



NSF Astronomy Update

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Committee on Solar and Space Physics (CSSP)

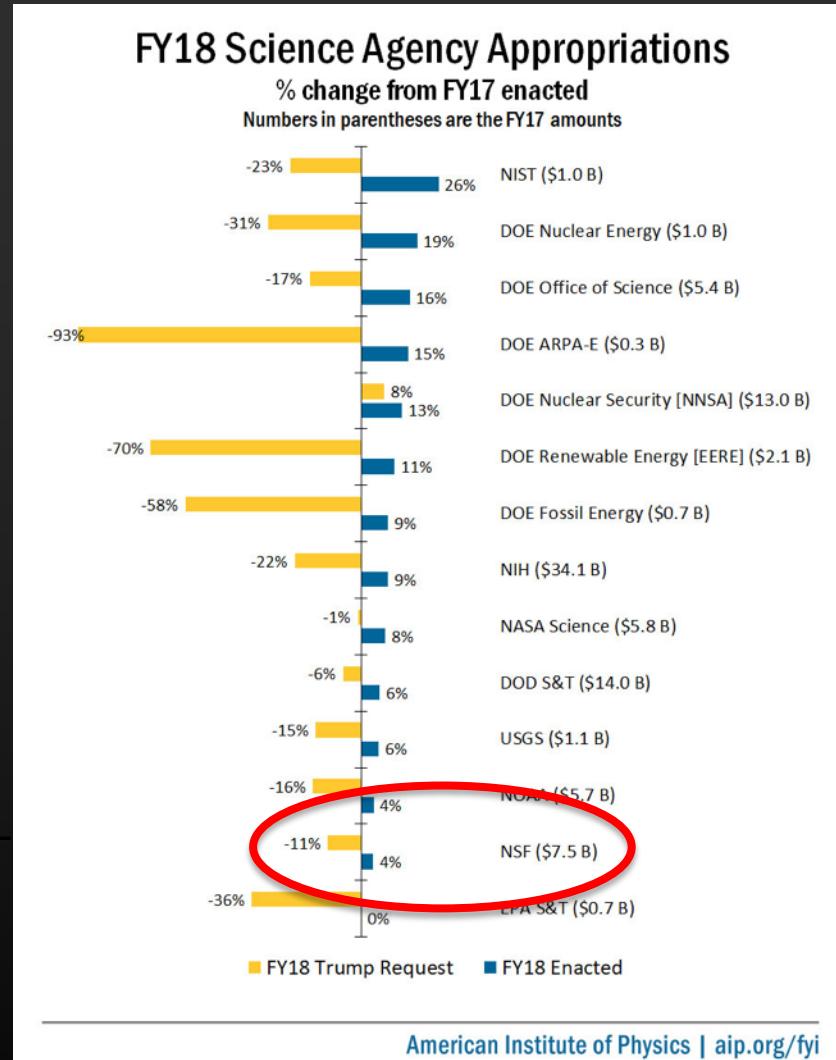
March 28, 2017



Astronomical Sciences

Consolidated Appropriations Act, 2018

- Became law **March 23, 2018**
- NSF top line **~\$7.5B**
 - up ~4%; ~\$295M
- NSF ~6% increase in R&RA
- MREFC fully funded
 - DKIST and LSST construction



2019 President's Budget Request (PBR)

- Initially, NSF budget -29.5% from FY 2017 enacted
 - Cut propagated to AST budget
- White House Budget Addendum added **\$2.2B** to FY 2019 PBR for NSF
 - NSF 2019 PBR essentially flat wrt FY 2017
- However...
 - NSF reserved **\$30M** for each of 6 Research Big Ideas
 - Process Big ideas share **\$102.5M**
 - Mid-Scale Big Idea: **\$60M**

2019 President's Budget Request (PBR)

- Impact on AST from PBR budget & Big Ideas
 - Down **-8.4%** from FY 2017 actuals
- Implications for FY 2019
 - Preserve facilities budgets
 - ATI and MSIP in alternate years
 - ATI fully funded at **\$8M** in FY 2019
 - ~11% reduction in Individual Investigator grants
- Potential to recover budget through Big Ideas

