55
801	2447975	2449685	15	16	FFTFFFFFF	FT	0.511	0.554	-0.068	-0.074	4.249	4.662
801	2448335	2449685	17	18	FFTFFFFFF	FT	0.62	0.618	-0.009	-0.147	4.476	4.314
801	2449385	2449685	16	17	FFTFFFFFF	FT	0.624	0.634	-0.047	-0.019	4.377	4.176
801	2449715	2450615	16	17	FFTFFFFFF	FT	0.549	0.702	0.036	-0.246	5.005	4.287
801	2449715	2450615	17	18	FFTFFFFFF	FT	0.608	0.682	0.089	-0.21	4.546	4.081
801	2449715	2450615	15	16	FFTFFFFFF	FT	0.538	0.665	0.021	-0.169	4.851	4.637
801	2441555	2448545	17	18	TFFFFFFFF	FT	0.906	0.835	0.064	0.055	3.823	4.255
804	2428925	2442785	10	11	TFFFFFFFF	FT	2.075	1.03	0.241	0.035	349.837	9.866
805	2440055	2446595	15	17	TFFFFFFFF	FT	0.874	0.897	-0.215	0.183	3.158	3.265
807	2450585	2451785	19	20	FFTFFFFFF	FT	0.37	0.401	-0.098	0.201	4.873	4.687
807	2453495	2454755	19	20	FFTFFFFFF	FT	0.206	0.207	0.034	0.081	9.475	4.911
807	2450285	2452145	18	19	FFTFFFFFF	FT	0.362	0.352	-0.061	0.126	6.461	6.195
807	2453495	2454755	18	19	FFTFFFFFF	FT	0.199	0.202	-0.001	0.069	16.393	4.258
807	2451395	2454875	17	18	FFTFFFFFF	FT	0.269	0.303	-0.025	0.064	7.976	6.22
807	2440445	2447855	12	17	TFFFFFFFF	FT	0.901	0.656	0.512	-0.247	2.642	3.826
807	2450945	2454755	20	21	FFTFFFFFF	FT	0.357	0.349	0.067	0.162	8.48	5.472
807	2452265	2452505	18	19	FFTFFFFFF	FT	0.421	0.355	0.098	0.118	7.509	4.162
807	2451395	2454995	16	17	FFTFFFFFF	FT	0.285	0.306	-0.049	0.05	12.01	12.263
807	2452685	2453255	19	20	FFTFFFFFF	FT	0.287	0.276	-0.009	0.044	8.499	5.406
807	2452265	2452505	19	20	FFTFFFFFF	FT	0.423	0.378	0.144	0.167	4.991	4.532
807	2452685	2453255	18	19	FFTFFFFFF	FT	0.258	0.272	-0.032	0.022	9.128	4.356

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
807	2451605	2454215	21	23	FFTFFFFFF	FT	0.443	0.385	0.111	0.186	5.818	3.598
807	2451905	2452145	19	20	FFTFFFFFF	FT	0.338	0.377	0.055	0.17	5.826	3.78
808	2438915	2449505	15	16	TFFFFFFFF	FT	0.954	0.927	-0.095	0.121	26.489	3.813
808	2438795	2449505	12	17	TFFFFFFFF	FT	6.123	3.834	-0.07	0.015	376.508	679.523
808	2450435	2455055	15	17	FFTFFFFFF	FT	0.636	1.093	-0.194	-0.076	4.003	3.02
809	2445935	2446205	16	17	TFFFFFFFF	FT	0.81	0.739	-0.216	-0.233	3.188	3.125
809	2450495	2450615	17	18	TFFFFFFFF	FT	1.215	1.396	0.239	0.244	2.417	2.203
809	2447945	2448005	17	18	TFFFFFFFF	FT	1.043	1.045	-0.072	-0.342	2.792	2.878
809	2450705	2450975	17	18	TFFFFFFFF	FT	1.226	1.277	0.357	0.087	2.487	2.505
809	2445575	2445845	16	17	TFFFFFFFF	FT	0.829	0.725	-0.193	-0.165	3.38	3.65
809	2449355	2449415	17	18	TFFFFFFFF	FT	1.288	1.344	0.538	0.305	2.318	2.331
809	2449115	2449235	17	18	TFFFFFFFF	FT	1.22	1.318	0.265	0.052	2.33	2.259
809	2449505	2449595	17	18	TFFFFFFFF	FT	1.234	1.302	0.447	0.3	2.412	2.425
809	2449595	2449625	17	18	TFFFFFFFF	FT	1.21	1.273	0.209	0.186	2.443	2.321
809	2448305	2448455	17	18	TFFFFFFFF	FT	1.136	1.066	-0.126	-0.109	2.646	2.684
809	2448095	2449115	15	16	TFFFFFFFF	FT	0.999	0.926	-0.032	-0.002	2.791	2.955
809	2447765	2447885	16	17	TFFFFFFFF	FT	0.979	0.996	-0.053	-0.25	3.107	3.104
809	2446805	2447075	15	16	TFFFFFFFF	FT	0.83	0.803	-0.102	-0.083	3.284	3.47
809	2448305	2448575	16	17	TFFFFFFFF	FT	1.071	1.015	0.041	-0.066	2.687	2.995
809	2446295	2446385	16	17	TFFFFFFFF	FT	0.871	0.767	-0.275	0.082	2.939	3.719
809	2448095	2448245	16	17	TFFFFFFFF	FT	1.014	1.01	-0.118	-0.173	2.833	2.945
809	2446775	2446895	16	17	TFFFFFFFF	FT	0.833	0.815	-0.018	-0.181	3.81	3.335
809	2449385	2449625	16	17	TFFFFFFFF	FT	1.248	1.347	0.417	0.345	2.377	2.321
809	2447195	2448785	17	18	TFFFFFFFF	FT	1.124	1.168	-0.202	-0.226	2.487	2.742
809	2446955	2447075	16	17	TFFFFFFFF	FT	0.967	0.917	-0.037	-0.171	3.254	3.414
809	2442725	2446145	14	15	TFFFFFFFF	FT	0.879	0.729	-0.226	-0.055	3.469	3.87

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
809	2442725	2449115	12	13	TFFFFFFFF	FT	0.875	0.737	-0.229	-0.062	3.097	3.868
809	2446445	2446715	16	17	TFFFFFFFF	FT	0.849	0.705	-0.219	0.073	3.048	3.117
809	2449265	2449295	17	18	TFFFFFFFF	FT	1.226	1.349	0.435	0.212	2.422	2.251
809	2448995	2449085	16	17	TFFFFFFFF	FT	0.923	0.841	0.107	0.047	3.295	3.829
809	2446655	2446715	15	16	TFFFFFFFF	FT	0.706	0.643	-0.049	0.167	4.345	3.059
809	2448095	2448155	17	18	TFFFFFFFF	FT	1.033	1.089	-0.148	-0.216	2.829	2.969
809	2448155	2448245	17	18	TFFFFFFFF	FT	1.125	1.146	-0.145	-0.364	2.599	2.675
809	2450105	2450315	17	18	TFFFFFFFF	FT	1.241	1.415	0.38	0.369	2.361	2.116
809	2449235	2449265	17	18	TFFFFFFFF	FT	1.3	1.36	0.201	0.247	2.352	2.237
809	2450975	2451065	17	18	TFFFFFFFF	FT	1.299	1.334	0.489	0.238	2.321	2.163
809	2448815	2448905	17	18	TFFFFFFFF	FT	1.166	1.279	0.01	-0.558	2.445	2.406
809	2447405	2447495	16	17	TFFFFFFFF	FT	0.958	0.851	-0.028	0.024	3.261	3.704
809	2447555	2447705	17	18	TFFFFFFFF	FT	1.081	1.063	-0.022	-0.096	2.698	2.977
809	2448995	2449085	17	18	TFFFFFFFF	FT	0.979	0.925	0.094	0.014	2.928	3.235
809	2449925	2450405	16	17	TFFFFFFFF	FT	1.151	1.206	0.394	0.196	2.701	2.79
809	2447165	2449115	14	15	TFFFFFFFF	FT	0.962	0.962	-0.034	-0.137	3.173	3.161
809	2451065	2451155	17	18	TFFFFFFFF	FT	1.32	1.423	0.521	0.269	2.213	2.115
809	2447165	2447315	16	17	TFFFFFFFF	FT	1.005	0.94	0.022	-0.317	3.053	3.585
809	2447945	2448005	16	17	TFFFFFFFF	FT	0.93	0.925	-0.165	-0.261	2.795	3.532
809	2447555	2447705	16	17	TFFFFFFFF	FT	0.913	0.879	0.111	-0.25	3.374	3.915
809	2449115	2449295	16	17	TFFFFFFFF	FT	1.234	1.328	0.259	0.213	2.451	2.358
809	2445935	2449625	15	16	TFFFFFFFF	FT	1.109	1.133	0.019	0.121	2.712	2.836
809	2447765	2447885	17	18	TFFFFFFFF	FT	1.082	1.135	-0.154	-0.326	2.75	2.654
809	2445725	2446145	15	16	TFFFFFFFF	FT	0.801	0.7	-0.29	-0.14	3.36	3.859
809	2450315	2450405	17	18	TFFFFFFFF	FT	1.224	1.327	0.359	0.341	2.546	2.333
809	2448455	2449115	17	18	TFFFFFFFF	FT	1.077	1.163	0.016	-0.09	2.652	2.648

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
809	2448665	2454545	19	20	FFTFFFFFF	FT	0.285	0.28	0	-0.007	13.974	13.393
809	2445935	2448905	16	17	TFFFFFFFF	FT	1.102	1.128	-0.182	-0.204	2.591	2.748
809	2450495	2451155	16	17	TFFFFFFFF	FT	1.264	1.374	0.431	0.264	2.406	2.225
809	2449925	2450015	17	18	TFFFFFFFF	FT	0.861	0.709	0.377	0.017	2.988	4.779
809	2444825	2445455	16	17	TFFFFFFFF	FT	0.915	0.806	-0.093	-0.077	3.211	3.244
809	2448995	2449085	18	19	TFFFFFFFF	FT	0.949	0.947	0.191	-0.024	2.854	3.031
809	2445005	2445605	15	16	TFFFFFFFF	FT	0.778	0.761	-0.255	-0.043	3.636	4.057
809	2450705	2451035	18	19	TFFFFFFFF	FT	1.207	1.291	0.322	0.149	2.425	2.437
809	2442725	2444885	15	16	TFFFFFFFF	FT	0.801	0.724	-0.194	0.057	4.112	3.56
809	2446295	2447075	14	15	TFFFFFFFF	FT	0.861	0.776	-0.203	-0.012	3.011	3.681
809	2450525	2450615	18	19	TFFFFFFFF	FT	1.204	1.389	0.308	0.215	2.399	2.222
809	2448305	2449115	18	19	TFFFFFFFF	FT	1.206	1.178	-0.154	-0.133	2.421	2.501
809	2442725	2448845	13	14	TFFFFFFFF	FT	0.907	0.798	-0.173	-0.086	3.147	3.794
809	2447165	2447495	15	16	TFFFFFFFF	FT	0.818	0.787	-0.047	-0.054	3.468	3.529
809	2453405	2454545	20	21	FFTFFFFFF	FT	0.259	0.267	0.018	-0.007	8.958	12.994
809	2449925	2450015	18	19	TFFFFFFFF	FT	0.883	0.705	0.291	-0.002	3.066	3.583
809	2447015	2447435	17	18	TFFFFFFFF	FT	0.997	0.905	-0.001	-0.101	3.154	3.331
809	2448095	2448245	18	19	TFFFFFFFF	FT	1.149	1.246	-0.095	-0.384	2.544	2.422
809	2442665	2444765	16	17	TFFFFFFFF	FT	0.789	0.766	-0.178	-0.143	3.734	3.639
809	2448875	2453405	20	21	FFTFFFFFF	FT	0.292	0.263	-0.013	0.016	6.979	18.703
809	2448125	2448785	18	19	TFFFFFFFF	FT	1.115	1.13	-0.27	-0.186	2.537	2.786
809	2450495	2450525	18	19	TFFFFFFFF	FT	1.24	1.385	0.313	0.264	2.41	2.15
809	2445935	2451125	14	15	TFFFFFFFF	FT	1.157	1.135	0.069	0.059	2.625	2.95
809	2446265	2446535	15	16	TFFFFFFFF	FT	0.903	0.74	-0.33	0.067	3.154	3.147
809	2445575	2446535	17	18	TFFFFFFFF	FT	0.909	0.746	-0.262	-0.211	3.216	3.189
809	2447555	2448005	15	16	TFFFFFFFF	FT	0.898	0.897	-0.093	-0.262	3.375	3.476

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
809	2450105	2450315	18	19	TFFFFFFFF	FT	1.269	1.388	0.365	0.308	2.356	2.166
809	2446655	2446865	17	18	TFFFFFFFF	FT	0.844	0.729	0.031	-0.008	3.585	3.68
809	2450315	2450405	18	19	TFFFFFFFF	FT	1.178	1.29	0.259	0.158	2.719	2.451
809	2445965	2448005	18	19	TFFFFFFFF	FT	1.155	1.239	-0.137	-0.299	2.615	2.485
809	2453405	2454545	21	22	FFTFFFFFF	FT	0.291	0.291	-0.02	-0.011	8.015	9.21
809	2449805	2453405	21	22	FFTFFFFFF	FT	0.285	0.244	-0.014	0.009	8.216	13.241
809	2449385	2449595	18	19	TFFFFFFFF	FT	1.16	1.373	0.275	0.294	2.496	2.242
809	2449235	2449265	18	19	TFFFFFFFF	FT	1.248	1.323	-0.047	0.126	2.422	2.326
809	2449595	2449625	18	19	TFFFFFFFF	FT	1.186	1.393	0.131	0.243	2.557	2.218
809	2449265	2449295	18	19	TFFFFFFFF	FT	1.202	1.371	0.191	0.225	2.525	2.194
809	2448725	2449115	16	17	TFFFFFFFF	FT	1.02	0.918	-0.06	0.144	2.764	2.925
809	2449925	2451125	15	16	TFFFFFFFF	FT	1.257	1.203	0.492	0.266	2.344	2.66
809	2448815	2448905	18	19	TFFFFFFFF	FT	1.233	1.273	-0.202	-0.481	2.39	2.412
809	2449115	2449235	18	19	TFFFFFFFF	FT	1.155	1.353	0.089	0.122	2.475	2.285
809	2449925	2449985	19	20	TFFFFFFFF	FT	0.94	0.829	0.381	0.039	2.738	3.457
809	2449505	2449625	19	20	TFFFFFFFF	FT	1.185	1.364	0.104	0.231	2.416	2.22
809	2442725	2445395	17	18	TFFFFFFFF	FT	0.808	0.822	-0.043	-0.148	3.537	3.384
809	2451035	2451155	18	19	TFFFFFFFF	FT	1.307	1.376	0.45	0.262	2.265	2.195
809	2448635	2449415	19	20	TFFFFFFFF	FT	1.158	1.228	0.022	0.052	2.56	2.502
809	2451185	2453915	22	23	FFTFFFFFF	FT	0.333	0.346	-0.002	-0.018	6.653	13.712
809	2450105	2451125	19	20	TFFFFFFFF	FT	1.22	1.378	0.29	0.253	2.407	2.272
809	2448665	2451125	20	21	TFFFFFFFF	FT	1.056	0.955	-0.009	0.184	2.891	3.229
809	2442635	2445275	18	19	TFFFFFFFF	FT	0.756	0.768	0.034	-0.29	3.49	3.514
809	2448665	2454545	15	19	FFTFFFFFF	FT	0.321	0.319	-0.011	-0.009	13.094	15.217
843	2451815	2453285	19	20	FFTFFFFFF	FT	0.929	0.682	-0.045	0.094	2.533	3.832
848	2451365	2452535	16	23	FFTFFFFFF	FT	0.579	0.666	-0.058	0.165	4.232	3.538

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
850	2451425	2455085	19	20	FFTFFFFFF	FT	0.658	0.602	-0.034	0.008	3.721	4.099
850	2451485	2455085	18	19	FFTFFFFFF	FT	0.604	0.564	-0.088	0.019	4.33	4.785
859	2451155	2453285	16	19	FFTFFFFFF	FT	0.601	0.548	-0.039	0.089	5.527	5.09
860	2450855	2452925	16	20	FFTFFFFFF	FT	0.776	0.732	-0.003	-0.018	3.877	3.908
888	2446745	2447945	15	17	TFFFFFFFF	FT	1.012	1.012	-0.126	-0.154	2.901	3.211
888	2450825	2452745	16	18	FFTFFFFFF	FT	0.43	0.47	0.003	-0.031	4.231	3.771
888	2450825	2452745	18	19	FFTFFFFFF	FT	0.519	0.569	0.024	-0.063	3.511	4.306
894	2448545	2451155	16	17	TFFFFFFFF	FT	1.043	0.946	-0.466	-0.17	2.896	2.927
894	2448545	2451155	15	16	TFFFFFFFF	FT	0.976	0.914	-0.502	-0.211	2.868	3.42
900	2448875	2455085	16	18	FFTFFFFFF	FT	0.573	0.538	-0.092	0.072	4.513	5.137
905	2449025	2451845	16	18	TFFFFFFFF	FT	0.854	0.819	-0.079	-0.093	3.202	3.243
910	2450945	2451275	17	18	FFTFFFFFF	FT	0.864	0.6	0.312	0.037	2.903	2.818
910	2451125	2451275	19	20	FFTFFFFFF	FT	1.032	0.646	0.114	-0.223	2.383	3.431
910	2450315	2450945	17	18	FFTFFFFFF	FT	0.871	0.588	0.275	-0.072	2.717	3.482
910	2450945	2451275	18	19	FFTFFFFFF	FT	0.897	0.603	0.286	-0.012	2.684	3.226
910	2450975	2451125	19	20	FFTFFFFFF	FT	0.885	0.591	0.349	0.224	2.846	3.11
910	2450795	2450945	18	19	FFTFFFFFF	FT	1.017	0.599	0.452	-0.216	2.302	3.035
910	2450735	2450825	19	20	FFTFFFFFF	FT	0.95	0.567	-0.107	-0.068	2.403	3.273
910	2450315	2450795	18	19	FFTFFFFFF	FT	0.838	0.616	0.228	0.081	2.828	3.885
910	2450225	2451275	16	17	FFTFFFFFF	FT	0.875	0.564	0.282	0.074	2.893	3.107
910	2450945	2451275	20	21	FFTFFFFFF	FT	1.044	0.632	0.112	0.029	2.517	3.056
910	2450825	2450975	19	20	FFTFFFFFF	FT	1.07	0.67	0.576	-0.278	2.094	3.134
910	2450315	2450735	19	20	FFTFFFFFF	FT	0.87	0.621	0.406	0.098	2.975	3.627
910	2450705	2450945	20	21	FFTFFFFFF	FT	1.056	0.607	0.16	-0.132	2.246	3.094
910	2450345	2450705	20	21	FFTFFFFFF	FT	0.93	0.63	0.48	0.036	2.292	3.826
910	2450435	2451275	14	22	FFTFFFFFF	FT	1.149	0.641	0.033	-0.043	2.397	3.322

