

The Advanced Technology Solar Telescope and NSO

Jim Ulvestad
Craig Foltz
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The ATST Science Case

ATST's relevance re-affirmed by recent NRC Solar and Space Physics and Astronomy & Astrophysics Decadal Surveys.

- The Sun's atmosphere is highly dynamic. This dynamic nature is driven by interplay of turbulent convection and magnetic fields, the origin, interaction, and annihilation of which we do not understand.
- Changes in the solar magnetic field produce solar flares, coronal mass ejections, and variations in the solar wind, the manifestations of space weather. *Space weather has potentially profound impacts on human society*
- ATST will probe the magnetic fields at all levels of the solar atmosphere down to equilibrium length scales (20-30 km). No other facility, existing or planned, ground- or space-based, can do this.



ATST Milestones

- Final Design Review established project baseline May 2009
- Awards totaling \$298M authorized (NSB-09-57) August 6, 2009
- Federal environmental compliance completed December 2, 2009
- Construction funding (ARRA & MREFC) awarded January 2010
- Anticipated access to Haleakala site June 2010
- Conservation District Use Permit granted by BLNR December 2, 2010
- CDUP challenged by *Kilakila o Haleakala* December 3, 2010
- Contested case hearing July 2011
- Final arguments presented to BLNR September 14, 2012
- BLNR issues final decision affirming the CDUP November 9, 2012
- Access to site December 1, 2012

Total delay of ~29 months.



Ramifications and Next Steps

- 2009 project baseline is no longer valid. Progress measured against original resource-loaded schedule shows large negative variances.
- The delay has cost implications and additional budgetary complexity arises due to coupling of delays with the expiration of ARRA funds.
- Project de-scopes have been implemented. Further de-scopes would have significant impact on performance.
- New baseline – i.e., cost, schedule, and risk – was reviewed by an expert panel October 16-18.
 - Panel issued a generally positive report – strong PM, safety program, requirements tracking, etc., but noted some deficiencies in the new baseline: insufficient schedule contingency, inconsistencies in methodology for contingency determination.
 - Project is acting on review recommendations. Final review report expected in Mid-March.
- AST will bring the new baseline to the NSF Director and NSB for discussion this spring and summer.



Current Status

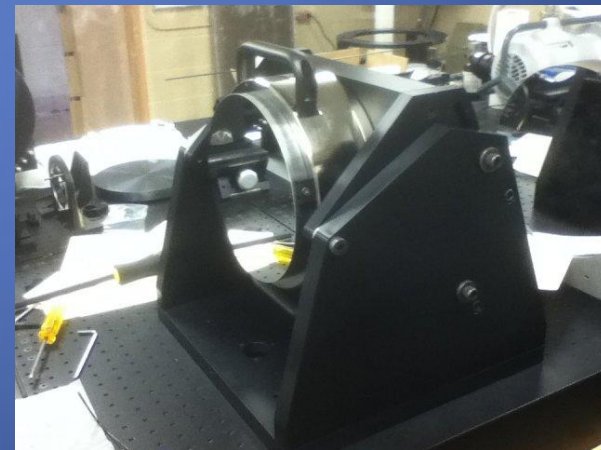
- Fabrication of the Telescope Mount Assembly is ongoing at Ingersoll Machine Tool, Rockport, IL.
- Fabrication of the Enclosure is ongoing at AEC-Idom (Spain).
- Final M1 blank in fabrication at Schott.
- On Haleakala:
 - Major excavation is complete. Concrete pouring has begun.
 - Infrastructure improvements (utility conduits, power improvements) nearly complete.
 - Endangered species (Hawaiian Petrel) habitat conservation programs in their second year. Installation of ungulate fence awaits permit from the Board on Land and Natural Resources.
 - Mountain activities are slightly ahead of schedule.
- Current schedule has completion in mid-2019, budget permitting.



Foundation preparation for the enclosure factory assembly work in the Tallares Hilfa factory in Basauri, Spain. Image courtesy of AEC-Idom, January 2013.



The ATST[±] primary mirror commissioning blank, fully exposed, on its support structure being examined by technical staff from Large Optics Shop at the College of Optical Sciences, University of Arizona.



The spare M5[±] Silicon Carbide mirror mounted to the tip tilt module and its adjustable platform (that will eventually mount to the top of the tower on ATST[±]).



NSO Status

- Current cooperative agreement (CA) will be extended through FY 2014.
- Renewal CA will not be competed. Renewal proposal will be submitted after budget guidance is provided by NSF, after release of the President's Budget Request.
 - Possible NSO move to Boulder will be considered as part of this renewal proposal.
- Search for a new NSO Director is nearing completion (AURA activity).
- NSO is actively seeking operators for the McMath/Pierce telescope and potential future occupants of the Sac Peak site.



MPS/AST Portfolio Review

- Because budget outlook is much below assumptions of all decadal surveys, the MPS Directorate empaneled an AST Portfolio Review Committee in 2011
 - 2 of 17 members have significant solar physics expertise
 - Report delivered in August 2012
- Main NSO-related recommendations
 - Continued high priority for ATST; Dunn Solar Telescope to remain open until two years before ATST reaches operational state
 - Divestment of McMath-Pierce, which was already planned
 - AST should spend no more than \$2M/yr on synoptic program (GONG and SOLIS); seek partners for remaining cost or else divest completely.
- Divestment decisions not yet made for recommended lower priority AST facilities (including other radio and night-time optical telescopes), but all have been encouraged to seek partnerships and/or explore lower-cost operations models.