Big Ideas Where MPS/AST Can Contribute

RESEARCH IDEAS

PROCESS IDEAS

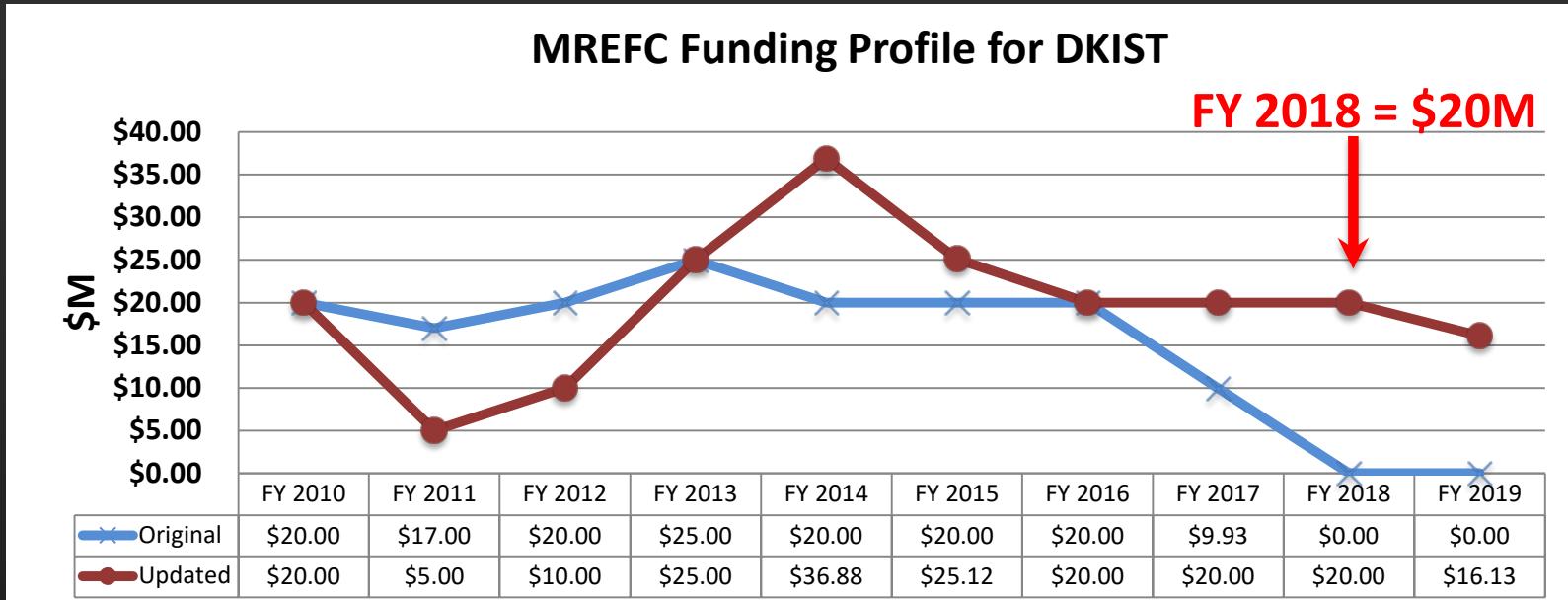
RESEARCH IDEAS

- Harnessing the Data Revolution**
Harnessing Data for 21st Century Science and Engineering
- Work at the Human-Technology Frontier: Shaping the Future**
Navigating the New Arctic
- Windows on the Universe: The Era of Multi-messenger Astrophysics**
Understanding the Rules of Life: Predicting Phenotype
- The Quantum Leap: Leading the Next Quantum Revolution**