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
916	2451755	2452565	16	18	FFTFFFFFF	FT	0.715	0.665	-0.135	-0.165	4.325	4.553
918	2451785	2454485	18	20	FFTFFFFFF	FT	0.7	0.596	-0.058	-0.039	4.438	5.173
919	2451785	2452145	18	19	FFTFFFFFF	FT	0.723	0.723	-0.031	-0.067	4.39	4.773
919	2451845	2452145	19	21	FFTFFFFFF	FT	0.72	0.654	0.045	0.114	4.082	4.171
919	2451785	2452145	14	18	FFTFFFFFF	FT	0.862	0.839	-0.054	-0.226	3.68	4.007
926	2451935	2454905	20	21	FFTFFFFFF	FT	0.401	0.415	0.009	-0.004	5.128	5.557
926	2451875	2454995	19	20	FFTFFFFFF	FT	0.359	0.365	0.013	-0.005	5.773	6.221
926	2451875	2454965	18	19	FFTFFFFFF	FT	0.354	0.379	-0.006	-0.02	6.715	6.622
941	2451845	2454905	18	19	FFTFFFFFF	FT	0.639	0.519	-0.075	0.096	5.602	6.262
941	2451905	2454815	17	18	FFTFFFFFF	FT	0.576	0.469	-0.092	0.095	5.438	5.603
941	2451935	2454995	19	20	FFTFFFFFF	FT	0.454	0.444	0.037	0.048	6.816	5.983
941	2452385	2454995	20	21	FFTFFFFFF	FT	0.451	0.502	0.041	0.047	4.582	5.234
950	2445815	2447225	10	11	FFFTFFFFF	FT	0.321	0.293	0.006	-0.029	4.932	3.79
950	2445815	2447225	11	12	FFFTFFFFF	FT	0.387	0.369	-0.03	0.002	3.99	9.721
950	2448875	2450435	10	11	FFFTFFFFF	FT	0.238	0.194	0.083	-0.008	3.17	4.756
950	2447285	2450435	11	12	FFFTFFFFF	FT	0.289	0.214	0.041	0.005	9.554	4.078
950	2447285	2448875	10	11	FFFTFFFFF	FT	0.256	0.211	0.068	-0.028	5.323	4.13
950	2445815	2447225	9	10	FFFTFFFFF	FT	0.286	0.286	0.018	-0.046	3.351	3.826
950	2447285	2450435	9	10	FFFTFFFFF	FT	0.21	0.196	0.065	-0.033	5.403	4.531
950	2445875	2450435	7	9	FFFTFFFFF	FT	0.253	0.235	0.029	-0.051	4.946	3.765
950	2445815	2450435	12	13	FFFTFFFFF	FT	0.308	0.285	0.042	-0.03	3.626	10.279
950	2445815	2450435	9	11	FFFTFFFFF	TF	0.293	0.244	-0.022	-0.011	7.415	4.536
950	2448605	2454965	17	21	FFTFFFFFF	FT	0.472	0.4	0.06	0.077	6.942	6.181
951	2451845	2453825	17	18	FFTFFFFFF	FT	0.44	0.405	0.011	0.017	5.09	5.541
951	2451845	2453825	18	19	FFTFFFFFF	FT	0.501	0.444	0.012	0.002	3.816	4.178
951	2450735	2454545	16	17	FFTFFFFFF	FT	0.388	0.363	-0.017	0.022	7.073	6.718

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
951	2453945	2454935	17	18	FFTFFFFFF	FT	0.397	0.31	0.028	-0.029	4.903	4.976
951	2453945	2454935	18	19	FFTFFFFFF	FT	0.449	0.378	0.035	-0.07	4.134	4.768
958	2450675	2454245	16	19	FFTFFFFFF	FT	0.682	0.625	-0.033	-0.172	4.345	3.964
999	2446115	2453465	10	11	FFFTFFFFF	FT	0.253	0.285	-0.015	-0.007	15.355	6.469
999	2446115	2452925	9	10	FFFTFFFFF	FT	0.178	0.292	-0.007	-0.037	5.801	9.002
999	2446115	2453615	11	12	FFFTFFFFF	FT	0.32	0.291	-0.055	-0.006	10.862	6.389
A13	2453135	2454335	18	19	FFTFFFFFF	FT	0.421	0.366	-0.144	0.002	5.09	6.641
A13	2454335	2455085	18	19	FFTFFFFFF	FT	0.332	0.358	-0.117	-0.047	5.55	7.394
A13	2453135	2455085	17	18	FFTFFFFFF	FT	0.316	0.324	-0.114	-0.018	6.661	10.615
A13	2453885	2454335	19	20	FFTFFFFFF	FT	0.437	0.426	-0.145	0.017	4.975	5.613
A13	2453135	2453885	19	20	FFTFFFFFF	FT	0.498	0.496	-0.136	0.005	4.177	4.367
A13	2454335	2455085	19	20	FFTFFFFFF	FT	0.447	0.424	-0.118	0.004	4.827	4.603
A13	2453165	2455085	16	21	FFTFFFFFF	FT	0.471	0.449	-0.089	0.049	4.938	4.885
A24	2453225	2454305	16	17	FFTFFFFFF	FT	0.41	0.37	-0.036	0	5.562	8.204
A24	2453315	2454335	17	18	FFTFFFFFF	FT	0.416	0.405	-0.035	-0.004	5.161	6.729
A24	2453675	2454275	18	19	FFTFFFFFF	FT	0.466	0.472	-0.031	-0.019	4.539	5.693
A24	2454305	2454935	16	17	FFTFFFFFF	FT	0.369	0.323	-0.077	-0.011	6.885	8.114
A24	2454275	2454935	18	19	FFTFFFFFF	FT	0.436	0.424	-0.008	-0.036	5.065	5.431
A24	2454335	2454935	17	18	FFTFFFFFF	FT	0.393	0.382	-0.026	-0.069	5.234	6.467
A24	2452535	2454935	14	15	FFTFFFFFF	FT	0.405	0.34	-0.038	0.054	5.981	7.857
A24	2453735	2454935	19	20	FFTFFFFFF	FT	0.447	0.431	-0.025	-0.032	4.375	5.299
A24	2453225	2454935	15	16	FFTFFFFFF	FT	0.384	0.335	-0.055	0.034	6.801	8.878
A35	2452715	2454845	16	20	FFTFFFFFF	FT	0.286	0.261	0.02	-0.033	6.094	6.11
A41	2452895	2454905	16	20	FFTFFFFFF	FT	0.466	0.511	-0.064	0.053	4.065	4.4
A44	2453045	2455085	18	21	FFTFFFFFF	FT	0.428	0.456	0.036	-0.054	4.424	3.917
A50	2453645	2453735	18	19	FFTFFFFFF	FT	0.544	0.547	-0.003	0.006	4.369	4.545

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
A50	2452715	2453915	17	18	FFTFFFFFFF	FT	0.485	0.492	0.002	-0.048	5.582	4.956
A50	2453915	2454455	17	18	FFTFFFFFFF	FT	0.466	0.45	0.069	-0.15	4.808	4.156
A50	2453975	2454095	18	19	FFTFFFFFFF	FT	0.531	0.459	0.102	-0.113	3.807	3.525
A50	2454605	2454845	18	19	FFTFFFFFFF	FT	0.485	0.517	0.034	-0.022	3.969	3.635
A50	2453435	2453645	18	19	FFTFFFFFFF	FT	0.539	0.557	-0.02	-0.083	5.168	4.531
A50	2453645	2453735	19	20	FFTFFFFFFF	FT	0.671	0.681	0.008	0.012	3.341	3.144
A50	2454095	2454365	18	19	FFTFFFFFFF	FT	0.506	0.479	-0.008	-0.161	3.967	3.601
A50	2452745	2453645	19	20	FFTFFFFFFF	FT	0.609	0.62	0.04	-0.062	3.933	3.963
A50	2453885	2453975	18	19	FFTFFFFFFF	FT	0.459	0.522	0.034	-0.262	3.72	3.037
A50	2453735	2453885	18	19	FFTFFFFFFF	FT	0.385	0.46	-0.093	-0.277	5.462	3.16
A50	2454155	2454395	19	20	FFTFFFFFFF	FT	0.555	0.536	0.035	-0.157	3.12	3.447
A50	2452715	2453405	18	19	FFTFFFFFFF	FT	0.658	0.632	0.04	0.023	3.353	3.328
A50	2454365	2454605	18	19	FFTFFFFFFF	FT	0.469	0.46	0.067	0.019	3.486	3.607
A50	2453735	2454155	19	20	FFTFFFFFFF	FT	0.481	0.481	-0.018	-0.232	3.945	3.126
A50	2454455	2455085	17	18	FFTFFFFFFF	FT	0.431	0.443	0.096	0.103	4.16	4.126
A50	2454395	2454665	19	20	FFTFFFFFFF	FT	0.514	0.517	0.009	-0.046	3.036	2.976
A50	2454875	2455085	18	19	FFTFFFFFFF	FT	0.552	0.535	0.199	0.174	3.354	3.019
A50	2454665	2454725	19	20	FFTFFFFFFF	FT	0.564	0.586	0.007	-0.115	3.048	3.408
A50	2452805	2455085	16	17	FFTFFFFFFF	FT	0.406	0.413	0.03	0.011	7.175	5.03
A50	2454725	2454845	19	20	FFTFFFFFFF	FT	0.498	0.527	-0.015	0.069	2.783	3.056
A50	2454875	2455085	19	20	FFTFFFFFFF	FT	0.601	0.555	0.208	0.117	3.137	3.247
A50	2452775	2455085	20	21	FFTFFFFFFF	FT	0.583	0.583	-0.033	-0.107	3.376	3.624
A60	2453105	2455085	13	17	FFTFFFFFFF	FT	0.718	0.736	-0.142	-0.007	3.017	3.169
A77	2454725	2454845	17	18	FFTFFFFFFF	FT	0.474	0.397	0.084	-0.024	4.543	5.745
A77	2454275	2454605	15	16	FFTFFFFFFF	FT	0.423	0.407	0.018	0.079	4.957	5.175
A77	2454635	2455085	15	16	FFTFFFFFFF	FT	0.39	0.342	0.05	0.039	6.693	6.244

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
A77	2454395	2454605	16	17	FFTFFFFFF	FT	0.447	0.39	0.05	0.026	5.344	5.316
A77	2454725	2454815	16	17	FFTFFFFFF	FT	0.459	0.385	0.044	0.014	5.78	6.276
A77	2454125	2454395	16	17	FFTFFFFFF	FT	0.476	0.407	0.016	0.046	4.961	5.361
A77	2454815	2455085	16	17	FFTFFFFFF	FT	0.439	0.389	0.012	0.018	5.539	5.266
A77	2454635	2454725	17	18	FFTFFFFFF	FT	0.512	0.456	0.046	-0.008	4.633	5.376
A77	2454845	2454935	17	18	FFTFFFFFF	FT	0.458	0.385	0.04	-0.048	5.666	5.414
A77	2454635	2454725	16	17	FFTFFFFFF	FT	0.462	0.378	0.062	0.02	5.196	6.358
A77	2454395	2454635	18	19	FFTFFFFFF	FT	0.546	0.484	0.094	0.036	3.808	3.971
A77	2454275	2455085	10	15	FFTFFFFFF	FT	0.434	0.366	0.046	0.088	5.538	6.039
A77	2454605	2455085	19	20	FFTFFFFFF	FT	0.554	0.492	0.092	0.028	3.876	4.275
A77	2454845	2454965	18	19	FFTFFFFFF	FT	0.529	0.437	0.041	-0.022	4.81	4.993
A77	2454635	2454785	18	19	FFTFFFFFF	FT	0.556	0.502	0.085	0.002	3.79	4.165
A77	2454005	2454395	17	18	FFTFFFFFF	FT	0.493	0.419	0.009	0.009	4.648	4.879
A77	2454455	2454605	17	18	FFTFFFFFF	FT	0.509	0.447	0.108	-0.017	4.61	4.375
A77	2454395	2454455	17	18	FFTFFFFFF	FT	0.456	0.415	0.051	0.039	4.945	4.503
A77	2454785	2454845	18	19	FFTFFFFFF	FT	0.525	0.44	0.123	0	3.925	5.145
A77	2454365	2454395	18	19	FFTFFFFFF	FT	0.504	0.453	0.064	0.001	3.702	4.065
A77	2454965	2455085	17	18	FFTFFFFFF	FT	0.538	0.478	0.069	0.045	4.06	4.107
A77	2454965	2455085	18	19	FFTFFFFFF	FT	0.553	0.54	0.126	0.128	3.257	3.63
A77	2453735	2454365	18	19	FFTFFFFFF	FT	0.573	0.474	-0.003	0.014	4.222	4.283
A77	2454245	2454605	19	20	FFTFFFFFF	FT	0.566	0.527	0.099	0.06	3.37	4.006
B01	2453975	2455085	15	19	FFTFFFFFF	FT	0.398	0.315	0.058	-0.035	5.227	6.114
B01	2453975	2455085	19	20	FFTFFFFFF	FT	0.521	0.409	0.094	-0.01	3.99	5.325
D29	2454755	2454905	16	17	FFTFFFFFF	FT	0.365	0.331	0.059	-0.043	12.164	14.307
D29	2454335	2454545	15	16	FFTFFFFFF	FT	0.321	0.3	0.059	0.005	13.315	18.898
D29	2454455	2454485	18	19	FFTFFFFFF	FT	0.353	0.434	0.032	-0.16	8.082	6.838

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
D29	2454065	2454155	17	18	FFTFFFFFF	FT	0.463	0.423	-0.112	-0.069	6.98	10.224
D29	2454065	2454305	16	17	FFTFFFFFF	FT	0.408	0.397	-0.014	-0.051	14.667	11.407
D29	2454065	2455085	13	15	FFTFFFFFF	FT	0.301	0.285	0.069	0.021	12.857	17.63
D29	2454395	2454545	16	17	FFTFFFFFF	FT	0.359	0.387	0.035	-0.052	12.178	12.392
D29	2454185	2454215	19	20	FFTFFFFFF	FT	0.446	0.494	0.072	-0.151	4.924	7.022
D29	2454185	2454215	18	19	FFTFFFFFF	FT	0.379	0.406	0.013	-0.109	7.181	7.661
D29	2454905	2455085	16	17	FFTFFFFFF	FT	0.405	0.379	0.08	0.009	8.597	14.306
D29	2454875	2454935	17	18	FFTFFFFFF	FT	0.414	0.382	0.069	-0.032	7.84	10.813
D29	2454935	2455085	17	18	FFTFFFFFF	FT	0.466	0.423	0.084	0.012	8.527	11.374
D29	2454845	2454875	17	18	FFTFFFFFF	FT	0.367	0.401	0.048	-0.102	11.285	11.973
D29	2454845	2454905	18	19	FFTFFFFFF	FT	0.38	0.425	0.066	-0.138	8.419	9.103
D29	2454425	2454455	17	18	FFTFFFFFF	FT	0.363	0.415	0.008	-0.109	8.445	9.631
D29	2454185	2454215	17	18	FFTFFFFFF	FT	0.359	0.411	-0.038	-0.075	11.865	11.982
D29	2454155	2454185	18	19	FFTFFFFFF	FT	0.387	0.397	-0.006	-0.099	8.182	9.054
D29	2454155	2454185	17	18	FFTFFFFFF	FT	0.353	0.37	-0.012	-0.068	10.362	10.789
D29	2454065	2454335	15	16	FFTFFFFFF	FT	0.29	0.325	-0.019	-0.005	11.199	19.283
D29	2454365	2454395	16	17	FFTFFFFFF	FT	0.374	0.332	0.084	-0.026	16.537	15.153
D29	2454065	2454155	18	19	FFTFFFFFF	FT	0.469	0.443	-0.092	-0.059	6.122	9.206
D29	2454335	2454365	18	19	FFTFFFFFF	FT	0.401	0.422	0.037	-0.128	6.161	6.197
D29	2454335	2454365	17	18	FFTFFFFFF	FT	0.354	0.36	0.037	-0.076	8.592	8.348
D29	2454365	2454395	17	18	FFTFFFFFF	FT	0.343	0.353	0.096	-0.092	10.296	12.283
D29	2454365	2454395	18	19	FFTFFFFFF	FT	0.348	0.388	0.11	-0.151	5.881	6.447
D29	2454815	2454845	17	18	FFTFFFFFF	FT	0.462	0.406	0.213	0.031	6.956	9.517
D29	2454935	2455085	18	19	FFTFFFFFF	FT	0.465	0.426	0.135	-0.028	6.688	8.691
D29	2454515	2454545	18	19	FFTFFFFFF	FT	0.452	0.462	0.119	-0.086	5.824	6.41
D29	2454755	2455085	15	16	FFTFFFFFF	FT	0.358	0.317	0.079	-0.016	10.39	17.901

