George R. Wallace, Jr. Astrophysical Observatory

Located in Westford, Massachusetts, the George R. Wallace, Jr. Astrophysical Observatory is MIT's local astronomical observatory for both research and teaching. During FY2007, postdoctoral associate Michael J. Person (1992, SM 2001, PhD 2006) joined the staff. Observatory specialist and engineer Stephen Slivan (1984, SM 1986, 1989, PhD 1995) and postdoctoral associate Susan D. Kern (PhD 2006) left the staff.

Facilities

The primary research instrument at Wallace Astrophysical Observatory (WAO) is a 24-inch Cassegrain reflecting telescope housed in the main dome. A subsidiary dome houses a 16-inch reflecting telescope, and a four-bay shed with a roll-off roof houses three Celestron 14-inch reflecting telescopes and a computer-controlled Celestron 11-inch telescope. Several additional portable telescopes are available for special use, including a classic Alvin Clark 5-inch refractor. Further infrastructure on site includes an electronics shop, machine shop, computer facilities for data analysis and storage with high-speed Internet service, an office, and a service area for use by observers.

With the design work completed the previous year for the new charge-coupled device (CCD) camera for the 24-inch telescope, in this past year several major parts were fabricated by Folkers Rojas (2008), including the filter wheel (which accommodates six filters) and the vacuum dewar that contains the cooled CCD. With only the electronics work remaining, the camera is expected to be ready for tests on the telescope in fall 2007. When operational, this camera will allow MIT observers to become familiar with the operation of the Magellan Instant Camera (MagIC) before observing trips to Las Campanas Observatory in Chile and will provide WAO with a modern research-grade camera for continuing studies of Pluto, Triton, the Kuiper Belt, and extrasolar planets. Mr. Rojas, assisted by Claudio Di Leo (2010) and Jeffrey Bonde (2010), designed and constructed a four-port instrument rotator that will allow rapid exchange of the camera with other instruments on the telescope.

A complete electronics system for a Portable Occultation, Eclipse, and Transit Systems (POETS) camera—a high-speed CCD camera with photon-counting capability built by Professor James Elliot's group—was installed in the 24-inch dome and control room so that POETS can be easily used on that telescope. A new server, with a RAID system for data storage and to provide an offsite backup of data used on campus, was acquired. The fiber optics internet connection between WAO and Haystack Observatory was replaced with new fibers.

In the four-bay shed, a Software Bisque Paramount ME robotic telescope mount was installed for Telescope 4 by Michael Star (2007). This upgrade will allow remote operation of the telescope by students on campus and will facilitate the collection of a greater volume of data by students in astronomy classes, using a mix of campus and observatory laboratory sessions. It is planned to similarly upgrade Telescope 3 in time for remote use of both telescopes by fall 2007 classes.

Research and Academic Work

Dr. Amanda Gulbis carried out observations to characterize and calibrate a POETS camera in the photon-counting mode, and Samuel Cole (2007) observed some near-Earth asteroids for his senior project under the supervision of Professor Richard Binzel.

Eight MIT students in the fall 2006 class 8.287J/12.410J Observational Techniques of Optical Astronomy used the observatory under the supervision of Professor James Elliot and graduate students Robyn Sanderson and Elisabeth Adams. Fifteen MIT students in the spring 2007 class 12.409 Hands-on Astronomy: Observing Stars and Planets used both the 24-inch and the shed telescopes under Professor Maria Zuber, Dr. Gulbis, and Dr. Stephen Slivan. A student in the 12.616 Occultations, Eclipses, and Transits class, taught by Professor Elliot, used the 24-inch telescope and POETS for a lunar occultation project. In addition, the observatory staff offered a tour to MIT students and staff during the Independent Activities Period.

James L. Elliot
Director
Professor of Planetary Astronomy

More information about the George R. Wallace, Jr. Astrophysical Observatory can be found at http://web.mit.edu/wallace/.