PROCESS IDEAS

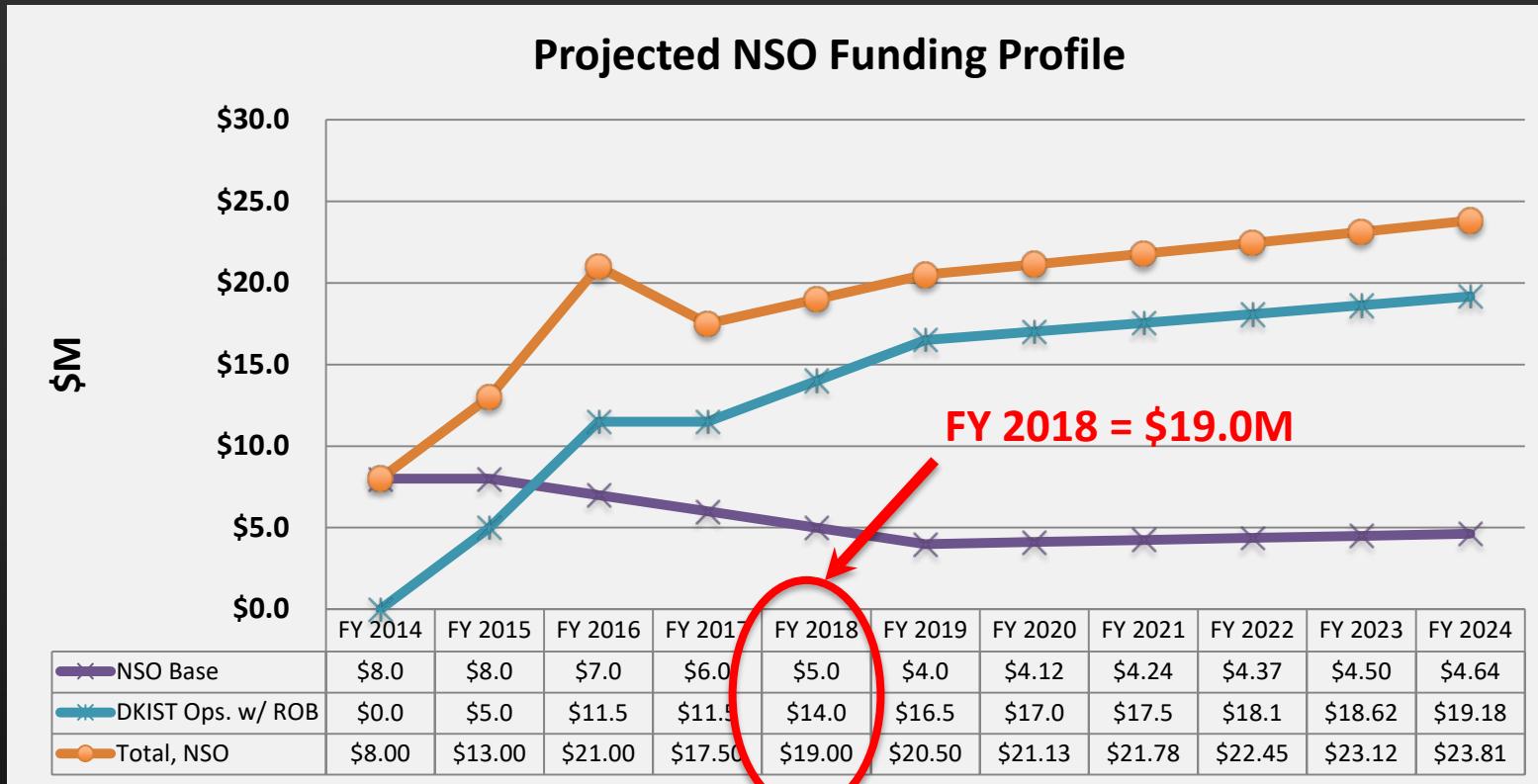
- Mid-scale Research Infrastructure**
Growing Convergent Research at NSF
- NSF 2050**
NSF INCLUDES: Enhancing STEM through Diversity and Inclusion

DKIST Construction Funding (MREFC)



- DKIST Re-baselined Total Project Cost = **\$344.13M**
- FY 2018 MREFC **\$20M** approved by NSB
 - **\$18.2M** awarded (Dec. 2018)
 - **\$1.8M** (33% of contingency amount) withheld for future allocation
- FY 2019 MREFC **\$16.1M** estimated

NSO Operations & Maintenance (R&RA)



- Total projected through FY 2024 = **\$201.84M**
- FY 2018 O&M estimated = **\$19.0M**
- **\$4.3M** awarded under CR