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
D29	2454425	2455025	17	18	FFTFFFFFF	TF	0.428	0.432	0.033	-0.054	7.506	9.475
D29	2454905	2454935	18	19	FFTFFFFFF	FT	0.438	0.417	0.109	-0.052	7.046	8.289
D29	2454875	2454935	19	20	FFTFFFFFF	FT	0.456	0.42	0.163	-0.085	5.319	5.748
D29	2454935	2455025	19	20	FFTFFFFFF	FT	0.498	0.439	0.217	-0.06	4.978	6.618
D29	2454935	2455085	20	21	FFTFFFFFF	FT	0.536	0.439	0.294	-0.044	4.01	4.763
D29	2454485	2454545	17	18	FFTFFFFFF	FT	0.447	0.473	0.074	-0.082	6.762	7.508
D29	2454065	2455025	14	17	FFTFFFFFF	TF	0.416	0.443	0.043	-0.058	8.018	10.733
D29	2454275	2454335	17	18	FFTFFFFFF	FT	0.391	0.404	0.028	-0.077	9.583	11.151
D29	2454245	2454335	18	19	FFTFFFFFF	FT	0.402	0.434	0.024	-0.129	8.214	7.473
D29	2454455	2454485	19	20	FFTFFFFFF	FT	0.369	0.479	0.067	-0.202	5.171	5.386
D29	2454455	2454485	17	18	FFTFFFFFF	FT	0.343	0.436	0.013	-0.112	11.784	11.221
D29	2454065	2454425	17	18	FFTFFFFFF	TF	0.405	0.434	0.069	-0.058	6.761	8.518
D29	2454305	2454365	16	17	FFTFFFFFF	FT	0.335	0.319	0.02	-0.002	12.508	17.639
D29	2454215	2454275	17	18	FFTFFFFFF	FT	0.449	0.46	0.011	-0.018	10.228	10.384
D29	2454395	2454425	17	18	FFTFFFFFF	FT	0.327	0.337	0.052	-0.074	10.927	12.308
D29	2454485	2454515	18	19	FFTFFFFFF	FT	0.424	0.441	0.048	-0.142	4.733	5.533
D29	2454065	2454155	19	20	FFTFFFFFF	FT	0.476	0.452	-0.072	-0.087	3.629	5.345
D29	2454245	2454335	19	20	FFTFFFFFF	FT	0.429	0.452	0.027	-0.142	6.546	6.52
D29	2454155	2454185	19	20	FFTFFFFFF	FT	0.418	0.404	0.025	-0.075	6.095	5.844
D29	2454815	2454845	18	19	FFTFFFFFF	FT	0.452	0.428	0.231	0.001	5.978	9.203
D29	2454815	2454845	19	20	FFTFFFFFF	FT	0.434	0.398	0.242	-0.03	4.091	7.371
D29	2454845	2454875	19	20	FFTFFFFFF	FT	0.38	0.435	0.099	-0.174	5.905	6.271
D29	2454065	2454425	18	19	FFTFFFFFF	TF	0.38	0.402	0.047	-0.12	6.092	7.807
D29	2454215	2454245	18	19	FFTFFFFFF	FT	0.424	0.427	0.071	-0.051	8.224	8.027
D29	2454425	2455025	18	19	FFTFFFFFF	TF	0.433	0.453	0.059	-0.109	7.289	7.151
D29	2454215	2454245	19	20	FFTFFFFFF	FT	0.408	0.453	0.093	-0.043	5.295	6.738

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
D29	2454425	2454455	18	19	FFTFFFFFF	FT	0.364	0.409	0.01	-0.143	6.698	6.688
D29	2454755	2454785	17	18	FFTFFFFFF	FT	0.366	0.328	0.02	-0.077	9.508	13.123
D29	2454515	2454545	19	20	FFTFFFFFF	FT	0.486	0.47	0.218	-0.075	4.48	6.886
D29	2454065	2454245	20	21	FFTFFFFFF	FT	0.518	0.544	0.063	-0.095	4.25	5.133
D29	2454485	2454515	19	20	FFTFFFFFF	FT	0.43	0.432	0.081	-0.132	3.96	3.967
D29	2454395	2454425	18	19	FFTFFFFFF	FT	0.335	0.366	0.071	-0.098	9.965	9.141
D29	2454845	2454905	20	21	FFTFFFFFF	FT	0.422	0.495	0.126	-0.209	3.904	5.358
D29	2454755	2454785	18	19	FFTFFFFFF	FT	0.349	0.346	0.049	-0.124	6.214	7.418
D29	2454425	2454455	19	20	FFTFFFFFF	FT	0.365	0.437	0.061	-0.172	6.613	7.586
D29	2454755	2454845	20	21	FFTFFFFFF	FT	0.459	0.414	0.249	-0.046	2.911	5.774
D29	2454395	2454425	19	20	FFTFFFFFF	FT	0.357	0.389	0.09	-0.129	4.695	6.277
D29	2455025	2455085	19	20	FFTFFFFFF	FT	0.402	0.394	0.091	0.099	5.058	8.745
D29	2454755	2454785	19	20	FFTFFFFFF	FT	0.343	0.389	0.086	-0.157	4.941	6.437
D29	2454515	2454545	20	21	FFTFFFFFF	FT	0.522	0.487	0.299	-0.068	3.39	5.739
D29	2454335	2454365	19	20	FFTFFFFFF	FT	0.466	0.458	0.03	-0.126	6.116	4.527
D29	2454365	2454515	20	21	FFTFFFFFF	FT	0.445	0.491	0.111	-0.175	3.994	4.575
D29	2454905	2454935	20	21	FFTFFFFFF	FT	0.515	0.455	0.227	-0.081	3.948	4.871
D29	2454365	2454395	19	20	FFTFFFFFF	FT	0.39	0.439	0.119	-0.194	4.559	4.683
D29	2454275	2454365	20	21	FFTFFFFFF	FT	0.523	0.455	-0.024	-0.081	5.832	5.252
D29	2454065	2455025	19	21	FFTFFFFFF	TF	0.415	0.434	0.077	-0.131	7.831	6.454
D29	2454815	2455085	21	22	FFTFFFFFF	FT	0.595	0.521	0.299	-0.089	3.55	5.058
D29	2454065	2454545	21	22	FFTFFFFFF	FT	0.602	0.553	0.256	-0.057	3.588	5.585
D35	2454365	2454965	16	17	FFTFFFFFF	FT	0.319	0.336	0.061	0.02	6.354	8.22
D35	2453675	2454395	17	18	FFTFFFFFF	FT	0.305	0.32	0.057	0.138	5.756	7.431
D35	2454395	2454605	17	18	FFTFFFFFF	FT	0.277	0.257	0.049	-0.035	6.996	7.734
D35	2452595	2454365	16	17	FFTFFFFFF	FT	0.306	0.347	0.04	0.186	7.129	4.426

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
D35	2454005	2454275	18	19	FFTFFFFFF	FT	0.349	0.31	0.161	0.14	4.198	4.929
D35	2454455	2454515	18	19	FFTFFFFFF	FT	0.315	0.29	0.09	-0.046	4.845	5.495
D35	2454395	2454515	19	20	FFTFFFFFF	FT	0.38	0.337	0.107	-0.03	4.415	4.687
D35	2454275	2454335	18	19	FFTFFFFFF	FT	0.296	0.341	0.021	0.132	4.818	3.501
D35	2454395	2454425	18	19	FFTFFFFFF	FT	0.273	0.247	0.057	-0.038	4.317	3.76
D35	2454425	2454455	18	19	FFTFFFFFF	FT	0.327	0.319	0.044	-0.029	5.757	4.798
D35	2454335	2454395	18	19	FFTFFFFFF	FT	0.314	0.289	0.049	0.057	4.343	3.672
D35	2454515	2454605	18	19	FFTFFFFFF	FT	0.36	0.317	0.055	-0.013	4.276	5.818
D35	2454035	2454275	19	20	FFTFFFFFF	FT	0.396	0.323	0.198	0.116	3.316	4.109
D35	2453045	2454035	19	20	FFTFFFFFF	FT	0.53	0.435	-0.149	0.176	4.7	4.709
D35	2453675	2454005	18	19	FFTFFFFFF	FT	0.536	0.427	-0.155	0.201	4.631	6.267
D35	2454275	2454395	19	20	FFTFFFFFF	FT	0.35	0.35	0.012	0.1	4.022	3.688
D35	2453795	2454965	13	16	FFTFFFFFF	FT	0.311	0.329	0.062	0.112	6.512	6.037
D35	2454695	2454965	17	18	FFTFFFFFF	FT	0.538	0.561	0.177	0.111	3.301	3.329
D35	2454245	2454965	20	21	FFTFFFFFF	FT	0.433	0.412	0.059	0.098	3.982	3.793
D35	2454185	2454245	20	21	FFTFFFFFF	FT	0.44	0.385	0.17	0.114	4.031	3.391
D35	2454785	2454965	18	19	FFTFFFFFF	FT	0.452	0.453	0.09	-0.034	3.959	4.583
D35	2454035	2454185	20	21	FFTFFFFFF	FT	0.522	0.376	0.333	0.165	3.027	4.13
D35	2454695	2454785	18	19	FFTFFFFFF	FT	0.672	0.766	0.438	0.456	2.325	2.079
D35	2454515	2454605	19	20	FFTFFFFFF	FT	0.429	0.426	0.117	0.022	4.027	4.927
D35	2454725	2454965	19	20	FFTFFFFFF	FT	0.532	0.557	0.181	0.085	3.598	3.613
D35	2453045	2454035	20	21	FFTFFFFFF	FT	0.467	0.444	-0.008	0.19	5.177	4.498
D35	2453795	2454395	21	22	FFTFFFFFF	FT	0.485	0.438	0.142	0.155	3.798	3.435
D39	2454515	2454995	17	19	FFTFFFFFF	FT	0.24	0.239	-0.04	-0.012	3.9	8.854
E09	2454365	2454875	14	16	FFTFFFFFF	FT	0.328	0.267	-0.063	0.101	15.866	21.69
E12	2453165	2453195	17	18	FFTFFFFFF	FT	0.554	0.776	0.047	0.275	3.657	2.857

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
E12	2453195	2453225	19	20	FFTFFFFFF	FT	0.493	0.481	-0.036	0.143	4.535	4.116
E12	2453195	2453225	18	19	FFTFFFFFF	FT	0.422	0.457	-0.04	0.154	5.325	5.222
E12	2453195	2453225	17	18	FFTFFFFFF	FT	0.37	0.422	-0.038	0.14	6.935	6.472
E12	2454365	2454545	16	17	FFTFFFFFF	FT	0.293	0.312	-0.033	0.121	8.167	7.332
E12	2453405	2453555	15	16	FFTFFFFFF	FT	0.247	0.29	-0.038	0.075	9.782	11.474
E12	2454275	2454545	15	16	FFTFFFFFF	FT	0.255	0.266	-0.04	0.111	5.853	9.245
E12	2454305	2454335	16	17	FFTFFFFFF	FT	0.284	0.3	-0.046	0.134	7.433	6.797
E12	2453405	2453465	16	17	FFTFFFFFF	FT	0.273	0.365	-0.023	0.119	7.814	8.035
E12	2453465	2453495	16	17	FFTFFFFFF	FT	0.307	0.377	-0.012	0.113	9.32	8.856
E12	2453495	2453555	16	17	FFTFFFFFF	FT	0.286	0.334	-0.033	0.136	9.875	7.782
E12	2453555	2453585	16	17	FFTFFFFFF	FT	0.321	0.374	-0.026	0.147	8.014	8.859
E12	2453585	2453615	17	18	FFTFFFFFF	FT	0.359	0.406	-0.02	0.168	5.821	5.258
E12	2453615	2453645	17	18	FFTFFFFFF	FT	0.338	0.407	-0.008	0.177	5.08	4.829
E12	2453825	2453855	17	18	FFTFFFFFF	FT	0.394	0.419	-0.04	0.169	5.371	5.741
E12	2453885	2453915	16	17	FFTFFFFFF	FT	0.313	0.334	-0.025	0.143	7.012	6.226
E12	2453885	2453915	17	18	FFTFFFFFF	FT	0.365	0.415	-0.019	0.18	5.185	5.101
E12	2454635	2454665	18	19	FFTFFFFFF	FT	0.402	0.5	-0.05	0.268	4.123	3.436
E12	2454785	2454995	15	16	FFTFFFFFF	FT	0.27	0.268	-0.022	0.103	9.149	8.274
E12	2455025	2455055	16	17	FFTFFFFFF	FT	0.338	0.396	-0.017	0.208	6.055	5.351
E12	2453915	2453945	8	16	FFTFFFFFF	FT	0.291	0.305	-0.024	0.109	7.977	8.535
E12	2453225	2453255	16	17	FFTFFFFFF	FT	0.227	0.287	-0.053	0.118	13.631	8.846
E12	2453855	2453885	16	17	FFTFFFFFF	FT	0.309	0.339	-0.016	0.139	8.227	8.42
E12	2454635	2454665	16	17	FFTFFFFFF	FT	0.308	0.372	-0.047	0.196	6.153	5.191
E12	2453195	2453225	16	17	FFTFFFFFF	FT	0.348	0.381	-0.039	0.13	9.808	7.661
E12	2453765	2454065	14	15	FFTFFFFFF	FT	0.237	0.229	-0.03	0.062	7.38	12.352
E12	2453915	2453945	16	17	FFTFFFFFF	FT	0.342	0.375	-0.033	0.145	6.421	6.114

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
E12	2453945	2453975	16	17	FFTFFFFFF	FT	0.302	0.341	-0.021	0.148	7.453	7.471
E12	2453975	2454005	17	18	FFTFFFFFF	FT	0.322	0.393	-0.013	0.172	5.64	4.93
E12	2454215	2454245	16	17	FFTFFFFFF	FT	0.328	0.348	-0.014	0.138	8.591	7.732
E12	2454995	2455025	17	18	FFTFFFFFF	FT	0.38	0.484	-0.023	0.281	4.343	3.63
E12	2454995	2455025	16	17	FFTFFFFFF	FT	0.339	0.426	-0.03	0.246	6.151	4.568
E12	2453405	2453765	14	15	FFTFFFFFF	FT	0.23	0.255	-0.037	0.102	10.1	10.825
E12	2453585	2453795	15	16	FFTFFFFFF	FT	0.26	0.314	-0.026	0.14	8.335	9.625
E12	2453795	2453885	15	16	FFTFFFFFF	FT	0.274	0.29	-0.049	0.087	7.531	13.255
E12	2453555	2453585	15	16	FFTFFFFFF	FT	0.277	0.325	-0.019	0.137	10.447	8.623
E12	2453885	2453915	15	16	FFTFFFFFF	FT	0.25	0.287	-0.024	0.105	7.089	10.004
E12	2454995	2455085	15	16	FFTFFFFFF	FT	0.282	0.33	-0.024	0.168	8.123	6.138
E12	2454245	2454275	16	17	FFTFFFFFF	FT	0.3	0.32	-0.041	0.138	6.071	6.772
E12	2454245	2454425	14	15	FFTFFFFFF	FT	0.234	0.236	-0.035	0.082	6.55	15.461
E12	2452925	2453375	15	16	FFTFFFFFF	FT	0.403	0.535	-0.004	0.159	6.676	5.113
E12	2453135	2453195	16	17	FFTFFFFFF	FT	0.526	0.755	0.063	0.227	3.879	2.956
E12	2454935	2454965	16	17	FFTFFFFFF	FT	0.317	0.342	-0.021	0.157	8.477	6.777
E12	2452925	2453135	16	17	FFTFFFFFF	FT	0.555	0.792	0.049	0.184	3.442	2.704
E12	2454065	2454245	14	15	FFTFFFFFF	FT	0.249	0.209	-0.049	0.03	8.233	11.703
E12	2453105	2453135	17	18	FFTFFFFFF	FT	0.571	0.809	0.074	0.226	3.334	2.63
E12	2453945	2453975	17	18	FFTFFFFFF	FT	0.337	0.387	-0.027	0.16	6.221	5.588
E12	2454185	2454215	16	17	FFTFFFFFF	FT	0.326	0.326	-0.054	0.116	7.394	6.775
E12	2453585	2453615	16	17	FFTFFFFFF	FT	0.313	0.357	-0.026	0.156	6.81	6.878
E12	2453765	2453855	16	17	FFTFFFFFF	FT	0.346	0.352	-0.036	0.128	7.203	7.681
E12	2454785	2455085	14	15	FFTFFFFFF	FT	0.242	0.217	-0.02	0.067	7.321	8.36
E12	2454215	2454245	17	18	FFTFFFFFF	FT	0.384	0.409	-0.017	0.15	5.744	5.393
E12	2453675	2454065	13	14	FFTFFFFFF	FT	0.224	0.191	-0.042	0.039	5.281	9.245

