

Scanning the skies for NEOs

Pan-STARRS initial findings to be presented at AMOS Conference

It's still in the calibration process, but the prototype Pan-STARRS telescope and its massive 1.4-billion pixel digital camera already have detected about 100 known asteroids and two Near-Earth Objects.

Findings utilizing the Moving Object Processing System devised by the University of Hawaii research team operating the prototype, PS1, will be among the presentations at the 10th annual Advanced Maui Optical and Space Surveillance Technologies Conference, more commonly referred to as the AMOS Conference, being held on Maui in September.

"We believe that when PS1 performs as advertised that we will discover many thousands more NEOs that are larger than 140 to 200 meters in diameter," said Dr. Robert Jedicke, MOPS lead scientist with the University of Hawaii's Institute for Astronomy.

Haleakala is providing the site to prove the technology for Pan-STARRS, the Panoramic Survey Telescope & Rapid Response System. The complete project involving four telescopes systems is planned for Mauna Kea.

Developed by the IfA, Pan-STARRS eventually will deploy four 1.8-meter mirrors, each linked to 1.4 billion pixel digital cameras to capture the faint light from smaller – 100 meter – asteroids.

The goal is to find and characterize Near-Earth Objects – space rocks or comets that appear to be approaching and might pose a threat to Earth. The images to be produced by the wide-field imaging system will be of use for other scientific research projects.

When operational possibly by September, Jedicke said PS1 is expected to increase the number of NEO sightings exponentially. NASA's Near Earth Object Program lists 6,227 NEOs detected and identified by the array of observatories involved in scanning space since 1995, including the Lincoln Near-Earth Asteroid Research project and the Catalina Sky Survey.

"Pan-STARRS will find more just by itself. This has important implications for truly understanding the NEO population," Jedicke said.

Pan-STARRS and MOPS were designed to provide data for further analysis of search patterns and sensitivity of past searches.

"The calibrated Pan-STARRS survey will thus provide much more information than just simply tallying numbers. It will allow us to make predictions about the overall population that we do 'not' detect," he said. The system will cover a wider area of the sky faster with MOPS able to move directly from detection of an object to prediction of its orbit.

The AMOS Conference presentation, "Asteroid Detection with the Pan-STARRS Moving Object Processing System," will be among the astronomy research projects scheduled for an afternoon session on Sept. 4.

In addition to Jedicke, the MOPS team includes Nick Kaiser, Pan-STARRS principal investigator; Ken Chambers, PS1 director; Will Burgett, Pan-STARRS program manager; Larry Denneau, MOPS senior software engineer and Mikael Granvik, MOPS post-doc.

In addition to the initial discoveries of asteroids and comets by PS1, the presentation will cover MOPS's design and the simulations that lead Jedicke to predict that PS1 will locate and identify more objects than have been discovered since asteroids were first recognized 200 years ago.

Other presentations will cover the design and development of Pan-STARRS and its camera, its image processing capabilities and the calibration process that IfA expects will provide previously unachievable levels of photometric accuracy.

There is more to AMOS than presenting what IfA expects to accomplish, Jedicke added. He said input from other astronomers involved in NEO tracking will be invaluable to the Pan-STARRS program.

"Pan-STARRS and MOPS appreciate the support, interest and opportunity to speak with and interact with the AMOS attendees," he said. "There are always some colleagues in attendance who provide new perspectives on the problems we are trying to solve."

For more on Pan-STARRS: pan-starrs.ifa.hawaii.edu/public/

The 2009 AMOS Conference is a gathering of specialists in astronomy, imaging and optical systems providing updates on ongoing research and discoveries in space situational awareness.

It will be held Sept. 1 through 4 at the Wailea Beach Marriott Resort, presented by the Maui Economic Development Board.

"In a lot of cases, this is THE forum for scientists to discuss their research activities, since it's difficult to have them all together in the same place," said Co-chairman Wes Freiwald. "It's very important for researchers to understand what other researchers have done just for the simple reason of avoiding duplication, but also to leverage findings and to collaborate on and to advance research activities."

A featured subject for the 2009 conference is the Iridium-Cosmos Collision, the crash of a nonoperational Cosmos 2251 satellite into an Iridium communications satellite at 490 miles altitude over Siberia on Feb. 11.

Freiwald is president of Pacific Defense Solutions. He is AMOS co-chairman with Paul Kervin, chief scientist with the Air Force Research Laboratory's Maui Space Surveillance System.

For more on AMOS: www.amostech.com/