NSO Facilities on Sacramento Peak

- Recommended for divestment by the 2012 AST Portfolio Review
- NSF funding to NSO for Sac Peak operations projected to ramp down to the end of 2017
- Environmental Impact Statement (EIS)/Section 106 process started
 - Notice of Intent, [July 5, 2016](#)
 - Public scoping meeting, [July 21, 2016](#)
 - DEIS public meeting, [Feb. 28, 2018](#)
 - Public comments due, [Mar. 26, 2018](#)



Status: SPO Divestment

- NSF awarded a 2-year proposal from NMSU for funding to bridge the gap between NSO and consortium, **Sept. 2016**
- State of New Mexico recently awarded a \$273K grant to NMSU for 2018
- NSF continues to work with NSO and NMSU
 - NSO to operate site infrastructure
 - NMSU to lead consortium; operate Dunn Solar Telescope and Visitor Center

NSO Facilities on Kitt Peak

- Recommended for divestment by the 2012 AST Portfolio Review
- AURA/NSO released an RFP for McMath
 - July 1, 2017
 - The one proposal received was deemed to be not financially viable
 - Back-up plan could involve NOAO Visitor Center
- Vacuum (SOLIS) tower
 - FY 2017 funds awarded to AURA to investigate costs to deconstruct
 - RFP to be issued soon





NISP: GONG Status

- Oct. 2016 Executive Order continues NSWS/NSWAP efforts
- GONG plays an important role
 - \$2.5M upgrade to GONG FY 2016
 - Work continues FY 2018
 - 3rd year of NSF-NOAA Interagency Agreement
- GONG engineering site relocation to Boulder completed

FYI: The AIP Bulletin of Science Policy News

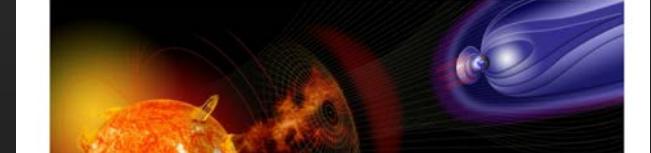
Obama Issues Executive Order to Coordinate and Spur Space Weather Preparedness

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Publication date: 19 October 2016
Number: 133

In a new executive order, President Obama has directed federal agencies and the White House to focus on national preparedness for space weather, calling it an "all-of-nation endeavor."

In an [executive order](#) issued on Oct. 13, President Obama made it official government policy to coordinate and prepare the nation for incoming space weather. The order, which calls space weather preparedness an "all-of-nation endeavor," aims to minimize the extent of economic loss and human hardship from space weather, particularly high-impact events which can be caused by [solar flares](#) or [coronal mass ejections](#) emitted from the Sun.