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
E12	2453225	2453255	17	18	FFTFFFFFF	FT	0.295	0.346	-0.045	0.104	8.178	7.729
E12	2454665	2454695	17	18	FFTFFFFFF	FT	0.344	0.41	-0.037	0.203	5.991	5.334
E12	2454815	2454905	16	17	FFTFFFFFF	FT	0.29	0.279	-0.044	0.117	6.011	5.292
E12	2454245	2454275	15	16	FFTFFFFFF	FT	0.254	0.267	-0.04	0.127	6.365	6.301
E12	2453045	2453375	14	15	FFTFFFFFF	FT	0.366	0.519	0.005	0.15	6.545	5.766
E12	2453495	2453525	18	19	FFTFFFFFF	FT	0.368	0.426	-0.019	0.174	5.637	4.624
E12	2453495	2453525	19	20	FFTFFFFFF	FT	0.408	0.459	-0.012	0.188	4.438	3.814
E12	2453945	2453975	18	19	FFTFFFFFF	FT	0.381	0.443	-0.026	0.189	4.843	3.962
E12	2454155	2454185	18	19	FFTFFFFFF	FT	0.415	0.473	-0.014	0.186	4.004	3.793
E12	2454065	2454185	17	18	FFTFFFFFF	FT	0.376	0.406	-0.037	0.158	4.935	4.977
E12	2454185	2454215	17	18	FFTFFFFFF	FT	0.369	0.395	-0.027	0.143	5.37	5.624
E12	2454095	2454545	13	14	FFTFFFFFF	FT	0.216	0.168	-0.068	0.024	3.637	10.332
E12	2454665	2454785	15	16	FFTFFFFFF	FT	0.248	0.293	-0.026	0.162	6.79	6.718
E12	2453555	2453585	17	18	FFTFFFFFF	FT	0.358	0.405	-0.011	0.167	6.178	5.832
E12	2453975	2454095	15	16	FFTFFFFFF	FT	0.241	0.262	-0.009	0.12	7.079	9.411
E12	2453975	2454005	16	17	FFTFFFFFF	FT	0.275	0.33	-0.013	0.157	5.522	6.94
E12	2454005	2454155	16	17	FFTFFFFFF	FT	0.264	0.308	-0.014	0.167	7.583	4.806
E12	2453945	2453975	15	16	FFTFFFFFF	FT	0.267	0.283	-0.028	0.116	8.271	8.801
E12	2454635	2454665	15	16	FFTFFFFFF	FT	0.265	0.315	-0.047	0.114	6.083	9.533
E12	2454575	2455085	13	14	FFTFFFFFF	FT	0.214	0.169	-0.034	0.031	3.498	6.943
E12	2453255	2453285	17	18	FFTFFFFFF	FT	0.286	0.342	-0.044	0.134	7.021	6.486
E12	2454455	2454785	14	15	FFTFFFFFF	FT	0.228	0.219	-0.034	0.083	7.697	11.008
E12	2453045	2453675	13	14	FFTFFFFFF	FT	0.252	0.36	-0.02	0.11	11.483	10.568
E12	2453615	2453645	16	17	FFTFFFFFF	FT	0.297	0.344	-0.004	0.167	7.514	7.017
E12	2454695	2454725	17	18	FFTFFFFFF	FT	0.325	0.413	-0.039	0.222	5.291	4.337
E12	2454725	2454755	17	18	FFTFFFFFF	FT	0.342	0.425	-0.029	0.227	4.793	4.098

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
E12	2454935	2454965	17	18	FFTFFFFFF	FT	0.344	0.414	-0.009	0.214	5.463	4.664
E12	2453255	2453315	18	19	FFTFFFFFF	FT	0.353	0.397	-0.052	0.12	5.18	4.689
E12	2453465	2453495	19	20	FFTFFFFFF	FT	0.396	0.461	-0.002	0.204	4.3	3.615
E12	2453465	2453495	18	19	FFTFFFFFF	FT	0.357	0.42	0.003	0.181	5.134	4.814
E12	2453495	2453525	17	18	FFTFFFFFF	FT	0.342	0.398	-0.017	0.156	7.249	5.981
E12	2454215	2454245	15	16	FFTFFFFFF	FT	0.308	0.303	-0.04	0.076	8.538	10.747
E12	2453585	2453615	18	19	FFTFFFFFF	FT	0.398	0.451	-0.021	0.182	4.242	4.062
E12	2453825	2453855	18	19	FFTFFFFFF	FT	0.427	0.454	-0.027	0.193	4.398	4.09
E12	2454635	2454665	17	18	FFTFFFFFF	FT	0.351	0.439	-0.044	0.242	4.648	4.168
E12	2454665	2454695	18	19	FFTFFFFFF	FT	0.382	0.472	-0.029	0.239	4.609	3.861
E12	2454725	2454755	16	17	FFTFFFFFF	FT	0.28	0.365	-0.031	0.197	5.217	4.936
E12	2454965	2454995	16	17	FFTFFFFFF	FT	0.336	0.39	-0.004	0.185	7.022	5.817
E12	2453765	2453825	17	18	FFTFFFFFF	FT	0.353	0.388	-0.005	0.156	4.882	4.53
E12	2454275	2454305	16	17	FFTFFFFFF	FT	0.32	0.34	-0.049	0.137	6.321	6.968
E12	2454335	2454365	16	17	FFTFFFFFF	FT	0.276	0.327	-0.043	0.177	5.46	4.853
E12	2453915	2453945	17	18	FFTFFFFFF	FT	0.372	0.409	-0.025	0.179	5.273	4.751
E12	2454365	2454485	17	18	FFTFFFFFF	FT	0.341	0.379	-0.023	0.15	4.82	4.782
E12	2454575	2454605	17	18	FFTFFFFFF	FT	0.326	0.442	-0.025	0.249	6.789	5.109
E12	2454485	2454515	17	18	FFTFFFFFF	FT	0.346	0.313	-0.058	0.067	4.729	3.846
E12	2454665	2454695	16	17	FFTFFFFFF	FT	0.303	0.35	-0.05	0.182	7.614	6.104
E12	2454695	2454725	16	17	FFTFFFFFF	FT	0.288	0.337	-0.033	0.184	7.662	5.418
E12	2454215	2454245	18	19	FFTFFFFFF	FT	0.423	0.46	-0.011	0.169	4.2	4.129
E12	2454575	2454605	18	19	FFTFFFFFF	FT	0.368	0.493	-0.012	0.292	4.778	3.43
E12	2454605	2454635	18	19	FFTFFFFFF	FT	0.378	0.561	-0.026	0.355	4.017	2.973
E12	2454605	2454635	17	18	FFTFFFFFF	FT	0.328	0.477	-0.029	0.3	4.773	3.413
E12	2454605	2454635	19	20	FFTFFFFFF	FT	0.42	0.673	-0.03	0.438	3.427	2.662

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
E12	2454755	2454815	16	17	FFTFFFFFFF	FT	0.294	0.387	-0.023	0.224	6.664	5.141
E12	2454095	2454215	15	16	FFTFFFFFFF	FT	0.271	0.269	-0.057	0.081	5.679	9.356
E12	2454335	2454365	17	18	FFTFFFFFFF	FT	0.329	0.404	-0.031	0.187	5.193	4.887
E12	2454575	2454605	16	17	FFTFFFFFFF	FT	0.281	0.383	-0.039	0.178	7.749	8.251
E12	2454305	2454335	17	18	FFTFFFFFFF	FT	0.324	0.361	-0.04	0.146	5.94	5.548
E12	2454515	2454545	17	18	FFTFFFFFFF	FT	0.348	0.388	-0.008	0.129	4.35	5.948
E12	2453525	2453555	17	18	FFTFFFFFFF	FT	0.295	0.383	-0.036	0.179	8.319	6.253
E12	2453525	2453555	18	19	FFTFFFFFFF	FT	0.344	0.437	-0.034	0.208	5.227	4.499
E12	2453465	2453495	17	18	FFTFFFFFFF	FT	0.329	0.412	-0.008	0.154	7.464	6.513
E12	2454425	2454515	18	19	FFTFFFFFFF	FT	0.398	0.412	-0.025	0.131	4.121	4.12
E12	2454965	2454995	17	18	FFTFFFFFFF	FT	0.377	0.444	0.008	0.216	4.826	4.621
E12	2453225	2453255	18	19	FFTFFFFFFF	FT	0.348	0.383	-0.041	0.109	6.168	5.465
E12	2454575	2454635	15	16	FFTFFFFFFF	FT	0.243	0.268	-0.032	0.12	6.614	6.404
E12	2453855	2453885	17	18	FFTFFFFFFF	FT	0.357	0.386	-0.005	0.172	6.279	5.513
E12	2453255	2453375	16	17	FFTFFFFFFF	FT	0.21	0.277	-0.052	0.132	12.787	8.19
E12	2453405	2453465	17	18	FFTFFFFFFF	FT	0.34	0.433	-0.013	0.173	6.44	5.855
E12	2453615	2453645	18	19	FFTFFFFFFF	FT	0.382	0.443	-0.004	0.185	4.647	4.111
E12	2453855	2453885	18	19	FFTFFFFFFF	FT	0.408	0.442	0.004	0.195	4.605	3.965
E12	2453885	2453915	18	19	FFTFFFFFFF	FT	0.424	0.464	-0.013	0.205	4.248	4.048
E12	2454845	2454875	18	19	FFTFFFFFFF	FT	0.405	0.468	-0.069	0.238	4.23	3.402
E12	2455055	2455085	17	18	FFTFFFFFFF	FT	0.328	0.431	-0.008	0.252	5.486	3.795
E12	2453405	2453465	18	19	FFTFFFFFFF	FT	0.387	0.457	-0.002	0.171	4.989	4.225
E12	2453555	2453585	18	19	FFTFFFFFFF	FT	0.414	0.455	-0.014	0.179	4.621	4.338
E12	2454995	2455025	18	19	FFTFFFFFFF	FT	0.432	0.555	-0.024	0.33	3.881	3.219
E12	2454275	2454305	17	18	FFTFFFFFFF	FT	0.335	0.382	-0.034	0.164	4.844	4.669
E12	2454905	2454935	17	18	FFTFFFFFFF	FT	0.346	0.397	-0.016	0.197	4.407	4.302

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
E12	2455025	2455055	17	18	FFTFFFFFF	FT	0.384	0.467	-0.002	0.239	5.136	4.164
E12	2453165	2453195	18	19	FFTFFFFFF	FT	0.579	0.763	0.07	0.185	3.396	2.887
E12	2453165	2453195	19	20	FFTFFFFFF	FT	0.631	0.777	0.064	0.193	3.216	2.86
E12	2454665	2454695	19	20	FFTFFFFFF	FT	0.448	0.567	-0.026	0.307	3.801	3.077
E12	2453225	2453255	19	20	FFTFFFFFF	FT	0.409	0.447	-0.034	0.128	4.348	4.252
E12	2454245	2454275	17	18	FFTFFFFFF	FT	0.349	0.404	-0.036	0.175	4.993	5.016
E12	2453765	2453825	18	19	FFTFFFFFF	FT	0.42	0.435	0.027	0.166	4.366	3.928
E12	2454995	2455025	19	20	FFTFFFFFF	FT	0.507	0.604	-0.035	0.313	3.895	2.907
E12	2453645	2453765	16	17	FFTFFFFFF	FT	0.284	0.296	-0.013	0.153	7.282	6.372
E12	2453645	2453705	17	18	FFTFFFFFF	FT	0.341	0.397	-0.01	0.186	5.327	5.08
E12	2454695	2454725	18	19	FFTFFFFFF	FT	0.382	0.482	-0.041	0.261	4.408	3.483
E12	2454935	2454965	18	19	FFTFFFFFF	FT	0.411	0.488	0.012	0.261	4.083	3.407
E12	2455055	2455085	16	17	FFTFFFFFF	FT	0.295	0.373	-0.002	0.213	7.114	5.234
E12	2454305	2454335	18	19	FFTFFFFFF	FT	0.362	0.418	-0.032	0.17	4.326	4.113
E12	2454755	2454845	17	18	FFTFFFFFF	FT	0.367	0.436	-0.031	0.242	4.906	3.699
E12	2453705	2453765	17	18	FFTFFFFFF	FT	0.343	0.343	-0.039	0.12	5.705	6.915
E12	2454185	2454215	18	19	FFTFFFFFF	FT	0.427	0.47	-0.015	0.162	4.075	4.383
E12	2454155	2454185	16	17	FFTFFFFFF	FT	0.31	0.355	-0.045	0.162	5.381	5.731
E12	2453405	2453465	19	20	FFTFFFFFF	FT	0.445	0.516	0.008	0.197	4.012	3.622
E12	2454005	2454065	17	18	FFTFFFFFF	FT	0.325	0.392	-0.009	0.187	5.304	4.912
E12	2453045	2454545	12	13	FFTFFFFFF	FT	0.226	0.245	-0.043	0.042	8.31	15.982
E12	2453735	2453765	18	19	FFTFFFFFF	FT	0.454	0.445	-0.005	0.154	4.232	4.608
E12	2454155	2454215	19	20	FFTFFFFFF	FT	0.499	0.536	-0.005	0.2	3.649	3.543
E12	2454905	2454935	16	17	FFTFFFFFF	FT	0.308	0.323	-0.047	0.153	6.72	5.788
E12	2454605	2454635	16	17	FFTFFFFFF	FT	0.271	0.367	-0.038	0.228	5.406	4.241
E12	2454005	2454035	18	19	FFTFFFFFF	FT	0.384	0.45	-0.008	0.191	4.487	3.877

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
E12	2453195	2453225	20	21	FFTFFFFFF	FT	0.583	0.558	-0.03	0.142	3.893	3.492
E12	2454575	2455085	12	13	FFTFFFFFF	FT	0.229	0.147	-0.035	0.022	5.119	4.408
E12	2454785	2454875	19	20	FFTFFFFFF	FT	0.447	0.533	-0.033	0.276	3.693	3.367
E12	2454785	2454845	18	19	FFTFFFFFF	FT	0.385	0.46	-0.039	0.239	4.218	4.107
E12	2453105	2455085	11	12	FFTFFFFFF	FT	0.357	0.193	-0.124	0.012	7.598	18.201
E12	2453975	2454005	18	19	FFTFFFFFF	FT	0.378	0.437	-0.019	0.182	4.48	3.907
E12	2453975	2454005	19	20	FFTFFFFFF	FT	0.44	0.51	-0.025	0.212	3.767	3.529
E12	2454245	2454275	18	19	FFTFFFFFF	FT	0.397	0.455	-0.027	0.19	3.881	3.758
E12	2454245	2454275	19	20	FFTFFFFFF	FT	0.47	0.522	-0.023	0.216	3.83	3.332
E12	2453585	2453615	19	20	FFTFFFFFF	FT	0.465	0.522	-0.023	0.199	3.877	3.625
E12	2455055	2455085	18	19	FFTFFFFFF	FT	0.378	0.505	0.001	0.287	4.624	3.346
E12	2453255	2453315	19	20	FFTFFFFFF	FT	0.424	0.472	-0.05	0.128	4.017	4.137
E12	2454305	2454335	19	20	FFTFFFFFF	FT	0.431	0.483	-0.037	0.198	3.876	3.498
E12	2454275	2454305	18	19	FFTFFFFFF	FT	0.371	0.43	-0.03	0.17	4.227	4.019
E12	2455025	2455055	18	19	FFTFFFFFF	FT	0.432	0.531	0.001	0.274	4.057	3.34
E12	2453135	2453165	18	19	FFTFFFFFF	FT	0.624	0.833	0.073	0.25	2.977	2.477
E12	2453915	2453945	18	19	FFTFFFFFF	FT	0.411	0.447	-0.039	0.19	4.786	4.018
E12	2454635	2454665	19	20	FFTFFFFFF	FT	0.481	0.583	-0.06	0.309	3.572	3.119
E12	2454965	2454995	18	19	FFTFFFFFF	FT	0.436	0.509	0.018	0.261	4.14	3.436
E12	2454845	2454905	17	18	FFTFFFFFF	FT	0.345	0.404	-0.044	0.216	5.069	3.995
E12	2453135	2453165	17	18	FFTFFFFFF	FT	0.599	0.812	0.107	0.258	3.067	2.553
E12	2454065	2454155	18	19	FFTFFFFFF	FT	0.396	0.428	-0.025	0.165	4.521	4.09
E12	2453315	2453375	19	20	FFTFFFFFF	FT	0.463	0.443	-0.049	0.096	4.064	3.941
E12	2453315	2453375	18	19	FFTFFFFFF	FT	0.381	0.386	-0.028	0.089	5.545	4.918
E12	2454725	2454755	18	19	FFTFFFFFF	FT	0.389	0.468	-0.03	0.227	4.179	3.545
E12	2453285	2453375	17	18	FFTFFFFFF	FT	0.276	0.321	-0.034	0.099	6.768	6.183

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
E12	2453855	2453885	19	20	FFTFFFFFF	FT	0.494	0.501	0.005	0.221	3.828	3.584
E12	2454935	2454965	19	20	FFTFFFFFF	FT	0.478	0.576	0.013	0.33	3.599	3.002
E12	2454335	2454365	18	19	FFTFFFFFF	FT	0.371	0.456	-0.029	0.196	4.046	3.765
E12	2453105	2453135	18	19	FFTFFFFFF	FT	0.613	0.832	0.087	0.249	3.089	2.521
E12	2453525	2453555	19	20	FFTFFFFFF	FT	0.396	0.474	-0.029	0.211	4.337	3.664
E12	2453105	2453135	19	20	FFTFFFFFF	FT	0.644	0.844	0.108	0.225	3.014	2.559
E12	2453135	2453165	19	20	FFTFFFFFF	FT	0.676	0.845	0.072	0.249	2.792	2.499
E12	2453915	2453945	19	20	FFTFFFFFF	FT	0.504	0.502	-0.067	0.172	4.349	3.464
E12	2453945	2453975	19	20	FFTFFFFFF	FT	0.439	0.504	-0.025	0.223	3.814	3.477
E12	2455025	2455055	19	20	FFTFFFFFF	FT	0.498	0.595	-0.01	0.31	3.472	2.997
E12	2455055	2455085	19	20	FFTFFFFFF	FT	0.408	0.587	-0.017	0.358	3.546	2.927
E12	2454365	2454425	18	19	FFTFFFFFF	FT	0.394	0.446	-0.026	0.149	4.119	3.9
E12	2454515	2454545	18	19	FFTFFFFFF	FT	0.409	0.44	0	0.126	4.128	4.524
E12	2453555	2453585	19	20	FFTFFFFFF	FT	0.49	0.513	-0.024	0.199	3.885	3.54
E12	2453675	2453735	18	19	FFTFFFFFF	FT	0.41	0.425	-0.004	0.165	4.295	3.922
E12	2453405	2453525	20	21	FFTFFFFFF	FT	0.474	0.517	-0.016	0.209	3.903	3.533
E12	2453825	2453855	19	20	FFTFFFFFF	FT	0.475	0.515	-0.025	0.231	3.916	3.384
E12	2453885	2453915	19	20	FFTFFFFFF	FT	0.492	0.511	-0.028	0.199	3.875	3.64
E12	2454755	2454785	18	19	FFTFFFFFF	FT	0.42	0.499	-0.024	0.27	4.132	3.475
E12	2454425	2454545	19	20	FFTFFFFFF	FT	0.437	0.463	0.002	0.18	3.721	3.755
E12	2454215	2454245	19	20	FFTFFFFFF	FT	0.499	0.53	-0.022	0.199	3.682	3.567
E12	2454695	2454725	19	20	FFTFFFFFF	FT	0.441	0.581	-0.071	0.344	3.699	3.011
E12	2453645	2453675	18	19	FFTFFFFFF	FT	0.379	0.447	-0.003	0.186	4.114	3.982
E12	2454575	2454605	19	20	FFTFFFFFF	FT	0.429	0.573	-0.017	0.34	3.838	3.054
E12	2454905	2454935	18	19	FFTFFFFFF	FT	0.416	0.466	0.002	0.223	4.095	3.536
E12	2454725	2454755	19	20	FFTFFFFFF	FT	0.487	0.534	-0.03	0.236	3.963	3.265

