

## **Spacewatch 0.9m Mosaic Camera Survey, v1.0**

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The History of Spacewatch

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SPACEWATCH® is a research group at the University of Arizona's Lunar and Planetary Laboratory founded in 1980 by Professor Tom Gehrels and Dr. Robert S. McMillan.

Spacewatch was created to explore the various populations of small objects in the solar system and study the statistics of asteroids and comets in order to investigate the dynamical evolution of the solar system. Studies included the Main-Belt, Centaur, Trojan, Comet, Trans-Neptunian, and Earth-approaching asteroid populations. Spacewatch played an important role in selecting potential targets for interplanetary spacecraft missions.

After 1998, Spacewatch focused primarily on follow-up astrometry of such targets, and monitored the positions and motions of objects that might present a hazard to the Earth. Later on, the focus was on near-Earth objects (NEOs), especially Potentially Hazardous Asteroids (PHAs) and Virtual Impactors (VIs). Spacewatch also focused on Yarkovsky effect candidates, NEOs observed by spacecraft, potential spacecraft destinations, and potential targets of planetary radar.

Spacewatch primarily used Steward Observatory's 0.9-m telescope and the Lunar and Planetary Laboratory's Spacewatch II 1.8-m telescope. Their observatory codes at the Minor Planet Center (MPC) are 691 and 291 respectively. Spacewatch was the exclusive user of these telescopes on Kitt Peak in the Tohono O'odham Nation, Arizona.

Notable highlights from Spacewatch's history include being the first to:

- use Charge-Coupled Device (CCD) scanning routinely in astronomy
- use CCDs to survey the sky for comets and asteroids
- do astrometry on an asteroid with a CCD (1984 JZ (3325)) on 1984 Apr 28
- do targeted astrometry of a near-Earth asteroid (1982 TB (3200) Phaethon) on 1984 Sep 22
- discover asteroids with a CCD
- discover a Near-Earth Asteroid (NEA; 1989 UP (496816)) with a CCD on 1989 Oct 27
- develop automated real-time software for moving object detection in astronomy
- discover a NEA (1990 SS (11885)) with software on 1990 Sep 25
- discover a comet (125P/1991 R2) with a CCD on 1991 Sep 8
- automatically discover a comet (C/1992 J1) on 1992 May 1
- discover the C or S type asteroid 1995 CR, which at the time of discovery, 1995 Feb 3, had the closest known approach to the Sun (0.120AU)
- identify the small NEA and distant Centaur populations
- discover 1998 KY26, which at the time of discovery, 1998 May 28, had the fastest known rotation and was the most accessible asteroid
- led the community in follow-up recoveries of NEO discoveries by the Wide-field Infrared Survey Explorer (WISE) spacecraft during its cryogenic phase

In addition, Spacewatch discovered the large Trans-Neptunian object (TNO) 2000 WR106 (20000) Varuna, one of the few known main belt comets P/2005 U1 (Read), and the close Earth-approaching PHA 2005 YU55.