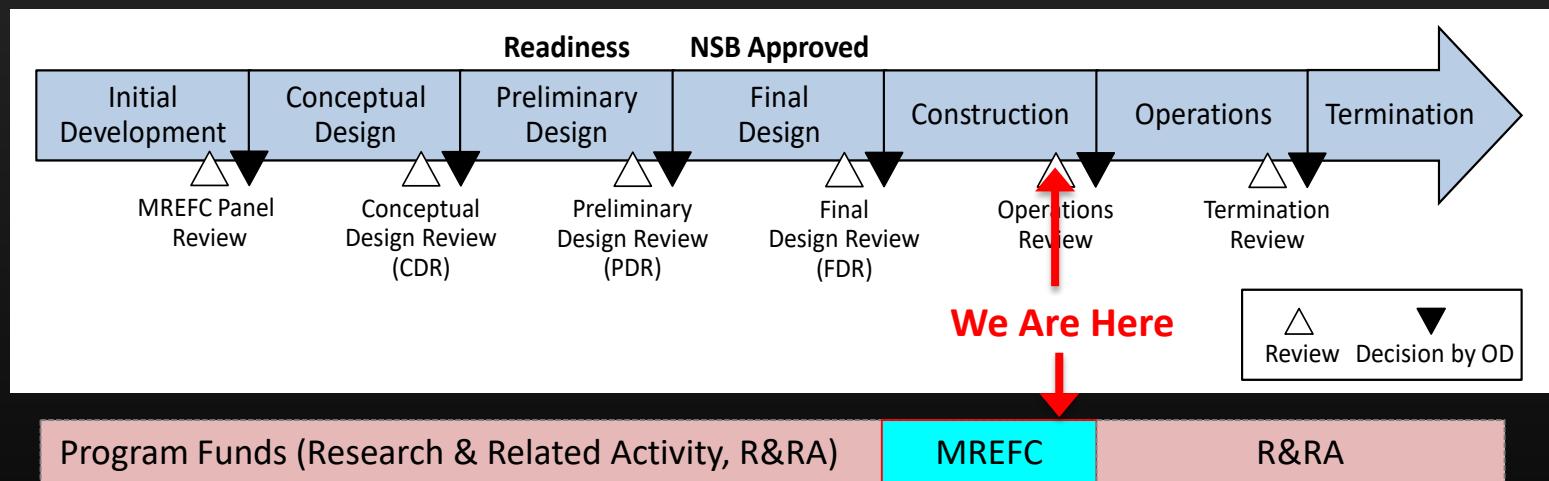


NISP: SOLIS Status

- SOLIS relocating to NJIT's BBSO near current GONG site.
- Permit received from San Bernadino County, Sept. 2017
- Telescope moved, Jan. 2018
- Installation on hold until Apr. 2018 for Bald Eagle nesting season



DKIST in the NSF Facility Lifecycle



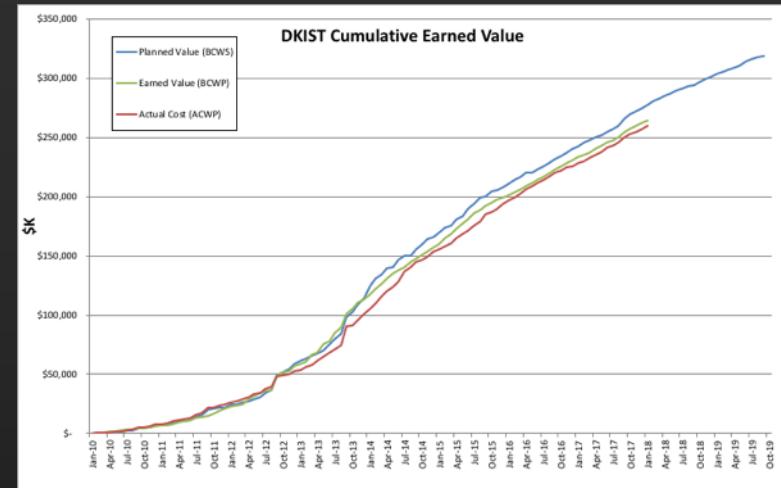
R&RA funds also support scientific research

Major Research Equipment and Facilities Construction (separate appropriation)
3/29/2018