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
E12	2453225	2453315	20	21	FFTFFFFFF	FT	0.469	0.508	-0.049	0.151	3.769	3.346
E12	2452925	2453105	19	20	FFTFFFFFF	FT	0.639	0.845	0.077	0.184	3.052	2.481
E12	2454575	2454635	20	21	FFTFFFFFF	FT	0.503	0.69	-0.025	0.412	3.344	2.74
E12	2453645	2453675	19	20	FFTFFFFFF	FT	0.441	0.496	-0.013	0.184	3.925	3.944
E12	2454875	2455085	20	21	FFTFFFFFF	FT	0.564	0.659	-0.024	0.365	3.298	2.817
E12	2454875	2454905	18	19	FFTFFFFFF	FT	0.404	0.465	-0.006	0.239	4.402	3.634
E12	2454125	2454275	20	21	FFTFFFFFF	FT	0.558	0.611	0.003	0.231	3.255	3.137
E12	2454665	2454875	20	21	FFTFFFFFF	FT	0.533	0.636	-0.055	0.336	3.136	2.856
E12	2454635	2454665	20	21	FFTFFFFFF	FT	0.553	0.658	-0.07	0.321	3.309	2.971
E12	2453675	2453795	19	20	FFTFFFFFF	FT	0.494	0.523	0.004	0.194	3.76	3.569
E12	2454755	2454785	19	20	FFTFFFFFF	FT	0.445	0.558	-0.027	0.292	3.858	3.117
E12	2454035	2454065	18	19	FFTFFFFFF	FT	0.37	0.459	-0.004	0.211	3.821	3.926
E12	2453525	2453555	20	21	FFTFFFFFF	FT	0.465	0.494	0.002	0.202	3.939	3.254
E12	2454275	2454305	19	20	FFTFFFFFF	FT	0.439	0.486	-0.02	0.173	3.981	3.27
E12	2453615	2453645	19	20	FFTFFFFFF	FT	0.43	0.507	-0.022	0.183	3.748	3.524
E12	2452925	2453105	18	19	FFTFFFFFF	FT	0.606	0.824	0.039	0.179	3.37	2.627
E12	2454965	2454995	19	20	FFTFFFFFF	FT	0.503	0.581	0.022	0.302	3.763	3.126
E12	2454365	2454425	19	20	FFTFFFFFF	FT	0.441	0.498	-0.021	0.168	3.368	3.446
E12	2452925	2453105	17	18	FFTFFFFFF	FT	0.554	0.775	0.007	0.165	3.241	3.018
E12	2453795	2453825	19	20	FFTFFFFFF	FT	0.483	0.51	0.047	0.186	3.632	3.411
E12	2453165	2453195	20	21	FFTFFFFFF	FT	0.623	0.795	0.014	0.091	3.315	2.976
E12	2453855	2453885	20	21	FFTFFFFFF	FT	0.602	0.566	-0.026	0.229	3.364	3.1
E12	2454335	2454365	19	20	FFTFFFFFF	FT	0.425	0.52	-0.031	0.227	3.748	3.5
E12	2454005	2454065	19	20	FFTFFFFFF	FT	0.433	0.496	-0.035	0.215	3.824	3.597
E12	2453885	2453915	20	21	FFTFFFFFF	FT	0.608	0.566	-0.023	0.22	3.22	3.305
E12	2453555	2453675	20	21	FFTFFFFFF	FT	0.545	0.588	-0.032	0.218	3.603	3.226

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
E12	2454905	2454935	19	20	FFTFFFFFF	FT	0.487	0.536	0.023	0.287	3.453	3.073
E12	2454065	2454155	19	20	FFTFFFFFF	FT	0.462	0.508	-0.005	0.231	3.876	3.853
E12	2454275	2454545	20	21	FFTFFFFFF	FT	0.504	0.568	-0.041	0.216	3.561	3.192
E12	2453045	2453135	20	21	FFTFFFFFF	FT	0.691	0.866	0.091	0.231	2.782	2.44
E12	2453135	2453165	20	21	FFTFFFFFF	FT	0.756	0.869	0.026	0.236	2.808	2.507
E12	2453675	2453855	20	21	FFTFFFFFF	FT	0.561	0.563	-0.026	0.222	3.472	3.166
E12	2453915	2454125	20	21	FFTFFFFFF	FT	0.556	0.589	-0.053	0.223	3.683	3.141
E12	2454875	2454905	19	20	FFTFFFFFF	FT	0.444	0.509	0.022	0.264	3.464	3.467
E12	2453315	2453375	20	21	FFTFFFFFF	FT	0.539	0.51	-0.07	0.085	3.453	3.658
E12	2453075	2455085	21	22	FFTFFFFFF	FT	0.625	0.65	-0.007	0.159	3.522	3.456
F51	2454755	2455055	15	19	FFTFFFFFF	FT	0.208	0.19	-0.003	-0.031	3.245	5.107
F51	2454755	2455055	19	20	FFTFFFFFF	FT	0.232	0.197	0.011	-0.028	3.653	3.421
F51	2454995	2455025	14	22	FFTFFFFFF	TF	0.252	0.233	-0.002	-0.033	4.013	3.527
F51	2454755	2455025	14	22	FFTFFFFFF	FT	0.25	0.209	0.031	-0.011	3.958	3.186
F51	2454995	2455055	16	19	FFTFFFFFF	TF	0.23	0.197	-0.033	-0.039	4.361	2.971
F84	2453855	2455055	17	19	FFTFFFFFF	FT	0.442	0.428	0.026	0.021	5.292	5.977
F84	2453855	2455055	19	21	FFTFFFFFF	FT	0.567	0.544	0.02	0.021	3.68	3.788
F85	2454155	2455055	18	19	FFTFFFFFF	FT	0.382	0.367	0.023	-0.03	6.071	6.537
F85	2454125	2455055	19	21	FFTFFFFFF	FT	0.446	0.453	0.036	-0.002	4.178	4.801
G69	2454095	2455055	13	18	FFTFFFFFF	FT	0.31	0.24	0.094	0.066	5.201	7.144
G78	2452475	2452535	8	17	FFTFFFFFF	FT	0.481	0.473	-0.101	0.178	6.026	5.821
G78	2452475	2452535	17	20	FFTFFFFFF	FT	0.688	0.623	-0.163	0.203	4.277	4.167
G91	2450585	2451905	13	17	FFTFFFFFF	FT	0.306	0.3	-0.096	-0.039	5.54	6.498
G91	2450615	2451905	15	16	FFTFFFFFF	FT	0.247	0.24	-0.073	-0.035	7.504	9.756
G92	2454755	2454905	17	18	FFTFFFFFF	FT	0.4	0.443	-0.037	-0.128	5.705	4.985
G92	2454755	2454905	18	19	FFTFFFFFF	FT	0.453	0.502	-0.011	-0.138	4.449	4.001

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
G92	2454455	2454905	16	17	FFTFFFFFFF	FT	0.35	0.377	0.004	-0.047	7.521	7.124
G92	2454455	2454635	17	18	FFTFFFFFFF	FT	0.367	0.336	0.071	-0.001	5.556	5.4
G92	2454455	2454545	18	19	FFTFFFFFFF	FT	0.402	0.398	0.05	-0.016	4.568	4.247
G92	2453105	2453465	19	20	FFTFFFFFFF	FT	0.483	0.411	0.013	-0.102	5.107	3.901
G92	2453735	2454365	17	18	FFTFFFFFFF	FT	0.42	0.378	-0.049	-0.017	5.866	6.007
G92	2453135	2453675	17	18	FFTFFFFFFF	FT	0.379	0.339	0.001	-0.038	7.996	7.449
G92	2454545	2454635	18	19	FFTFFFFFFF	FT	0.372	0.369	0.056	0.034	5.037	5.61
G92	2454005	2454365	18	19	FFTFFFFFFF	FT	0.478	0.394	-0.018	-0.003	4.752	4.613
G92	2454755	2454905	19	20	FFTFFFFFFF	FT	0.474	0.542	0.016	-0.139	3.8	3.219
G92	2453135	2453405	18	19	FFTFFFFFFF	FT	0.455	0.393	-0.006	-0.12	5.524	4.813
G92	2453735	2454005	18	19	FFTFFFFFFF	FT	0.486	0.399	-0.078	-0.161	5.495	4.016
G92	2453405	2453675	18	19	FFTFFFFFFF	FT	0.389	0.334	0.051	-0.009	5.736	4.519
G92	2453735	2454365	19	20	FFTFFFFFFF	FT	0.534	0.46	-0.042	-0.092	4.242	4.398
G92	2453135	2454365	16	17	FFTFFFFFFF	FT	0.365	0.331	-0.012	-0.013	7.228	7.196
G92	2453105	2453645	20	21	FFTFFFFFFF	FT	0.567	0.459	-0.01	-0.117	3.986	3.542
G92	2453465	2453675	19	20	FFTFFFFFFF	FT	0.465	0.41	0.033	-0.058	4.627	3.68
G92	2454455	2454635	19	20	FFTFFFFFFF	FT	0.447	0.416	0.072	0.001	4.156	3.794
G92	2453165	2454905	13	16	FFTFFFFFFF	FT	0.322	0.328	-0.023	-0.018	6.223	10.413
G92	2453735	2454905	20	21	FFTFFFFFFF	FT	0.565	0.496	-0.025	-0.105	3.926	3.807
G92	2453105	2454875	17	20	FFTFFFFFFF	TF	0.401	0.429	-0.054	-0.06	6.362	5.858
G96	2453615	2453645	17	18	FFTFFFFFFF	FT	0.27	0.251	-0.026	0.046	7.19	13.655
G96	2453615	2453645	16	17	FFTFFFFFFF	FT	0.242	0.245	-0.028	0.072	4.563	12.956
G96	2453645	2453675	16	17	FFTFFFFFFF	FT	0.249	0.235	-0.036	0.033	7.046	13.859
G96	2453705	2453795	15	16	FFTFFFFFFF	FT	0.251	0.203	-0.063	-0.048	8.96	16.944
G96	2453825	2453855	16	17	FFTFFFFFFF	FT	0.295	0.247	-0.094	0.031	8.972	23.619
G96	2454395	2454425	17	18	FFTFFFFFFF	FT	0.264	0.235	0.013	-0.066	7.269	9.35

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
G96	2454515	2454545	16	17	FFTFFFFFF	FT	0.251	0.198	-0.058	-0.06	8.395	18.783
G96	2454455	2454665	15	16	FFTFFFFFF	FT	0.251	0.208	-0.047	-0.025	8.248	14.49
G96	2454785	2454815	16	17	FFTFFFFFF	FT	0.248	0.223	-0.021	-0.042	6.735	19.203
G96	2454815	2454845	16	17	FFTFFFFFF	FT	0.259	0.226	-0.024	-0.082	6.776	7.773
G96	2454815	2455025	15	16	FFTFFFFFF	FT	0.241	0.196	-0.057	-0.011	5.407	10.564
G96	2453795	2453945	15	16	FFTFFFFFF	FT	0.241	0.227	-0.071	0.037	5.871	18.338
G96	2454335	2454665	13	14	FFTFFFFFF	FT	0.24	0.355	-0.031	-0.16	5.54	9.496
G96	2454755	2454785	15	16	FFTFFFFFF	FT	0.244	0.219	-0.012	0.028	4.399	13.987
G96	2453435	2453465	17	18	FFTFFFFFF	FT	0.255	0.218	-0.111	-0.02	10.391	14.619
G96	2453255	2453465	16	17	FFTFFFFFF	FT	0.244	0.227	-0.107	-0.04	10.106	15.122
G96	2453975	2454305	14	15	FFTFFFFFF	FT	0.22	0.162	-0.049	0.005	5.793	15.309
G96	2454335	2454665	14	15	FFTFFFFFF	FT	0.229	0.196	-0.034	0.005	3.686	7.048
G96	2454665	2455025	14	15	FFTFFFFFF	FT	0.237	0.212	-0.03	0.005	5.784	13.259
G96	2454035	2454125	15	16	FFTFFFFFF	FT	0.228	0.176	-0.029	-0.024	10.275	15.007
G96	2453615	2453705	15	16	FFTFFFFFF	FT	0.224	0.211	-0.006	0.045	6.386	13.33
G96	2454785	2454815	15	16	FFTFFFFFF	FT	0.264	0.222	-0.041	-0.019	6.552	7.916
G96	2454875	2454905	16	17	FFTFFFFFF	FT	0.271	0.228	-0.066	-0.033	6.085	13.804
G96	2454905	2454935	17	18	FFTFFFFFF	FT	0.258	0.211	-0.057	-0.056	7.345	15.781
G96	2454125	2454305	15	16	FFTFFFFFF	FT	0.25	0.208	-0.074	-0.003	7.38	28.583
G96	2453975	2454035	15	16	FFTFFFFFF	FT	0.217	0.178	-0.019	0.042	11.086	15.883
G96	2454035	2454065	16	17	FFTFFFFFF	FT	0.235	0.204	-0.022	-0.028	10.268	18.564
G96	2454395	2454425	16	17	FFTFFFFFF	FT	0.262	0.218	-0.003	-0.04	8.662	13.406
G96	2454455	2454485	16	17	FFTFFFFFF	FT	0.289	0.276	-0.017	-0.079	8.13	9.298
G96	2454485	2454515	16	17	FFTFFFFFF	FT	0.243	0.195	-0.041	-0.064	8.727	13.207
G96	2454545	2454575	16	17	FFTFFFFFF	FT	0.264	0.202	-0.074	-0.019	9.109	19.524
G96	2454575	2454605	16	17	FFTFFFFFF	FT	0.266	0.219	-0.067	0.029	7.948	25.213

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
G96	2454575	2454605	17	18	FFTFFFFFFF	FT	0.269	0.225	-0.058	0.021	8.107	16.686
G96	2454605	2454665	18	19	FFTFFFFFFF	FT	0.311	0.291	-0.021	0.066	5.439	7.148
G96	2453615	2453945	14	15	FFTFFFFFFF	FT	0.23	0.181	-0.059	-0.011	5.989	10.377
G96	2454965	2454995	17	18	FFTFFFFFFF	FT	0.271	0.246	-0.031	0.047	8.909	16.182
G96	2454965	2454995	16	17	FFTFFFFFFF	FT	0.245	0.185	-0.051	0.063	7.229	10.607
G96	2454665	2454755	15	16	FFTFFFFFFF	FT	0.251	0.227	-0.012	0.068	5.844	10.163
G96	2453855	2453885	16	17	FFTFFFFFFF	FT	0.269	0.235	-0.089	0.091	7.574	12.964
G96	2453915	2453945	17	18	FFTFFFFFFF	FT	0.271	0.236	-0.054	0.071	9.202	12.66
G96	2454335	2454395	15	16	FFTFFFFFFF	FT	0.227	0.206	-0.001	0.058	5.523	7.015
G96	2454365	2454395	16	17	FFTFFFFFFF	FT	0.251	0.209	-0.022	-0.018	8.677	13.645
G96	2454335	2454365	16	17	FFTFFFFFFF	FT	0.263	0.222	-0.024	0.025	6.084	7.261
G96	2454905	2454935	16	17	FFTFFFFFFF	FT	0.245	0.184	-0.071	-0.038	5.381	14.157
G96	2453285	2454275	13	14	FFTFFFFFFF	FT	0.223	0.312	-0.059	-0.13	5.998	7.196
G96	2453285	2453495	15	16	FFTFFFFFFF	FT	0.239	0.203	-0.086	-0.027	12.046	11.806
G96	2454395	2454455	15	16	FFTFFFFFFF	FT	0.247	0.226	-0.021	0.007	7.104	13.451
G96	2453765	2453795	17	18	FFTFFFFFFF	FT	0.288	0.241	-0.083	-0.024	6.604	14.355
G96	2453285	2453585	14	15	FFTFFFFFFF	FT	0.236	0.235	-0.089	0.002	10.442	12.268
G96	2454155	2454185	16	17	FFTFFFFFFF	FT	0.263	0.203	-0.07	-0.008	9.685	16.907
G96	2454185	2454215	16	17	FFTFFFFFFF	FT	0.258	0.205	-0.071	0.007	7.325	22.777
G96	2454425	2454455	17	18	FFTFFFFFFF	FT	0.279	0.275	-0.003	-0.113	7.097	7.682
G96	2454545	2454575	17	18	FFTFFFFFFF	FT	0.27	0.218	-0.061	-0.031	9.52	17.378
G96	2454725	2454755	17	18	FFTFFFFFFF	FT	0.269	0.236	-0.007	-0.032	6.126	8.043
G96	2454755	2454785	17	18	FFTFFFFFFF	FT	0.263	0.24	0.001	-0.054	6.844	9.56
G96	2453735	2453765	16	17	FFTFFFFFFF	FT	0.289	0.232	-0.075	-0.063	7.962	11.652
G96	2454005	2454035	18	19	FFTFFFFFFF	FT	0.256	0.23	-0.027	-0.064	7.697	12.378
G96	2454005	2454035	17	18	FFTFFFFFFF	FT	0.25	0.219	-0.02	-0.045	10.203	18.508

