

## PROJECT HIGHLIGHTS

### SEVENTH PRIMARY MIRROR CASTING

In early September, the University of Arizona Richard F. Caris Mirror Lab staff placed nearly 20 tons of glass into a recently constructed mirror mold for the Giant Magellan Telescope's seventh primary mirror. Marking a major milestone, the furnace reached high fire on October 7th. The mirror is now cooling over the next few months before moving into the polishing stage. [Read more about the casting.](#)

### SUPPORT SYSTEM PROTOTYPE TILT TEST

At the University of Arizona Tech Park, the M1 subsystem (M1S) team has been preparing for a Tilt Test of the primary mirror support system prototype to determine the performance of the support system (including the mirror simulator). In October, the prototype was successfully tilted at an angle of 13.5 degrees and will now move on to performance testing.

### FIRST ADAPTIVE SECONDARY MIRROR

Progress continues in the manufacturing of key elements of the telescope's first Adaptive Secondary Mirror (ASM). The Zerodur Thin Shell fabrication has included polishing and testing of the concave optical surface with thinning operations underway. The Reference Body manufacturing has been completed and the monolithic Zerodur blank has been CNC machined to produce the lightweight, pocketed, structure, as well as the front aspheric surface and the 675 Voice Coil Motor actuator holes.

In parallel with the Thin Shell and Reference Body work, manufacturing, and integration activities for the first ASM segment are ongoing. The calibration and testing of the hexapod positioner actuators are complete, in addition to the construction and inspection of the ASM main structural components.

### HIGH CONTRAST AO TESTBED (HCAT) RUNS

Two testbed runs were recently conducted. After completing the acquisition of interaction matrices on the deformable mirror and the Piston/Tip/Tilt (PTT) array, a series of control tests were conducted using the Pyramid Wavefront Sensor (PWFS) to measure performance of the control of high order modes excluding the segment piston. Subsequently, the real time control loop ran, merging the PWFS and Holographic Dispersed Fringe Sensor (HDFS) sensors to simultaneously control both 1500 high order modes and the low order segment piston modes.

The successful test was the first demonstration that the telescope's phasing strategy for NGAO mode is sound and served as a validation of the Natural Guide Star Wavefront Sensor Prototype's (NGWS-p) unique design, operating two wavefront sensors simultaneously.



[Seventh primary mirror casting promotional video featuring exclusive footage of the glass placement.](#) Video Credit: Giant Magellan Telescope - GMTO Corporation



The 9th Annual Community Science Meeting took place September 6 – 8 in Washington, D.C. As our largest group of participants to date, the GMTO Corporation thanks all involved in contributing to a successful meeting. In case you missed it, [view the photo gallery of meeting activities here.](#)

Fitting with the topic of exoplanets, the GMTO Corporation released a blog post in parallel on the telescope's capabilities in [Searching for Life Beyond Earth](#). The blog includes an interview with Dr. Andrew Szentgyorgyi from the Harvard Smithsonian Center for Astrophysics scientist and [engaging video](#). Image Credit: Damien Jemison, Giant Magellan Telescope - GMTO Corporation

## NSF AWARD

The US Extremely Large Telescope Program (US-ELTP) received \$15.3 million from the National Science Foundation (NSF) to support further design and development of advanced optical technologies and user services, including \$6.5 million to advance construction of the Giant Magellan Telescope. [Read more about the award.](#)