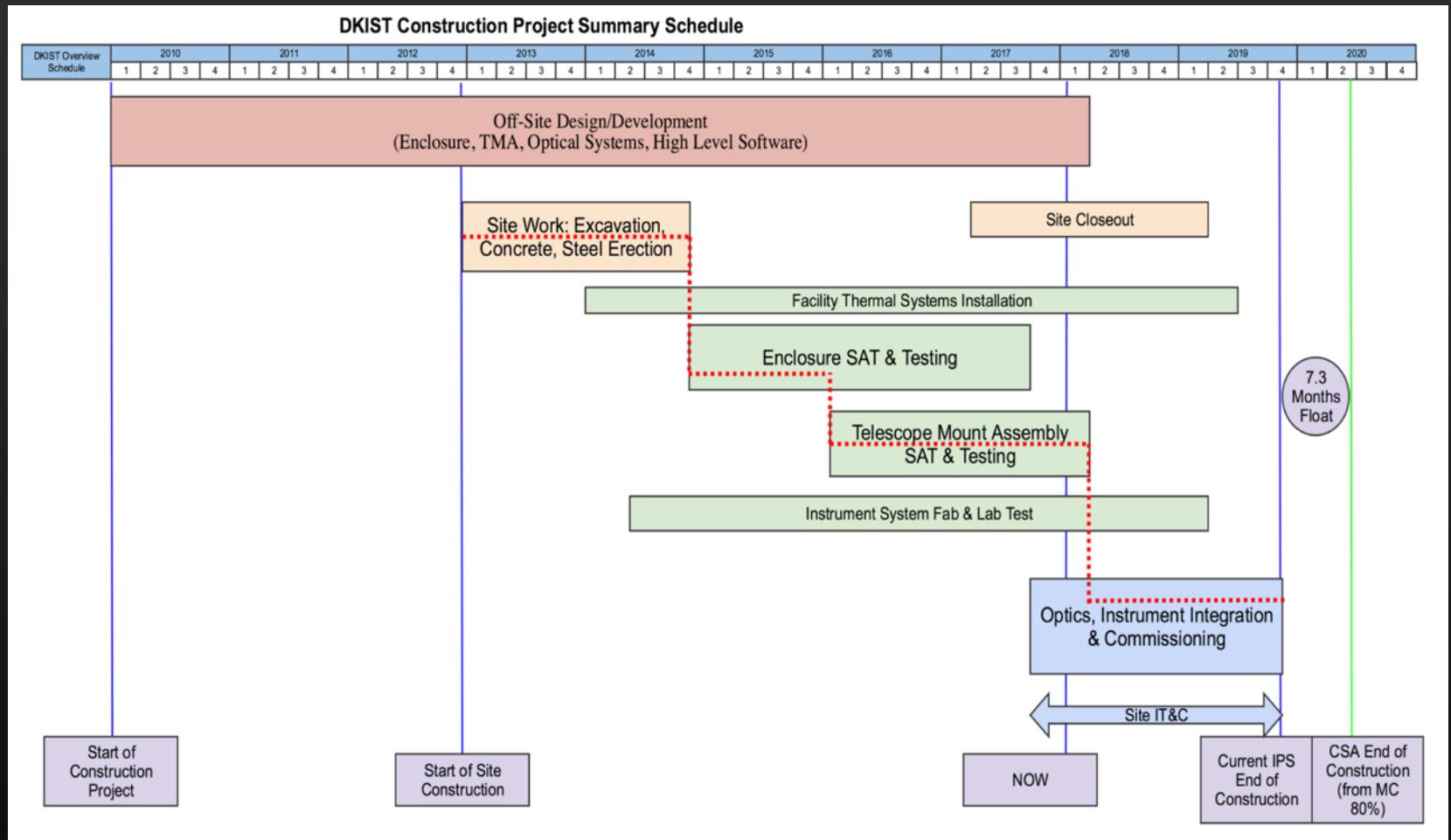
CSSP Meeting

DKIST Cost and Schedule Status (Jan. 31, 2018)

- Project **83% complete**
- Budget
 - TPC = **\$344.1M**
 - NSF Funding to date = **\$324.5M** (\$146M ARRA)
 - Actuals + Commitments = **\$278.5M**
 - Budget Contingency = **\$24.7M** (43.4% of remaining estimate to complete)
- Schedule
 - 80% MC CL end date = **June 10, 2020**
 - Current IPS end date = **Nov. 15, 2019**
 - Schedule Contingency = **6.8 months**
- Performance Indices
 - CPI = 1.02
 - SPI = 0.95