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
G96	2454035	2454065	17	18	FFTFFFFFF	FT	0.251	0.233	-0.016	-0.071	10.27	14.443
G96	2454095	2454125	16	17	FFTFFFFFF	FT	0.243	0.217	-0.049	-0.077	7.447	22.377
G96	2454125	2454155	16	17	FFTFFFFFF	FT	0.242	0.198	-0.055	-0.071	9.956	20.082
G96	2454845	2454875	17	18	FFTFFFFFF	FT	0.275	0.264	-0.048	-0.067	5.94	11.135
G96	2453675	2453705	16	17	FFTFFFFFF	FT	0.244	0.217	-0.027	-0.004	10.065	22.573
G96	2453855	2453885	17	18	FFTFFFFFF	FT	0.288	0.25	-0.085	0.081	9.191	14.873
G96	2454125	2454155	17	18	FFTFFFFFF	FT	0.251	0.22	-0.058	-0.083	9.128	16.99
G96	2453885	2453945	16	17	FFTFFFFFF	FT	0.25	0.226	-0.07	0.094	6.57	15.971
G96	2454455	2454485	17	18	FFTFFFFFF	FT	0.289	0.282	-0.009	-0.111	7.332	7.372
G96	2454605	2454665	16	17	FFTFFFFFF	FT	0.283	0.274	-0.037	0.079	6.469	10.449
G96	2454725	2454755	16	17	FFTFFFFFF	FT	0.258	0.225	-0.012	0.002	5.521	10.574
G96	2453735	2453765	17	18	FFTFFFFFF	FT	0.295	0.263	-0.057	-0.081	7.619	10.078
G96	2454665	2454725	16	17	FFTFFFFFF	FT	0.269	0.24	-0.046	0.047	7.544	10.2
G96	2454755	2454785	16	17	FFTFFFFFF	FT	0.254	0.235	-0.016	-0.023	5.055	10.255
G96	2453765	2453795	16	17	FFTFFFFFF	FT	0.284	0.209	-0.094	-0.03	8.345	11.239
G96	2454785	2454815	17	18	FFTFFFFFF	FT	0.265	0.245	-0.009	-0.082	7.348	8.552
G96	2453465	2453495	16	17	FFTFFFFFF	FT	0.258	0.253	-0.086	0.024	10.556	16.404
G96	2454665	2455025	13	14	FFTFFFFFF	FT	0.235	0.292	-0.029	-0.109	6.098	5.735
G96	2454065	2454095	16	17	FFTFFFFFF	FT	0.236	0.217	-0.033	-0.079	8.995	20.082
G96	2453495	2453525	16	17	FFTFFFFFF	FT	0.258	0.256	-0.091	0.047	9.308	16.464
G96	2453975	2454035	16	17	FFTFFFFFF	FT	0.237	0.2	-0.02	-0.002	9.418	22.005
G96	2454185	2454215	17	18	FFTFFFFFF	FT	0.283	0.242	-0.069	-0.009	9.151	18.215
G96	2454515	2454545	17	18	FFTFFFFFF	FT	0.255	0.224	-0.053	-0.078	8.694	17.713
G96	2454095	2454125	17	18	FFTFFFFFF	FT	0.258	0.238	-0.039	-0.102	9.864	12.669
G96	2453795	2453825	16	17	FFTFFFFFF	FT	0.25	0.182	-0.097	0.016	5.851	12.113
G96	2454245	2454305	17	18	FFTFFFFFF	FT	0.291	0.247	-0.028	0.033	8.415	13.212

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
G96	2454365	2454395	18	19	FFTFFFFFF	FT	0.266	0.245	0.009	-0.082	5.966	7.087
G96	2454605	2454665	17	18	FFTFFFFFF	FT	0.31	0.294	-0.049	0.078	6.38	9.914
G96	2454935	2454965	17	18	FFTFFFFFF	FT	0.259	0.216	-0.053	0.006	6.992	17.782
G96	2454935	2454965	16	17	FFTFFFFFF	FT	0.244	0.18	-0.084	0.025	5.973	23.914
G96	2454995	2455025	17	18	FFTFFFFFF	FT	0.261	0.229	-0.019	0.054	6.914	12.138
G96	2454155	2454185	17	18	FFTFFFFFF	FT	0.267	0.225	-0.073	-0.018	8.762	17.051
G96	2454365	2454395	17	18	FFTFFFFFF	FT	0.259	0.234	-0.001	-0.058	7.415	11.457
G96	2453495	2453585	15	16	FFTFFFFFF	FT	0.288	0.263	-0.074	0.094	9.616	10.618
G96	2454425	2454455	16	17	FFTFFFFFF	FT	0.27	0.267	-0.03	-0.098	8.793	10.102
G96	2454455	2454485	18	19	FFTFFFFFF	FT	0.297	0.293	0.01	-0.115	6.217	6.466
G96	2454335	2455025	12	13	FFTFFFFFF	FT	0.253	0.767	-0.064	-0.56	5.762	2.928
G96	2454845	2454875	16	17	FFTFFFFFF	FT	0.269	0.226	-0.06	-0.046	6.444	10.424
G96	2453645	2453675	17	18	FFTFFFFFF	FT	0.254	0.233	-0.029	0.009	7.241	11.696
G96	2454995	2455025	16	17	FFTFFFFFF	FT	0.247	0.199	-0.025	0.063	6.735	11.132
G96	2453285	2454275	12	13	FFTFFFFFF	FT	0.215	0.694	-0.055	-0.501	4.59	3.048
G96	2454815	2454845	17	18	FFTFFFFFF	FT	0.267	0.252	-0.003	-0.086	6.811	12.881
G96	2453705	2453735	16	17	FFTFFFFFF	FT	0.246	0.19	-0.043	-0.05	9.516	25.374
G96	2454485	2454515	17	18	FFTFFFFFF	FT	0.255	0.22	-0.041	-0.074	7.432	12.553
G96	2454515	2454545	18	19	FFTFFFFFF	FT	0.26	0.241	-0.026	-0.094	7.668	11.406
G96	2454755	2454785	18	19	FFTFFFFFF	FT	0.274	0.252	0.002	-0.068	5.722	8.722
G96	2454065	2454095	17	18	FFTFFFFFF	FT	0.258	0.237	-0.023	-0.11	10.486	12.182
G96	2454515	2454545	21	22	FFTFFFFFF	FT	0.364	0.335	0.079	-0.104	4.23	4.294
G96	2454515	2454545	20	21	FFTFFFFFF	FT	0.301	0.269	0.07	-0.068	4.347	5.901
G96	2454935	2454965	20	21	FFTFFFFFF	FT	0.306	0.258	0.058	-0.022	4.117	5.3
G96	2454935	2454965	19	20	FFTFFFFFF	FT	0.286	0.236	0.036	-0.009	5.225	9.168
G96	2454425	2454455	18	19	FFTFFFFFF	FT	0.285	0.294	0.024	-0.123	5.81	7.071

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
G96	2454725	2454755	18	19	FFTFFFFFFF	FT	0.278	0.249	0.001	-0.054	5.494	7.384
G96	2454335	2454365	17	18	FFTFFFFFFF	FT	0.278	0.247	-0.003	-0.021	5.829	8.401
G96	2454215	2454305	16	17	FFTFFFFFFF	FT	0.27	0.234	-0.072	0.053	9.394	21.991
G96	2454215	2454245	17	18	FFTFFFFFFF	FT	0.274	0.223	-0.057	0.023	8.414	17.224
G96	2453285	2455025	11	12	FFTFFFFFFF	FT	0.249	1.173	-0.069	-0.991	5.232	1.893
G96	2453675	2453705	17	18	FFTFFFFFFF	FT	0.259	0.224	-0.03	-0.025	11.03	16.888
G96	2453675	2453705	18	19	FFTFFFFFFF	FT	0.258	0.224	-0.028	-0.038	7.825	11.798
G96	2453525	2453585	16	17	FFTFFFFFFF	FT	0.328	0.326	-0.051	0.17	6.07	5.657
G96	2454965	2454995	18	19	FFTFFFFFFF	FT	0.282	0.242	-0.01	0.035	6.941	11.721
G96	2454815	2454845	18	19	FFTFFFFFFF	FT	0.28	0.262	0.001	-0.094	6.727	8.944
G96	2454845	2454875	18	19	FFTFFFFFFF	FT	0.291	0.269	-0.038	-0.063	6.062	9.191
G96	2453435	2453465	18	19	FFTFFFFFFF	FT	0.265	0.235	-0.11	-0.027	7.443	12.682
G96	2453465	2453495	18	19	FFTFFFFFFF	FT	0.268	0.249	-0.068	0.009	9.174	11.118
G96	2453495	2453525	18	19	FFTFFFFFFF	FT	0.275	0.266	-0.089	0.034	7.621	10.864
G96	2453495	2453525	19	20	FFTFFFFFFF	FT	0.291	0.27	-0.083	0.027	6.018	7.638
G96	2454845	2454875	19	20	FFTFFFFFFF	FT	0.307	0.286	-0.009	-0.04	5.232	8.586
G96	2454905	2454935	18	19	FFTFFFFFFF	FT	0.274	0.248	-0.019	-0.073	6.898	11.984
G96	2454905	2454935	19	20	FFTFFFFFFF	FT	0.296	0.259	0.043	-0.067	5.274	7.57
G96	2454935	2454965	18	19	FFTFFFFFFF	FT	0.269	0.226	-0.014	-0.006	6.79	12.903
G96	2454995	2455025	19	20	FFTFFFFFFF	FT	0.305	0.264	0.026	0.017	4.369	7.548
G96	2454335	2454365	18	19	FFTFFFFFFF	FT	0.278	0.249	-0.001	-0.045	5.792	7.434
G96	2453855	2453885	18	19	FFTFFFFFFF	FT	0.287	0.252	-0.07	0.073	6.58	11.427
G96	2454695	2454725	17	18	FFTFFFFFFF	FT	0.266	0.241	-0.018	0.003	4.866	14.474
G96	2453525	2453555	17	18	FFTFFFFFFF	FT	0.347	0.37	-0.052	0.18	6.401	4.92
G96	2453825	2453855	17	18	FFTFFFFFFF	FT	0.291	0.26	-0.094	0.037	7.989	14.482
G96	2454185	2454215	18	19	FFTFFFFFFF	FT	0.276	0.242	-0.036	-0.041	7.307	12.799

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
G96	2454395	2454425	18	19	FFTFFFFFF	FT	0.273	0.259	0.025	-0.094	6.401	7.549
G96	2453615	2453645	18	19	FFTFFFFFF	FT	0.272	0.246	-0.009	0.047	7.163	8.569
G96	2453495	2453525	17	18	FFTFFFFFF	FT	0.274	0.26	-0.089	0.041	10.373	12.475
G96	2454815	2454845	19	20	FFTFFFFFF	FT	0.293	0.267	0.014	-0.07	5.244	7.334
G96	2454425	2454455	19	20	FFTFFFFFF	FT	0.306	0.297	0.041	-0.111	5.444	5.907
G96	2454035	2454065	18	19	FFTFFFFFF	FT	0.255	0.244	-0.019	-0.092	7.656	10.845
G96	2453465	2453495	17	18	FFTFFFFFF	FT	0.245	0.243	-0.086	0.008	10.493	16.617
G96	2454605	2454665	19	20	FFTFFFFFF	FT	0.316	0.29	0.022	0.074	4.665	6.349
G96	2454875	2454905	17	18	FFTFFFFFF	FT	0.289	0.25	-0.065	-0.043	6.072	13.444
G96	2454125	2454155	18	19	FFTFFFFFF	FT	0.265	0.243	-0.05	-0.1	7.52	11.612
G96	2453615	2453645	19	20	FFTFFFFFF	FT	0.274	0.25	-0.006	0.071	5.695	6.014
G96	2454065	2454095	18	19	FFTFFFFFF	FT	0.267	0.257	-0.026	-0.121	7.724	8.707
G96	2453645	2453675	18	19	FFTFFFFFF	FT	0.263	0.24	-0.028	-0.011	7.649	9.856
G96	2453765	2453795	18	19	FFTFFFFFF	FT	0.293	0.251	-0.057	-0.006	6.712	10.742
G96	2453705	2453735	17	18	FFTFFFFFF	FT	0.27	0.222	-0.033	-0.07	10.946	15.741
G96	2454875	2454905	18	19	FFTFFFFFF	FT	0.302	0.286	-0.047	-0.048	6.363	11.71
G96	2454575	2454605	18	19	FFTFFFFFF	FT	0.269	0.228	-0.033	0.005	6.589	13.221
G96	2453825	2453855	18	19	FFTFFFFFF	FT	0.282	0.264	-0.06	0.049	7.117	9.728
G96	2454665	2454695	17	18	FFTFFFFFF	FT	0.293	0.255	-0.027	0.026	6.923	9.211
G96	2453255	2453375	17	18	FFTFFFFFF	FT	0.249	0.26	-0.059	-0.104	11.508	9.623
G96	2453795	2453825	17	18	FFTFFFFFF	FT	0.271	0.225	-0.094	0.04	7.749	18.82
G96	2453795	2453825	18	19	FFTFFFFFF	FT	0.279	0.246	-0.066	0.059	6.9	11.155
G96	2454035	2454065	19	20	FFTFFFFFF	FT	0.274	0.26	-0.02	-0.092	5.728	7.227
G96	2453975	2454005	17	18	FFTFFFFFF	FT	0.243	0.195	-0.04	-0.014	8.308	11.098
G96	2454485	2454515	18	19	FFTFFFFFF	FT	0.263	0.244	-0.008	-0.091	6.775	9.363
G96	2454755	2454785	19	20	FFTFFFFFF	FT	0.285	0.253	0.009	-0.041	4.764	6.979

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
G96	2453915	2453945	18	19	FFTFFFFFF	FT	0.264	0.223	-0.063	0.049	5.664	10.691
G96	2453735	2453765	18	19	FFTFFFFFF	FT	0.304	0.269	-0.045	-0.086	6.733	7.709
G96	2453975	2454005	19	20	FFTFFFFFF	FT	0.261	0.215	-0.036	-0.048	4.621	9.745
G96	2454005	2454035	19	20	FFTFFFFFF	FT	0.27	0.245	-0.019	-0.061	5.585	7.758
G96	2454785	2454815	18	19	FFTFFFFFF	FT	0.272	0.254	-0.001	-0.09	5.624	7.126
G96	2454155	2454185	19	20	FFTFFFFFF	FT	0.273	0.24	-0.009	-0.01	5.855	9.024
G96	2454365	2454395	19	20	FFTFFFFFF	FT	0.283	0.261	0.027	-0.067	4.946	6.819
G96	2454365	2454395	20	21	FFTFFFFFF	FT	0.303	0.28	0.053	-0.056	4.731	5.943
G96	2454155	2454185	18	19	FFTFFFFFF	FT	0.273	0.237	-0.051	-0.016	7.109	14.345
G96	2454395	2454425	19	20	FFTFFFFFF	FT	0.285	0.268	0.039	-0.08	5.345	6.808
G96	2454185	2454215	19	20	FFTFFFFFF	FT	0.278	0.247	0.012	-0.049	5.538	8.653
G96	2454215	2454245	18	19	FFTFFFFFF	FT	0.276	0.231	-0.021	0.005	7.33	12.181
G96	2454545	2454575	18	19	FFTFFFFFF	FT	0.269	0.23	-0.042	-0.032	7.306	14.429
G96	2453855	2453885	19	20	FFTFFFFFF	FT	0.284	0.254	-0.044	0.072	5.228	7.935
G96	2454395	2454425	20	21	FFTFFFFFF	FT	0.31	0.279	0.055	-0.067	4.95	5.624
G96	2454005	2454035	20	21	FFTFFFFFF	FT	0.297	0.285	-0.032	-0.087	4.738	5.775
G96	2454095	2454125	18	19	FFTFFFFFF	FT	0.268	0.246	-0.041	-0.107	8.516	9.243
G96	2454725	2454755	19	20	FFTFFFFFF	FT	0.291	0.261	0.011	-0.035	4.307	6.244
G96	2454335	2454365	20	21	FFTFFFFFF	FT	0.286	0.26	0.036	0.003	4.158	5.092
G96	2454335	2454365	21	22	FFTFFFFFF	FT	0.301	0.277	0.029	-0.045	3.481	4.299
G96	2454035	2454065	20	21	FFTFFFFFF	FT	0.31	0.298	-0.036	-0.113	4.913	5.03
G96	2454125	2454155	19	20	FFTFFFFFF	FT	0.27	0.253	-0.029	-0.096	6.355	8.163
G96	2454185	2454215	20	21	FFTFFFFFF	FT	0.297	0.274	0.043	-0.059	4.494	5.193
G96	2454665	2454695	18	19	FFTFFFFFF	FT	0.293	0.251	-0.02	0.019	5.768	7.391
G96	2454905	2454935	20	21	FFTFFFFFF	FT	0.337	0.284	0.093	-0.051	4.363	5.447
G96	2453465	2453495	19	20	FFTFFFFFF	FT	0.269	0.27	-0.034	0.027	6.576	9.838

