WISE Preliminary Detection Statistics of Minor Planets.

Tommy Grav[1], James M. Bauer[2,3], John Dailey[2], Amanda K. Mainzer[3], Roc Cutri[2], Joseph Masiero[3], Robert McMillan[4], Russ Walker[5], Edward L. Wright[6] and the WISE Team[2], [1] Dept. of Physics and Astronomy, Johns Hopkins University, 3400 N. Charles St., Baltimore, MD21218, (tgrav@pha.jhu.edu), [2] Infrared Processing and Analysis Center, California Institute of Technology, [3] Jet Propulsion Laboratory, California Institute of Technology, [4] Lunar and Planetary Laboratory, University of Arizona, [5] Monterey Institute for Research in Astronomy, [6] Department of Physics and Astronomy, University of California, Los Angles.

Introduction

The Wide-field Infrared Survey Explorer (WISE) is launching in mid-December and will start imaging the entire sky in early January 2010. WISE has hundred of times greater sensitivities in its four mid-infrared bandpasses (3.4, 4.7, 12 and 22μm) than previous surveys [1]. During its 9 month mission WISE is expected to detect over a thousand Near-Earth Objects (NEOs) of which half will be new, provide mid-infrared observations of $\sim$ 100,000 Main Belt Asteroids (MBAs) and several thousand Jovian Trojans, as well as hundreds of comets, Centaurs and other outer Solar System objects [2].

The NEOWISE project is funded by the planetary division of NASA and tasked with finding the previously unknown objects and pass these tracks (time-tagged positions) to the Minor Planet Center for publication. We employ state of the art association algorithms to create associations of individual detections into longer tracks that are potential objects moving on the sky [3]. A combination of automatic filtering routines and manual checking is used to distinguish real moving objects from chance associations of noise or other sources.

We will present the preliminary detection statistics of moving objects from the first two months of WISE scan operations and discuss such topics as survey efficiency, pipeline reliability and orbit determination accuracy. A overview of the automatic pipeline for generation and vetting of tracks is given in the related paper [4].

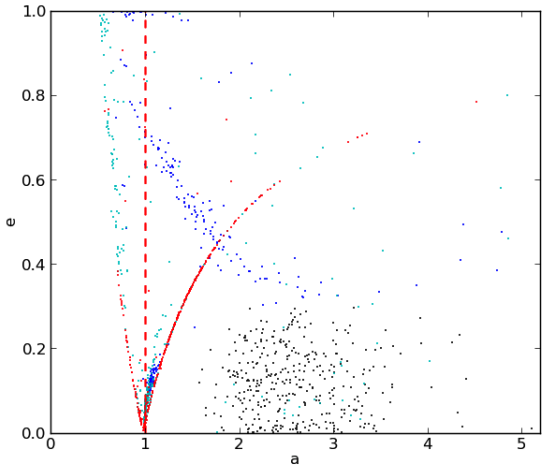

Figure 1: A number of false tracks (red and cyan) and real tracks (black and blue) were run through initial orbit determination software and shown are the resulting semi-major axis vs. eccentricity. These tests help determine filtering routines used to select which objects that are automatically accepted or rejected and those that are flagged for manual inspection.

References

[1] A. K. et al. Mainzer. In *SPIE*, volume 6265, July 2006.
[2] R. S. et al. McMillan. In *AAS Meeting Abstracts*, volume 214, pages #217.02–+, May 2009.
[3] J. et al. Kubica. *Icarus*, 189:151–168, July 2007.
[4] J. M. et al. Bauer. In *This conference*, 2010.

Additional Information

This research was funded in part by NASA (ROSES) NEOO program. The WISE project is led by its University of California at Los Angeles Principal Investigator, Dr Ned Wright. Jet Propulsion Laboratory is managing the WISE project and provide System engineering leadership; Ball Aerospace and Technology Corporation (BATC) is providing the spacecraft, lead flight system test and support launch operations; Utah State Universitys Space Dynamics Laboratory (SDL) is providing the Payload; operations will be led by JPL with science data processing and archiving by Caltechs Infrared Processing and Analysis Center (IPAC) using NASAs TDRSS facility for commanding and data retrieval; education and public outreach is provided by the University of California at Berkeley.