



NEWS! From the NAVAL OBSERVATORY

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U.S. Naval Observatory Press Release

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FOR IMMEDIATE RELEASE

USNO's Newest Telescope is Operational

The U.S. Naval Observatory's Robotic Astrometric Telescope (URAT) has achieved successful "Initial Operational Capability" at the Naval Observatory Flagstaff Station (NOFS) in Arizona

The Observatory's newest telescope is actually derived from two existing USNO instruments. The mounting for the 1970's-vintage 24-inch Cassegrain reflecting telescope in Washington was heavily modified for autonomous operation, and a special moving counterweight mechanism was fabricated by the USNO Instrument Shop to compensate for the boil-off of liquid nitrogen used to cool the camera detectors during an observing session. A new optical tube assembly was built around the old 8-inch "red lens" (which mapped the sky between 1998 and 2004 from Cerro Tololo and the Naval Observatory Flagstaff Station, producing the USNO CCD Astrograph Catalog, or UCAC) and the 300-pound "4-shooter" camera.

The "4-shooter" camera consists of an array of four monolithic STA1600 Charge-Coupled Device (CCD) imagers, each of which is 95 by 95 millimeters (3.75 x 3.75 inches) or 10560 by 10560 pixels, and covers about 2.65 by 2.65 degrees of the sky. Manufactured by Semiconductor Technology Associates, Inc., the STA1600 CCD is currently the largest monolithic CCD in the world. Together, the four CCD's cover about 28 square degrees of the sky in a single full frame. A single raw frame produces about 1 gigabyte of data (2-byte integers per pixel). Three 2000 x 5000 pixel guide CCD's share the focal plane with the large chips, all of which are cooled to minus 80°C by a Dewar container filled with liquid nitrogen.

After three successful nights of testing at USNO in Washington in late August, 2011, including one that was jolted by the East Coast earthquake, the telescope was shipped to NOFS where it was installed in a dome specially modified for autonomous operation. It saw "first light" at NOFS on September 26, 2011, and began regular observations on April 24, 2012.

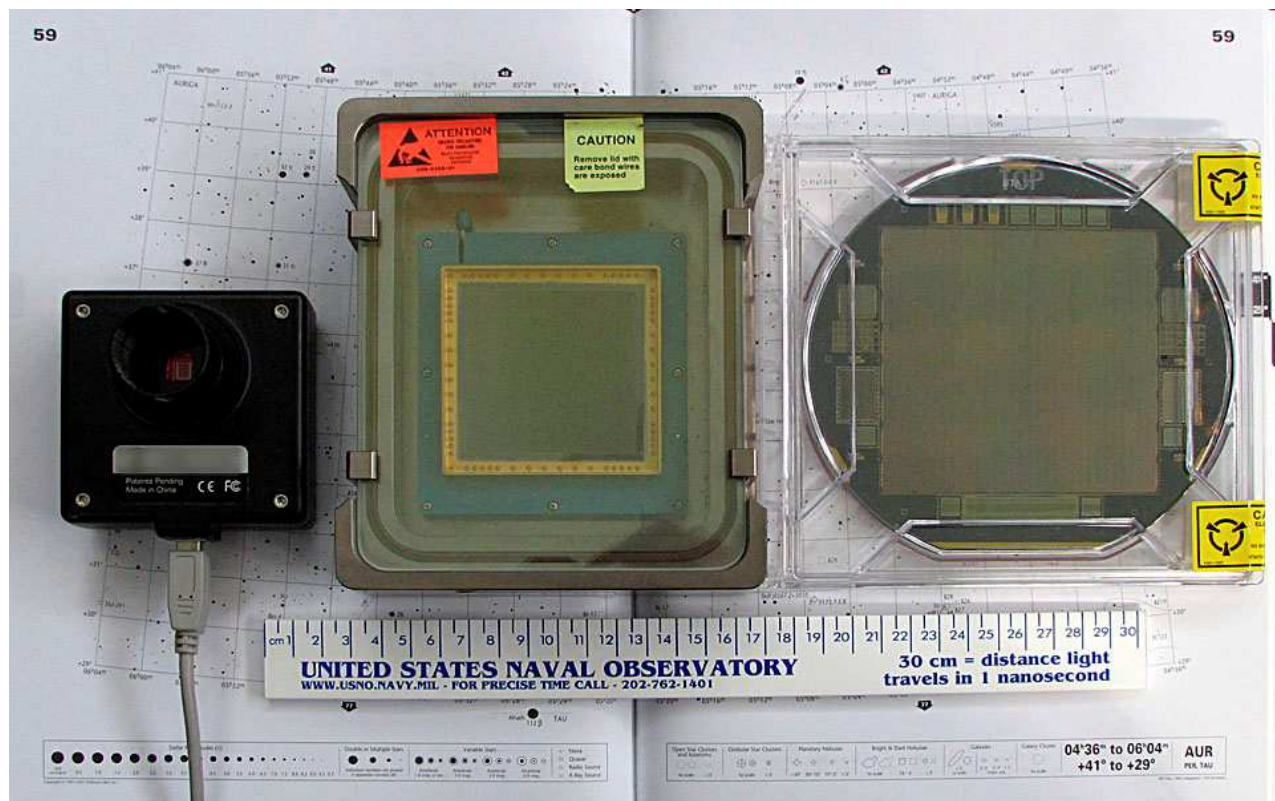
URAT will image the northern hemisphere sky from NOFS over the course of two to three years before being sent to the Cerro Tololo Inter-American Observatory (CTIO) in Chile to image the southern sky. Typical exposure times of three to four minutes will record stars to a limiting red-light magnitude of 17.5 (about 40,000 times fainter than the faintest stars visible to the unaided eye). Shorter exposures, taken on nights around Full Moon, will record brighter stars in the 3 to 13 magnitude range.

The star catalog produced by URAT will be the most complete and precise Earth-based astrometric catalog ever compiled for up to 400 million stars of red magnitude range 3.0 to 17.5. Position accuracies of 10 to 15 milliarcseconds as well as proper motion and parallax data will be obtained from images made with the telescope. URAT is designed to be run autonomously at both of its observing sites. The only human “interaction” with the telescope will be periodic replenishment of liquid nitrogen for the Dewar and replacement of the two-terabyte hard disk drives every week or two as data is collected.

Further details, images and periodic progress reports on the URAT program may be found on the Web at <http://www.usno.navy.mil/USNO/astrometry/optical-IR-prod/urat>.



**The URAT telescope undergoing testing in Building 39 at USNO in Washington, DC on August 30, 2011. Former USNO employee Ted Rafferty is seated center-left, N3AD24 Astronomer Charlie Finch is at the far right.
U.S. Naval Observatory Photo courtesy of Richard Schmidt.**



The URAT “4-shooter” camera uses a mosaic of four of the STA1600 10K x 10k 111-megapixel CCDs shown on the right in the above image. For comparison, a 4k x 4k array is shown at center, while a “low-end” amateur astronomer’s 510 x 492-pixel CCD camera is on the left.