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
G96	2454785	2454815	19	20	FFTFFFFFF	FT	0.294	0.262	0.01	-0.059	5.162	6.004
G96	2454425	2454455	20	21	FFTFFFFFF	FT	0.347	0.329	0.056	-0.096	4.112	5.094
G96	2454455	2454485	19	20	FFTFFFFFF	FT	0.314	0.304	0.039	-0.106	5.064	5.906
G96	2453435	2453465	19	20	FFTFFFFFF	FT	0.286	0.247	-0.091	-0.008	6.269	9.653
G96	2453435	2453465	20	26	FFTFFFFFF	FT	0.314	0.26	-0.095	-0.013	4.652	6.641
G96	2454725	2454755	20	21	FFTFFFFFF	FT	0.312	0.284	0.019	-0.028	4.147	5.971
G96	2454245	2454305	18	19	FFTFFFFFF	FT	0.279	0.25	-0.017	0.009	6.044	9.309
G96	2454695	2454725	18	19	FFTFFFFFF	FT	0.275	0.24	-0.01	-0.018	5.274	9.819
G96	2454215	2454245	19	20	FFTFFFFFF	FT	0.283	0.236	0.011	0.009	5.587	7.863
G96	2454095	2454125	19	20	FFTFFFFFF	FT	0.28	0.266	-0.04	-0.097	5.648	7.158
G96	2454485	2454515	19	20	FFTFFFFFF	FT	0.284	0.263	0.032	-0.091	5.65	7.306
G96	2454995	2455025	18	19	FFTFFFFFF	FT	0.283	0.241	0.006	0.028	5.775	9.897
G96	2454065	2454095	19	20	FFTFFFFFF	FT	0.286	0.279	-0.019	-0.103	5.318	6.587
G96	2454515	2454545	19	20	FFTFFFFFF	FT	0.272	0.249	0.024	-0.085	5.74	8.484
G96	2454545	2454575	19	20	FFTFFFFFF	FT	0.275	0.232	0.017	-0.017	5.346	9.42
G96	2453675	2453705	19	20	FFTFFFFFF	FT	0.274	0.232	-0.025	-0.013	5.971	8.924
G96	2453885	2453915	17	18	FFTFFFFFF	FT	0.286	0.252	-0.065	0.065	9.95	12.491
G96	2454575	2454605	19	20	FFTFFFFFF	FT	0.281	0.233	0.011	0.006	5.353	9.077
G96	2454245	2454275	19	20	FFTFFFFFF	FT	0.286	0.259	0.013	0.003	4.848	6.853
G96	2453525	2453555	19	20	FFTFFFFFF	FT	0.341	0.348	-0.06	0.162	4.428	3.7
G96	2453345	2453825	16	17	FFTFFFFFF	TF	0.31	0.294	-0.038	-0.061	10.068	15.849
G96	2453765	2453915	18	19	FFTFFFFFF	TF	0.288	0.27	-0.035	0.015	7.957	12.156
G96	2453735	2453765	19	20	FFTFFFFFF	FT	0.317	0.273	-0.022	-0.075	5.467	6.022
G96	2453645	2453675	19	20	FFTFFFFFF	FT	0.277	0.249	-0.028	-0.002	5.811	7.349
G96	2453885	2453915	18	19	FFTFFFFFF	FT	0.277	0.249	-0.065	0.038	6.503	8.189
G96	2454335	2454365	19	20	FFTFFFFFF	FT	0.281	0.26	0.02	-0.035	4.646	6.166

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
G96	2454365	2454395	21	22	FFTFFFFFF	FT	0.353	0.329	0.071	-0.119	4.357	4.375
G96	2454395	2454425	21	22	FFTFFFFFF	FT	0.361	0.318	0.063	-0.093	3.934	4.555
G96	2454635	2454695	20	21	FFTFFFFFF	FT	0.3	0.271	0.006	-0.007	4.386	6.353
G96	2454665	2454695	19	20	FFTFFFFFF	FT	0.289	0.257	-0.005	0.028	5.603	5.969
G96	2454455	2454485	20	21	FFTFFFFFF	FT	0.351	0.322	0.058	-0.069	4.712	5.268
G96	2454455	2454485	21	22	FFTFFFFFF	FT	0.412	0.375	0.063	-0.087	3.99	4.054
G96	2453765	2453795	19	20	FFTFFFFFF	FT	0.296	0.264	-0.027	0.025	5.272	7.348
G96	2453705	2453735	18	19	FFTFFFFFF	FT	0.27	0.23	-0.031	-0.066	8.159	12.167
G96	2454875	2454905	19	20	FFTFFFFFF	FT	0.31	0.277	-0.015	-0.031	5.869	9.071
G96	2454245	2454305	20	21	FFTFFFFFF	FT	0.293	0.298	0.021	-0.078	3.595	3.776
G96	2454965	2454995	19	20	FFTFFFFFF	FT	0.289	0.243	0.02	0.02	5.585	6.797
G96	2453525	2453555	18	19	FFTFFFFFF	FT	0.344	0.361	-0.061	0.185	5.483	5.083
G96	2453645	2453675	20	21	FFTFFFFFF	FT	0.301	0.276	-0.041	-0.016	4.697	5.625
G96	2453705	2453735	19	20	FFTFFFFFF	FT	0.283	0.23	-0.025	-0.045	6.312	7.57
G96	2453825	2453855	19	20	FFTFFFFFF	FT	0.285	0.285	-0.022	0.082	4.96	5.558
G96	2453825	2453855	20	21	FFTFFFFFF	FT	0.308	0.33	-0.018	0.103	4.12	4.134
G96	2454275	2454305	19	20	FFTFFFFFF	FT	0.282	0.256	-0.009	-0.099	6.006	5.326
G96	2453915	2453945	20	21	FFTFFFFFF	FT	0.355	0.267	-0.102	0.022	5.417	6.606
G96	2453915	2453945	19	20	FFTFFFFFF	FT	0.305	0.247	-0.08	0.033	5.901	7.642
G96	2454755	2454785	20	21	FFTFFFFFF	FT	0.306	0.269	0.01	-0.025	4.322	5.771
G96	2453975	2454005	18	19	FFTFFFFFF	FT	0.26	0.221	-0.038	-0.042	7.556	15.469
G96	2454065	2454095	20	21	FFTFFFFFF	FT	0.337	0.331	-0.02	-0.098	4.434	5.251
G96	2453405	2453435	17	18	FFTFFFFFF	FT	0.24	0.243	-0.095	-0.084	11.512	14.26
G96	2453495	2453525	20	21	FFTFFFFFF	FT	0.325	0.283	-0.1	0	4.711	5.39
G96	2454605	2454635	20	21	FFTFFFFFF	FT	0.347	0.307	0.023	0.05	3.941	4.916
G96	2453555	2453585	17	18	FFTFFFFFF	FT	0.35	0.338	-0.042	0.101	7.256	9.102

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
G96	2454005	2454245	17	18	FFTFFFFFF	TF	0.309	0.307	-0.04	-0.111	11.502	12.112
G96	2454485	2454515	20	21	FFTFFFFFF	FT	0.311	0.278	0.071	-0.076	4.449	5.768
G96	2454545	2454575	20	21	FFTFFFFFF	FT	0.299	0.261	0.06	0.005	4.254	6.976
G96	2454575	2454605	20	21	FFTFFFFFF	FT	0.302	0.25	0.034	-0.006	4.497	5.626
G96	2454935	2454965	21	22	FFTFFFFFF	FT	0.34	0.304	0.04	-0.083	4.443	4.278
G96	2454215	2454305	21	22	FFTFFFFFF	FT	0.359	0.34	-0.001	-0.064	4.28	3.667
G96	2454215	2454245	20	21	FFTFFFFFF	FT	0.305	0.263	0.011	-0.001	4.145	4.59
G96	2454695	2454755	21	22	FFTFFFFFF	FT	0.359	0.337	0.017	-0.104	4.166	4.67
G96	2454845	2454875	20	21	FFTFFFFFF	FT	0.342	0.298	0.025	-0.009	4.514	6.108
G96	2453855	2453885	20	21	FFTFFFFFF	FT	0.302	0.262	-0.05	0.042	4.526	6.358
G96	2453735	2453915	17	18	FFTFFFFFF	TF	0.312	0.269	-0.033	-0.049	8.884	10.177
G96	2454425	2454455	21	22	FFTFFFFFF	FT	0.426	0.387	0.076	-0.104	4.074	4.327
G96	2454875	2454905	20	21	FFTFFFFFF	FT	0.335	0.291	0.031	0.002	5.111	6.693
G96	2453345	2453735	17	18	FFTFFFFFF	TF	0.297	0.269	-0.044	-0.061	9.457	13.839
G96	2454035	2454065	21	22	FFTFFFFFF	FT	0.372	0.359	-0.053	-0.156	4.227	3.786
G96	2454815	2454845	20	21	FFTFFFFFF	FT	0.326	0.28	0.025	-0.041	4.447	5.198
G96	2454845	2454875	21	22	FFTFFFFFF	FT	0.407	0.34	0.035	-0.013	3.997	4.211
G96	2453615	2453645	20	21	FFTFFFFFF	FT	0.28	0.258	-0.012	0.073	5.126	5.617
G96	2454335	2454395	22	23	FFTFFFFFF	FT	0.407	0.375	0.076	-0.133	3.868	3.783
G96	2454575	2454605	21	22	FFTFFFFFF	FT	0.339	0.283	0.015	-0.046	4.017	4.271
G96	2453735	2453765	20	21	FFTFFFFFF	FT	0.352	0.295	-0.012	-0.063	4.627	4.939
G96	2453795	2453825	20	21	FFTFFFFFF	FT	0.297	0.316	-0.002	0.164	4.348	5.034
G96	2453795	2453825	19	20	FFTFFFFFF	FT	0.281	0.277	-0.017	0.114	5.383	7.079
G96	2453885	2453915	20	21	FFTFFFFFF	FT	0.309	0.286	-0.06	0.007	3.985	4.534
G96	2454995	2455025	20	21	FFTFFFFFF	FT	0.351	0.294	0.02	-0.021	3.969	4.662
G96	2454995	2455025	21	22	FFTFFFFFF	FT	0.432	0.33	0.008	-0.052	3.85	4.242

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
G96	2454785	2454815	20	21	FFTFFFFFF	FT	0.339	0.286	0.004	-0.042	4.41	4.833
G96	2453405	2453435	18	19	FFTFFFFFF	FT	0.259	0.247	-0.1	-0.094	9.926	9.591
G96	2454425	2454485	22	23	FFTFFFFFF	FT	0.514	0.469	0.074	-0.107	3.514	4
G96	2454155	2454185	21	22	FFTFFFFFF	FT	0.33	0.305	0.015	-0.039	4.393	4.934
G96	2454155	2454185	20	21	FFTFFFFFF	FT	0.284	0.253	0.023	-0.009	4.656	6.133
G96	2454965	2454995	20	21	FFTFFFFFF	FT	0.32	0.272	0.019	-0.012	4.796	5.536
G96	2454695	2454725	19	20	FFTFFFFFF	FT	0.288	0.254	0.003	-0.003	4.572	6.814
G96	2453765	2453795	20	21	FFTFFFFFF	FT	0.317	0.291	-0.009	0.059	4.493	5.057
G96	2454125	2454155	20	21	FFTFFFFFF	FT	0.289	0.274	-0.014	-0.091	4.599	5.21
G96	2453855	2453915	21	22	FFTFFFFFF	FT	0.361	0.286	-0.083	-0.002	4.389	4.423
G96	2454695	2454725	20	21	FFTFFFFFF	FT	0.308	0.258	0.032	0.016	4.704	4.589
G96	2454815	2454845	21	22	FFTFFFFFF	FT	0.38	0.309	0.006	-0.04	3.96	4.149
G96	2453525	2453555	20	21	FFTFFFFFF	FT	0.368	0.363	-0.07	0.144	4.013	3.581
G96	2453345	2453705	18	19	FFTFFFFFF	TF	0.265	0.257	-0.044	-0.049	7.096	12.577
G96	2454095	2454125	21	22	FFTFFFFFF	FT	0.382	0.359	-0.083	-0.11	4.294	4.153
G96	2454095	2454125	20	21	FFTFFFFFF	FT	0.311	0.288	-0.037	-0.091	4.529	4.743
G96	2453345	2453375	18	19	FFTFFFFFF	FT	0.288	0.273	-0.079	-0.102	8.733	8.601
G96	2454125	2454155	21	22	FFTFFFFFF	FT	0.348	0.339	-0.028	-0.107	4.229	4.175
G96	2453975	2454035	21	22	FFTFFFFFF	FT	0.33	0.334	-0.052	-0.155	4.289	4.317
G96	2453885	2453915	19	20	FFTFFFFFF	FT	0.286	0.266	-0.055	0.029	4.717	5.919
G96	2453975	2454005	20	21	FFTFFFFFF	FT	0.28	0.239	-0.028	-0.042	3.881	7.24
G96	2453555	2453585	18	19	FFTFFFFFF	FT	0.358	0.331	-0.071	0.082	5.732	6.878
G96	2453345	2453375	19	20	FFTFFFFFF	FT	0.293	0.274	-0.063	-0.079	6.423	6.695
G96	2453735	2453765	18	19	FFTFFFFFF	TF	0.304	0.264	-0.032	-0.056	7.044	6.005
G96	2454875	2454905	21	22	FFTFFFFFF	FT	0.398	0.344	0.035	-0.012	4.835	5.197
G96	2453645	2453675	21	22	FFTFFFFFF	FT	0.331	0.304	-0.038	-0.05	3.843	4.05

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
G96	2453675	2453705	20	21	FFTFFFFFF	FT	0.307	0.261	-0.044	-0.002	4.713	5.782
G96	2453495	2453585	21	22	FFTFFFFFF	FT	0.387	0.338	-0.111	0.022	4.267	4.437
G96	2454845	2454995	19	20	FFTFFFFFF	TF	0.308	0.288	0.035	-0.042	4.902	6.076
G96	2454965	2454995	21	22	FFTFFFFFF	FT	0.377	0.32	-0.012	-0.075	4.273	4.738
G96	2454335	2454605	17	18	FFTFFFFFF	TF	0.306	0.341	0.004	-0.119	8.565	10.54
G96	2454755	2454785	21	22	FFTFFFFFF	FT	0.352	0.295	0.006	-0.06	4.049	3.959
G96	2453255	2453315	18	19	FFTFFFFFF	FT	0.215	0.287	-0.051	-0.161	8.939	6.794
G96	2453285	2453465	21	22	FFTFFFFFF	FT	0.374	0.311	-0.122	-0.036	4.421	5.392
G96	2454665	2454755	22	23	FFTFFFFFF	FT	0.448	0.381	-0.002	-0.121	4.061	3.903
G96	2454785	2454815	21	22	FFTFFFFFF	FT	0.404	0.342	0.012	-0.061	3.836	4.549
G96	2454905	2455025	22	23	FFTFFFFFF	FT	0.462	0.409	0.027	-0.109	4.851	4.757
G96	2454005	2454995	16	17	FFTFFFFFF	TF	0.295	0.293	-0.04	-0.075	9.027	13.788
G96	2454185	2454215	21	22	FFTFFFFFF	FT	0.344	0.326	0.044	-0.104	4.188	3.966
G96	2453465	2453495	20	21	FFTFFFFFF	FT	0.298	0.285	-0.021	0.033	4.785	6.354
G96	2454485	2454515	21	22	FFTFFFFFF	FT	0.363	0.332	0.094	-0.116	3.973	4.349
G96	2454905	2454935	21	22	FFTFFFFFF	FT	0.414	0.364	0.116	-0.072	4.114	5.302
G96	2453735	2453765	21	22	FFTFFFFFF	FT	0.446	0.368	-0.004	-0.087	4.224	4.281
G96	2454545	2454575	21	22	FFTFFFFFF	FT	0.353	0.316	0.065	-0.004	4.061	5.177
G96	2453615	2453645	21	22	FFTFFFFFF	FT	0.296	0.271	-0.007	0.024	3.426	5.55
G96	2454605	2454665	21	22	FFTFFFFFF	FT	0.401	0.334	-0.042	-0.015	4.269	4.301
G96	2453405	2453435	19	20	FFTFFFFFF	FT	0.289	0.24	-0.099	-0.064	6.5	7.583
G96	2453765	2453795	21	22	FFTFFFFFF	FT	0.375	0.362	-0.042	0.054	4.202	4.195
G96	2454395	2454425	22	23	FFTFFFFFF	FT	0.457	0.379	0.083	-0.097	3.805	3.656
G96	2453705	2453735	20	21	FFTFFFFFF	FT	0.319	0.251	-0.018	-0.015	5.565	5.152
G96	2453705	2453735	18	19	FFTFFFFFF	TF	0.304	0.242	-0.037	-0.066	10.355	8.607
G96	2454065	2454095	21	22	FFTFFFFFF	FT	0.436	0.441	-0.018	-0.109	4.184	4.862

