

Discovery Channel Telescope - Fact Sheet 2014

About Discovery Channel Telescope: The Discovery Channel Telescope (DCT) – owned & operated by Lowell Observatory in Flagstaff, Arizona – is among the most technically sophisticated ground-based telescopes of its size. The 5th largest telescope in the continental United States, it is located at a dark sky site in the Coconino National Forest, approximately 45 miles SSE of Flagstaff. The project began in partnership with Discovery Communications and has since grown to include several research universities. Construction and commissioning of the telescope and infrastructure cost approximately \$53 million. The telescope is currently progressing from the commissioning phase to regular science observations. It has significantly augmented Lowell’s observational capability and will enable state-of-the-art studies in a number of important research areas.

Technical Capabilities: The telescope is designed to accommodate four different optical configurations: Ritchey-Chrétien (RC), prime focus, Nasmyth, and bent Cassegrain. Currently only the RC configuration is used, in which starlight reflects off the primary and secondary mirrors and comes to a focus near the bottom of the telescope. An instrument cube is mounted at the RC focus, permitting up to 5 instruments to be individually selected by means of fold mirrors in the cube. A high-resolution optical camera is currently installed on the cube, and optical and infrared spectrometers will soon be mounted. The DCT can also be equipped with a wide-field camera at the prime focus near the top of the telescope, and with provision for very large stationary instruments or small special purpose instruments at the intermediate Nasmyth foci and bent Cassegrain foci, respectively.

Research: The telescope will initially be applied to a wide and evolving range of research topics. Initially these will include a survey of the composition of Kuiper Belt objects orbiting the sun beyond Neptune, studies of the physical properties of comets, investigations of the evolution and structure of small galaxies, plus studies of the masses of stars, to name a few. Visit [DCT Science](#) for more detailed descriptions of specific projects of the DCT.

Timeline:

- 2003 - Lowell Observatory and Discovery Communications form a partnership to build the Discovery Channel Telescope.
- 2004 - A special use permit for construction and operation of the telescope at the Happy Jack site is received and improvement of an existing road to the site begins.
- 2005 - Construction of the telescope enclosure and an auxiliary support building begins; the primary mirror blank is completed by Corning.
- 2009 - Final figuring and polishing of the mirror by the University of Arizona’s College of Optical Sciences is finished.
- 2010 - The telescope mount, built by General Dynamics SATCOM Technologies, is installed in the dome.
- 2012 – First light is accomplished on time!
- 2013 - Telescope commissioning is well underway. All permanent hardware and software systems are in place; testing and refinement are ongoing. First published science results are released.
- 2014 – In addition to the [Large Monolithic Imager](#), two new instruments will soon be installed on the instrument cube: [NIHTS](#) – Near Infrared High Throughput Spectrograph; and

the [Deveny Spectrograph](#). Both these devices split starlight up into component wavelengths, in the same way a prism splits sunlight into individual colors. This enables a number of interesting measurements: velocity, rotation, component elements and molecules, etc.

Project Manager: Bill DeGroff

DCT Facts:

- 4.28-meter clear aperture, 100mm-thick, actively supported primary mirror.
- Primary mirror weight – 6700 lbs.
- Maximum slew rate - 1.8°/sec
- Multiple configurations: Ritchey-Chrétien, Prime Focus, Nasmyth Focus, bent Cassegrain.
- 73 foot tall, 62-foot diameter metal telescope building.
- Located at 7760-foot elevation on the edge of the Mogollon Rim at a site offering outstanding image quality and dark skies.

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