Photometry of Small Outer Solar System Bodies with the NEAT database. J. M. Bauer[1], K. J. Lawrence[1], B. J. Buratti[1], R. J. Bambery[1], S. C. Lowry[1], K. J. Meech[2], Y. R. Fernández[3], P. Petersen[1], M. McSavaney[1], J. Eckel[1], and the NEAT project team, [1]Jet Propulsion Laboratory, California Institute of Technology, 4800 Oak Grove Drive, Pasadena, CA 91109 (bauer@scn.jpl.nasa.gov), [2]Institute for Astronomy, University of Hawaii, 2680 Woodlawn Dr., Honolulu, HI 96822 (meech@ifa.hawaii.edu), [3]University of Central Florida, Dept. of Physics, 4000 Central Florida Blvd., M.A.P. Building, Orlando, FL 32816 (yan@physics.ucf.edu)

Introduction: The Near-Earth Asteroid Tracking (NEAT) project at the Jet Propulsion Laboratory has systematically searched the skies for earth-approaching asteroids and comets, collectively known as Near-Earth Objects (NEOs), from December 1995 - April 2007. NEAT has observed from Haleakala, Maui, HI and, beginning in 2001, from Palomar Observatory in San Diego, CA, from a variety of 1-meter class telescopes using CCD cameras with > a degree FOV.

Although the 3 principle cameras NEAT used were constructed differently, the observing strategy remained the same throughout the program. Sky coverage typically spanned > 6000 square degrees/month, with limiting m_R ~ 20. NEAT observed the same location of the sky three times at ~30 min intervals. These "triplets" were analyzed for moving objects. With the exception of follow-up fields, the two sites did not observe the same area of sky on the same night. However, sky coverage, from the same site, did repeat on a weekly (if observing runs lasted more than seven days), monthly and annual basis. Ecliptic coverage at opposition was given highest priority. Sky regions close to the moon and galactic plane were avoided.

The collection of images from these years still can serve as a potentially rich source of photometric data of newly discovered and active bodies down to 20th mag. using relative photometry techniques (Fig. 1)[1]. The multiple coverage, on the timescales of hours, days, months, and years, provides the potential to further characterize individual objects in several ways.

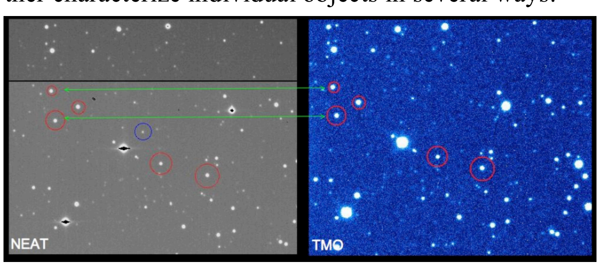

***Figure 1**: Magnitudes in each NEAT image (left panel) are determined by comparison of photometrically calibrated field standards (right). The magnitudes of the field standards are obtained from images taken at TMO's 0.6m telescope.*

The samplings provide the opportunity to constrain the rotational amplidues of the light curves, providing lower bounds on the axis ratios of the object. The broad range of phase sampling can also provide phase-curve data points (Fig. 2) [1]. For active bodies, such as comets, monitoring of the outburst activity may also be possible. We will present a sub-set of photometry of various bodies of interest and a preliminary analysis of the phase-curve behavior for a subset of distant minor bodies, derived from the NEAT database.

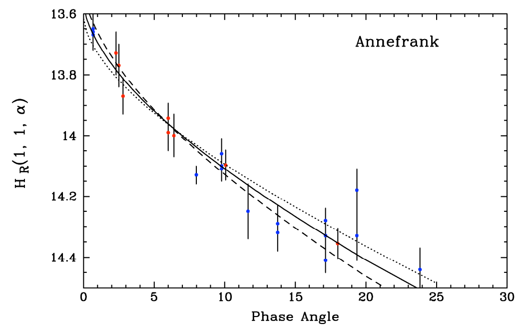

***Figure 2**: The Near-opposition phase curve of Annefrank. The red data points were taken from the 2005 & 2006 TMO images. The blue points are from the 2002 NEAT data. The errors represent the absolute photometric uncertainties. Low-angle phase photometry was not obtained by the Stardust spacecraft, but these points can be used to constrain the overall phase curve [2]. The lines represent an IAU phase curve fit to the data of G=0.26+/-0.1 & $H_R(1,1,0)$ of 13.6. The NEAT database has provided these phase curve points at the epoch of the encounter.*

Chiron & other active bodies: Chiron, often considered the first Centaur body discovered [3] is also one of the largest and most consistently active [4]. Activity seems to depart from a simplistic model of peak outbursts occurring near perihelion, at 8 AU. Rather, activity seems to intensify near 13AU, consistent with sublimation of CO-ice or related species driving the activiy [5]. The NEAT images provide photometric coverage of Chiron throughout its perihelion and up through 2007. Preliminary photometry from the database for this object and other active bodies will be shown along with the implications for the drivers of activity in these distant active comets.

References: [1] Bauer et al. (2007) *AGU Fall Mtg, abs.* #P41A-0221. [2] Hillier et al. (2008) *Icarus, submitted*. [3] Kowal et al. (1977) *IAUC* no. 3129 [4] Meech et al. (1997) *AJ*, 113, 844-862. [5] Meech & Søren (2004) *In Comets II*, 317-335. **Additional Information:** The research described here was carried out in part by the Jet Propulsion Laboratory, California Institute of Technology, under contract with NASA.