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
G96	2453915	2453945	21	22	FFTFFFFFF	FT	0.41	0.305	-0.11	0.01	5.048	5.297
G96	2453975	2454035	22	23	FFTFFFFFF	FT	0.395	0.395	-0.057	-0.199	3.846	3.689
G96	2454725	2454995	17	18	FFTFFFFFF	TF	0.287	0.301	-0.01	-0.093	6.066	8.997
G96	2454035	2454095	22	23	FFTFFFFFF	FT	0.485	0.481	-0.045	-0.166	3.959	3.794
G96	2453675	2453705	21	22	FFTFFFFFF	FT	0.371	0.324	-0.058	-0.037	4.082	4.694
G96	2453555	2453585	19	20	FFTFFFFFF	FT	0.338	0.334	-0.073	0.108	4.775	6.308
G96	2454665	2454695	21	22	FFTFFFFFF	FT	0.34	0.304	0.017	-0.072	3.461	5.449
G96	2453705	2453735	21	22	FFTFFFFFF	FT	0.405	0.317	-0.025	-0.006	4.847	5.681
G96	2454785	2454905	22	23	FFTFFFFFF	FT	0.498	0.402	0.009	-0.043	3.872	4.297
G96	2453255	2453315	19	20	FFTFFFFFF	FT	0.246	0.304	-0.045	-0.157	7.461	4.123
G96	2453825	2453855	21	22	FFTFFFFFF	FT	0.351	0.39	-0.058	0.095	3.874	3.81
G96	2453795	2453825	21	22	FFTFFFFFF	FT	0.366	0.381	-0.009	0.185	4.32	4.082
G96	2454335	2454605	18	19	FFTFFFFFF	TF	0.296	0.311	0.007	-0.121	5.864	8.738
G96	2453345	2453735	19	20	FFTFFFFFF	TF	0.282	0.231	-0.039	-0.016	8.834	11.152
G96	2454515	2454575	22	23	FFTFFFFFF	FT	0.464	0.432	0.061	-0.128	4.237	4.213
G96	2454845	2454995	18	19	FFTFFFFFF	TF	0.315	0.292	-0.003	-0.054	5.446	7.944
G96	2453405	2453435	20	21	FFTFFFFFF	FT	0.311	0.254	-0.09	-0.034	5.16	6.363
G96	2454095	2454245	18	19	FFTFFFFFF	TF	0.282	0.285	-0.018	-0.103	9.599	9.759
G96	2454005	2454095	18	19	FFTFFFFFF	TF	0.269	0.291	-0.029	-0.101	7.267	9.72
G96	2453765	2453915	19	20	FFTFFFFFF	TF	0.271	0.269	-0.031	0.074	6.035	7.972
G96	2454725	2454845	18	19	FFTFFFFFF	TF	0.305	0.324	-0.002	-0.08	5.891	7.821
G96	2454095	2454215	19	20	FFTFFFFFF	TF	0.273	0.263	-0.012	-0.076	5.115	5.326
G96	2453735	2453765	19	20	FFTFFFFFF	TF	0.279	0.262	-0.015	-0.023	4.187	6.072
G96	2454335	2454605	19	20	FFTFFFFFF	TF	0.285	0.294	0.023	-0.104	7.656	6.643
G96	2453705	2453945	22	23	FFTFFFFFF	FT	0.496	0.413	-0.059	-0.002	4.589	4.234
G96	2454155	2454305	22	23	FFTFFFFFF	FT	0.439	0.405	-0.005	-0.07	4.716	3.967

obs	JD start	JD end	app mag low	app mag upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
G96	2453285	2453375	20	21	FFTFFFFFF	FT	0.311	0.307	-0.06	-0.075	5.157	4.543
G96	2454005	2454095	19	20	FFTFFFFFF	TF	0.258	0.253	-0.03	-0.066	6.208	5.244
G96	2453285	2453705	22	23	FFTFFFFFF	FT	0.401	0.361	-0.071	-0.02	3.98	4.513
G96	2454485	2454515	22	23	FFTFFFFFF	FT	0.434	0.414	0.089	-0.168	3.478	4.073
G96	2454095	2454155	22	23	FFTFFFFFF	FT	0.479	0.455	-0.062	-0.123	3.976	4.294
G96	2454725	2454995	20	21	FFTFFFFFF	TF	0.332	0.295	0.07	-0.061	5.188	4.846
G96	2454575	2454635	22	23	FFTFFFFFF	FT	0.437	0.38	-0.057	-0.041	3.858	4.664
G96	2454755	2454785	22	23	FFTFFFFFF	FT	0.432	0.351	0.025	-0.076	3.858	4.12
G96	2453405	2454215	20	21	FFTFFFFFF	TF	0.283	0.275	-0.045	0.02	4.597	5.598
G96	2454725	2454845	19	20	FFTFFFFFF	TF	0.298	0.292	-0.001	-0.046	4.516	6.33
G96	2453465	2453495	21	22	FFTFFFFFF	FT	0.348	0.31	-0.027	0.008	3.784	4.254
G96	2453555	2453585	20	21	FFTFFFFFF	FT	0.333	0.307	-0.073	0.106	3.732	3.464
G96	2454335	2454605	20	21	FFTFFFFFF	TF	0.279	0.268	0.017	-0.086	4.331	4.912
G98	2453045	2455085	16	19	FFTFFFFFF	FT	0.338	0.293	-0.023	-0.002	6.035	7.276
G98	2453045	2455085	19	20	FFTFFFFFF	FT	0.353	0.325	-0.003	0.038	4.963	5.166
G98	2453045	2455085	20	22	FFTFFFFFF	FT	0.452	0.44	0.018	0.082	3.998	3.723
H06	2452895	2455085	16	20	FFTFFFFFF	FT	0.516	0.511	0.041	-0.017	3.831	4.319
H06	2452865	2455085	18	19	FFTFFFFFF	FT	0.473	0.45	0.054	-0.028	4.796	5.367
H06	2452865	2455085	13	18	FFTFFFFFF	FT	0.391	0.366	0.017	-0.013	7.759	7.718
H07	2453195	2454635	15	16	FFTFFFFFF	FT	0.475	0.565	-0.042	0.315	5.967	4.718
H07	2453705	2453945	16	17	FFTFFFFFF	FT	0.536	0.608	-0.003	0.303	5.77	3.909
H07	2453195	2453705	16	17	FFTFFFFFF	FT	0.552	0.721	-0.129	0.329	5.365	4.615
H07	2453195	2454635	17	18	FFTFFFFFF	FT	0.548	0.708	-0.056	0.279	5.518	4.621
H07	2453195	2454635	14	15	FFTFFFFFF	FT	0.468	0.521	-0.027	0.299	5.876	6.717
H07	2453195	2454635	13	14	FFTFFFFFF	FT	0.444	0.478	-0.035	0.305	9.042	5.581
H07	2453255	2454635	12	13	FFTFFFFFF	FT	0.433	0.434	0.015	0.291	9.597	4.227

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
H07	2453195	2453855	18	19	FFTFFFFFF	FT	0.448	0.485	-0.001	0.2	6.89	6.715
H07	2453195	2453855	19	20	FFTFFFFFF	FT	0.462	0.458	0.061	0.164	6.566	7.559
H07	2453195	2453855	20	21	FFTFFFFFF	FT	0.5	0.479	0.095	0.151	5.949	6.287
H07	2453915	2454275	19	20	FFTFFFFFF	FT	0.462	0.821	-0.028	0.408	8.747	4.368
H07	2453915	2454275	20	21	FFTFFFFFF	FT	0.56	0.928	0.028	0.483	6.493	3.652
H07	2454305	2454485	20	21	FFTFFFFFF	FT	0.638	0.795	0.008	0.39	5.155	4.063
H07	2454305	2454485	19	20	FFTFFFFFF	FT	0.513	0.737	-0.021	0.379	5.725	4.89
H07	2453915	2454485	18	19	FFTFFFFFF	FT	0.464	0.783	-0.047	0.421	8.497	5.014
H07	2453975	2454635	16	17	FFTFFFFFF	FT	0.513	0.61	-0.021	0.287	5.92	5.169
H07	2453195	2454485	21	22	FFTFFFFFF	FT	0.649	0.847	0.081	0.383	4.245	3.999
H10	2454155	2455085	15	19	FFTFFFFFF	FT	0.381	0.354	0.071	-0.023	5.898	8.526
H41	2452925	2453435	15	18	FFTFFFFFF	FT	0.358	0.354	0.029	-0.028	7.649	5.628
H41	2452925	2453435	18	19	FFTFFFFFF	FT	0.393	0.417	0.068	-0.023	5.998	5.106
H41	2452925	2453435	19	20	FFTFFFFFF	FT	0.443	0.441	-0.009	0.012	5.279	4.143
H45	2453405	2454875	17	19	FFTFFFFFF	FT	0.257	0.245	0.021	0.007	6.735	5.736
H45	2453405	2455025	19	20	FFTFFFFFF	FT	0.303	0.328	0.018	-0.015	7.079	6.598
H51	2453615	2454635	18	21	FFTFFFFFF	FT	0.448	0.422	0.042	-0.032	5.195	5.674
H53	2454485	2455085	16	19	FFTFFFFFF	FT	0.471	0.381	0.16	0.059	6.093	10.721
H55	2453225	2455055	19	20	FFTFFFFFF	FT	0.435	0.401	0.075	0.004	6.731	7.475
H55	2453705	2455055	20	21	FFTFFFFFF	FT	0.471	0.427	0.029	0.07	6.049	6.414
H55	2453015	2455085	18	19	FFTFFFFFF	FT	0.496	0.433	0.065	-0.062	5.706	5.918
H68	2453945	2454515	15	17	FFTFFFFFF	FT	0.435	0.396	0.134	0.114	6.708	7.403
I02	2450885	2451515	15	16	FFTFFFFFF	FT	0.263	0.257	-0.095	0.026	4.964	16.659
I02	2450885	2451485	16	17	FFTFFFFFF	FT	0.34	0.292	-0.122	0.015	4.629	6.189
I02	2451515	2451965	15	16	FFTFFFFFF	FT	0.28	0.23	-0.118	0.041	8.519	13.028
I02	2450885	2451965	10	15	FFTFFFFFF	FT	0.216	0.208	-0.091	0.038	11.278	41.15

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
I02	2451515	2451965	16	17	FFTFFFFFF	FT	0.359	0.307	-0.146	0.024	5.24	5.267
I10	2453135	2454005	16	17	FFTFFFFFF	FT	0.611	0.669	0.074	0.08	3.47	3.409
I10	2453135	2454005	17	18	FFTFFFFFF	FT	0.67	0.73	0.089	0.09	3.111	3.016
J17	2454815	2454935	12	20	FFTFFFFFF	FT	0.385	0.427	0.035	-0.095	4.966	4.805
J75	2454155	2455085	14	15	FFTFFFFFF	FT	0.244	0.241	0.025	0.014	9.249	9.962
J75	2454995	2455025	16	17	FFTFFFFFF	FT	0.329	0.364	-0.012	0.047	9.473	8.461
J75	2454755	2454995	15	16	FFTFFFFFF	FT	0.283	0.27	0.006	-0.015	9.405	12.782
J75	2454155	2455085	10	14	FFTFFFFFF	FT	0.267	0.219	0.007	0.014	12.853	6.83
J75	2454995	2455055	15	16	FFTFFFFFF	FT	0.3	0.285	0.02	0.056	11.641	11.568
J75	2454905	2454935	16	17	FFTFFFFFF	FT	0.304	0.261	-0.029	-0.047	8.823	9.487
J75	2455025	2455055	17	18	FFTFFFFFF	FT	0.373	0.367	0.031	0.017	5.559	6.045
J75	2454935	2454965	16	17	FFTFFFFFF	FT	0.276	0.28	-0.031	-0.024	12.993	11.591
J75	2454635	2454695	17	18	FFTFFFFFF	FT	0.315	0.292	0.011	-0.043	8.093	8.972
J75	2455055	2455085	15	16	FFTFFFFFF	FT	0.238	0.266	0.033	0.042	11.543	11.649
J75	2453975	2454755	15	16	FFTFFFFFF	FT	0.244	0.228	0.002	0.043	12.044	15.26
J75	2455025	2455055	16	17	FFTFFFFFF	FT	0.315	0.312	0.016	0.041	9.617	9.254
J75	2455055	2455085	16	17	FFTFFFFFF	FT	0.268	0.273	0.03	0.019	9.436	10.549
J75	2454815	2454905	16	17	FFTFFFFFF	FT	0.304	0.275	-0.046	-0.041	10.122	9.318
J75	2454635	2454695	16	17	FFTFFFFFF	FT	0.275	0.255	0.002	0.021	12.238	15.811
J75	2454845	2454875	17	18	FFTFFFFFF	FT	0.356	0.351	-0.011	-0.072	6.82	7.129
J75	2454965	2454995	16	17	FFTFFFFFF	FT	0.336	0.34	0.001	0.026	7.975	8.702
J75	2454875	2454905	18	19	FFTFFFFFF	FT	0.415	0.41	-0.008	-0.045	5.263	5.27
J75	2454905	2454935	18	19	FFTFFFFFF	FT	0.409	0.385	-0.005	-0.042	5.019	5.148
J75	2454935	2454965	18	19	FFTFFFFFF	FT	0.403	0.395	0.031	-0.017	5.019	4.908
J75	2454755	2454815	16	17	FFTFFFFFF	FT	0.295	0.289	0.037	-0.032	8.625	11.18
J75	2454635	2454695	18	19	FFTFFFFFF	FT	0.378	0.347	0.024	-0.058	5.691	5.511

			app mag				RA RMS	Dec RMS	RA Bias	Dec Bias		
obs	JD start	JD end	low	upper	tech code	gal lat	(arc sec)	(arc sec)	(arc sec)	(arc sec)	ra kurt	dec kurt
J75	2454905	2454935	17	18	FFTFFFFFF	FT	0.34	0.315	-0.036	-0.044	6.83	7.484
J75	2454695	2454755	16	17	FFTFFFFFF	FT	0.268	0.235	0.013	0	9.902	11.391
J75	2454995	2455025	17	18	FFTFFFFFF	FT	0.403	0.408	-0.024	0.052	5.802	5.692
J75	2454845	2454875	18	19	FFTFFFFFF	FT	0.45	0.439	-0.004	-0.098	4.896	5.046
J75	2454875	2454905	17	18	FFTFFFFFF	FT	0.344	0.337	-0.034	-0.044	6.821	7.205
J75	2454755	2454815	19	20	FFTFFFFFF	FT	0.491	0.493	0.007	-0.055	3.763	4.214
J75	2454755	2454815	18	19	FFTFFFFFF	FT	0.413	0.419	-0.001	-0.075	4.571	4.723
J75	2455055	2455085	18	19	FFTFFFFFF	FT	0.373	0.376	0.049	0.032	4.869	5.146
J75	2455055	2455085	17	18	FFTFFFFFF	FT	0.303	0.302	0.04	0.015	7.749	7.794
J75	2454695	2454725	17	18	FFTFFFFFF	FT	0.343	0.289	-0.004	-0.051	7.801	6.942
J75	2454935	2454965	17	18	FFTFFFFFF	FT	0.327	0.328	-0.009	-0.031	7.125	8.221
J75	2454965	2454995	17	18	FFTFFFFFF	FT	0.362	0.361	-0.005	0.025	6.311	6.445
J75	2454815	2454845	17	18	FFTFFFFFF	FT	0.391	0.389	-0.086	-0.096	6.672	7.011
J75	2454725	2454785	17	18	FFTFFFFFF	FT	0.294	0.283	0.044	-0.042	8.722	9
J75	2453885	2454365	16	17	FFTFFFFFF	FT	0.26	0.258	0.024	-0.02	9.075	10.659
J75	2454815	2454845	18	19	FFTFFFFFF	FT	0.461	0.437	-0.063	-0.114	4.541	5.147
J75	2454965	2454995	18	19	FFTFFFFFF	FT	0.433	0.419	0.018	0.023	4.556	4.521
J75	2454785	2454815	17	18	FFTFFFFFF	FT	0.333	0.339	0.011	-0.06	6.502	7.205
J75	2454995	2455055	19	20	FFTFFFFFF	FT	0.499	0.491	0.049	-0.001	3.605	3.829
J75	2455055	2455085	19	20	FFTFFFFFF	FT	0.446	0.446	0.068	0.053	3.827	4.033
J75	2453135	2454365	17	18	FFTFFFFFF	FT	0.3	0.303	0.037	-0.051	6.528	8.217
J75	2454995	2455025	18	19	FFTFFFFFF	FT	0.432	0.455	0.005	0.061	3.959	3.951
J75	2454905	2454935	19	20	FFTFFFFFF	FT	0.495	0.463	0.049	-0.029	3.871	3.995
J75	2454725	2454755	18	19	FFTFFFFFF	FT	0.338	0.321	0.056	-0.074	5.557	6.593
J75	2454845	2454875	19	20	FFTFFFFFF	FT	0.527	0.523	0.027	-0.095	3.905	4.017
J75	2454695	2454725	18	19	FFTFFFFFF	FT	0.4	0.359	0.013	-0.081	5.448	5.023

obs	JD start	JD end	app mag low	upper	tech code	gal lat	RA RMS (arc sec)	Dec RMS (arc sec)	RA Bias (arc sec)	Dec Bias (arc sec)	ra kurt	dec kurt
J75	2454755	2454905	20	21	FFTFFFFFF	FT	0.569	0.541	0.094	0.023	3.612	3.754
J75	2454875	2454905	19	20	FFTFFFFFF	FT	0.483	0.473	0.044	-0.022	4.036	4.182
J75	2455025	2455055	18	19	FFTFFFFFF	FT	0.446	0.431	0.043	-0.002	4.09	4.303
J75	2454245	2455055	17	18	FFTFFFFFF	TF	0.406	0.432	-0.045	-0.094	5.814	6.29
J75	2453135	2454515	18	19	FFTFFFFFF	FT	0.365	0.361	0.054	-0.059	5.622	5.851
J75	2454575	2454695	19	20	FFTFFFFFF	FT	0.461	0.404	0.068	-0.036	4.222	4.622
J75	2454695	2454725	19	20	FFTFFFFFF	FT	0.471	0.437	0.047	-0.06	4.038	4.18
J75	2454935	2454965	19	20	FFTFFFFFF	FT	0.481	0.468	0.061	-0.008	3.961	3.936
J75	2454965	2454995	19	20	FFTFFFFFF	FT	0.476	0.475	0.028	0.058	3.939	3.877
J75	2454815	2454845	19	20	FFTFFFFFF	FT	0.498	0.486	-0.053	-0.095	3.811	4.497
J75	2454725	2454755	19	20	FFTFFFFFF	FT	0.425	0.41	0.099	-0.058	4.331	4.939
J75	2454245	2454875	15	19	FFTFFFFFF	TF	0.435	0.435	-0.086	-0.068	4.707	6.1
J75	2453975	2454755	20	21	FFTFFFFFF	FT	0.548	0.502	0.109	-0.018	3.458	4.224
J75	2454245	2454845	14	20	FFTFFFFFF	TF	0.492	0.47	-0.033	-0.051	3.494	4.853
J75	2454905	2455085	20	21	FFTFFFFFF	FT	0.554	0.537	0.056	0.013	3.347	3.589
J75	2453135	2454545	19	20	FFTFFFFFF	FT	0.472	0.429	0.131	-0.008	4.505	5.036
J95	2452445	2455085	19	21	FFTFFFFFF	FT	0.472	0.458	0.039	0.002	4.716	4.714
J95	2452445	2455085	17	19	FFTFFFFFF	FT	0.306	0.311	0.03	-0.011	7.669	7.506
M1X							2.976	2.44	0.436	0.037	3.195	4.494
M2X							1.837	1.605	0.12	-0.018	8.552	11.679
M3X							0.941	0.919	-0.054	-0.041	8.592	7.271
M4X							0.545	0.534	-0.001	0.029	6.088	6.242