

Recent Discoveries and Advances for the Near-Earth Asteroid Tracking Program with the MSSS 1.2-meter Telescope

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Topic: Astronomy

The Near-Earth Asteroid Tracking (NEAT) Program at JPL uses the Maui Space Surveillance Systems (MSSS) 1.2-meter telescope located at Haleakala, Maui to detect and monitor Near Earth Objects (NEOs). Since February, 2000 MSSS has detected over 250,000 asteroids or on the average of 7000 asteroids per 8000 degrees of coverage per month. From the start of the program to March, 2003, MSSS has discovered 87 Near Earth Asteroids (NEAs), with 16 being classified as potentially hazardous. MSSS is also responsible for 10 new comet discoveries.

Comet 2002 V1 (NEAT) was discovered 06 Nov. 2002 UT using MSSS. It was moving at 0.45 deg/day and had a visual magnitude of 17.3. The discovery, in IAU circular (IAUC #8010), was published on 06 Nov 2002. As the orbit was refined it became apparent that Comet NEAT would make a perihelion passage from an inclination of 81 degrees at a distance of 0.09930 AU on Feb 18, 2003.

The SOHO spacecraft Coronagraph managed to capture several frames of the comet as it made its closest passage from Feb 16 – Feb 19, 2003. In one frame, a solar Coronal Mass Ejection (CME) occurred. In a planar projection it appears that the CME headed toward Comet NEAT. An animation of this activity will be presented.

The MSSS telescope also detected the Mars Exploration Rover B (MER-B) spacecraft “Opportunity” and its third stage some 12 hours after launch on its way to Mars on the night of July 8, 2003.

The NEAT camera at the MSSS telescope has electronic artifacts that produce “ghosts” of bright objects in one quadrant that contaminate the field of other three quadrants of the 4080 x 4080 CCD. These ghosts can trick the asteroid detection software into identifying them as moving objects. A fast ghost detection and filtering algorithm will be briefly described that identifies and removes the ghosts before the asteroid detections are made, thus significantly decreasing the amount human intervention needed for nightly verification of discoveries.

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