DKIST High-level Schedule

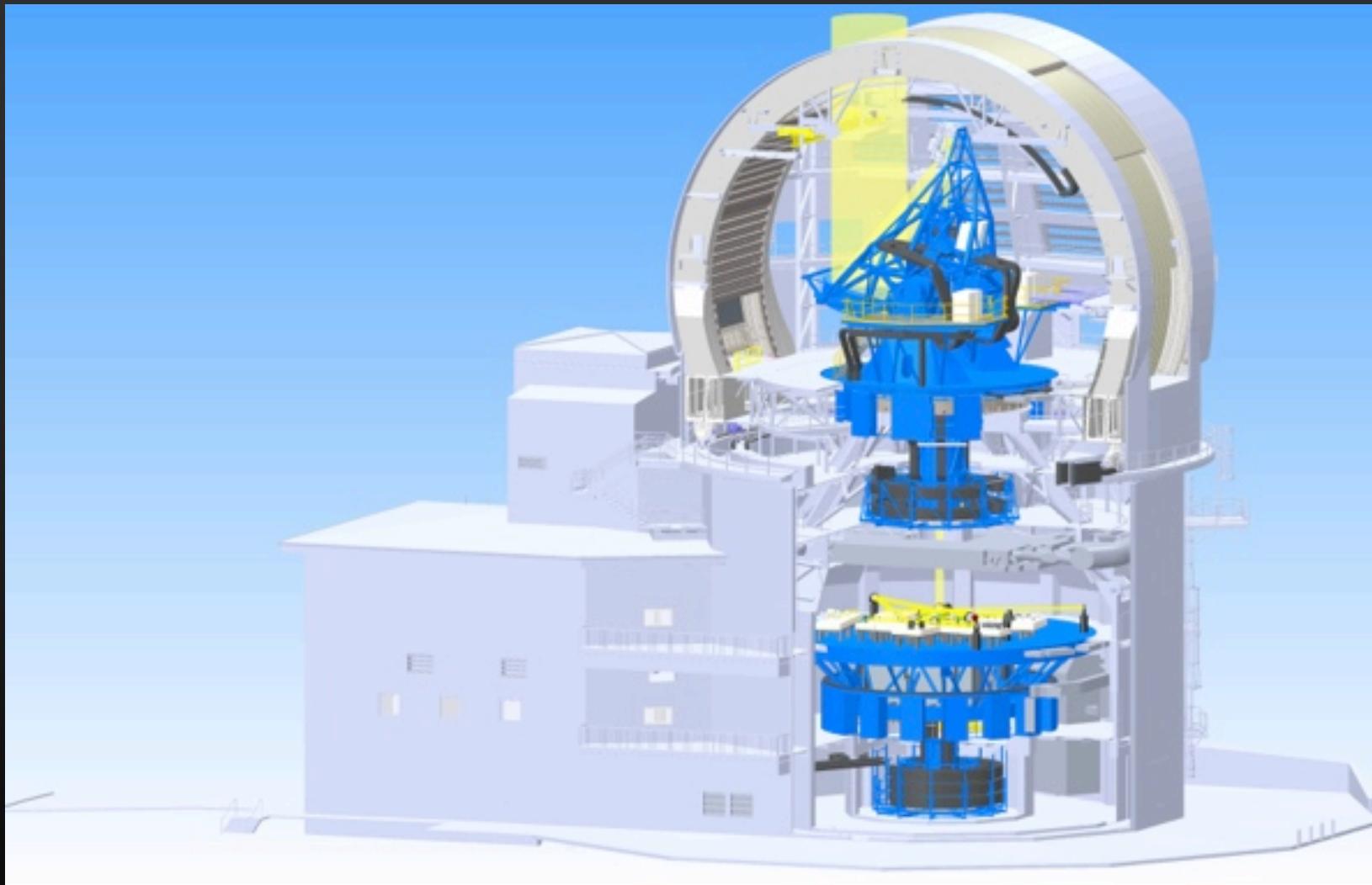


Current Construction Site

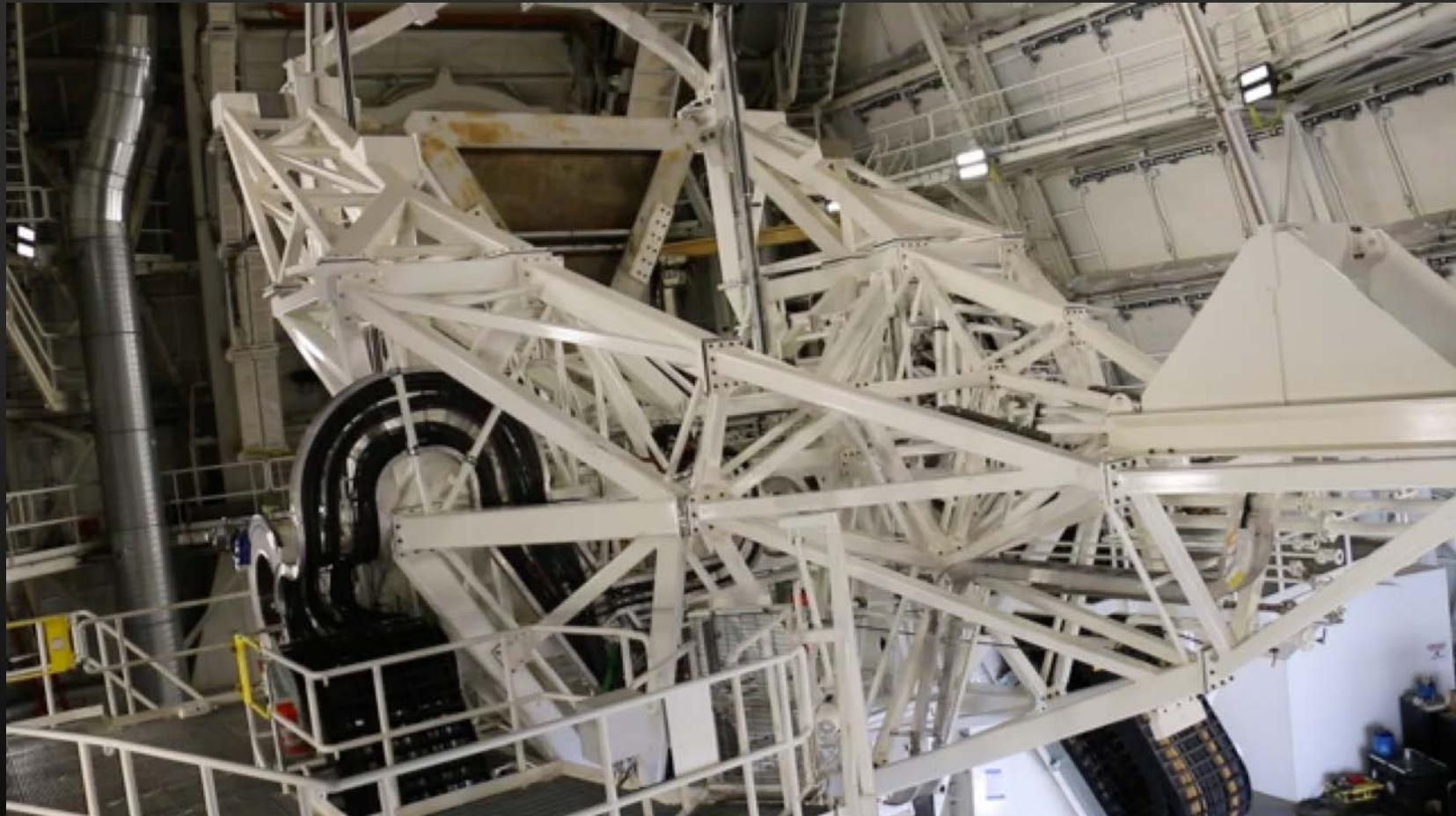
DKIST Construction Webcam 2018-03-26 15:47:11



DKIST Cutaway View



Telescope Mount, Dec. 2017



Coudé Rotator, Dec. 2017



MI, MI Cell Assembly Progress

- M1 recently moved to S&O building
- M1 Cell Assembly moved to telescope level
- M1 Cell Assembly SAT; expected completion **Apr. 2018**
- M1 coating at USAF MCF; expected **Apr. 2018**



DKIST Remote Office Building (ROB)

- Located in Pukalani, Maui, HI next to UH-IfA
- NSF approved the purchase of land by AURA (July 31, 2015)
- AURA closed on the land purchase (Aug. 21, 2015)
- Final EA and Finding of No Sig. Impact (FONSI) (Apr. 6, 2016)
- AURA issued RFP to build the ROB (June 30, 2016)
- Bids received (Sept. 6, 2016)
- Project's Selection approved by NSF (Dec. 2, 2016)
 - Contractor Arisumi Bros.
 - \$8.321M
- Construction schedule:
 - Completion: ~Apr. 2018

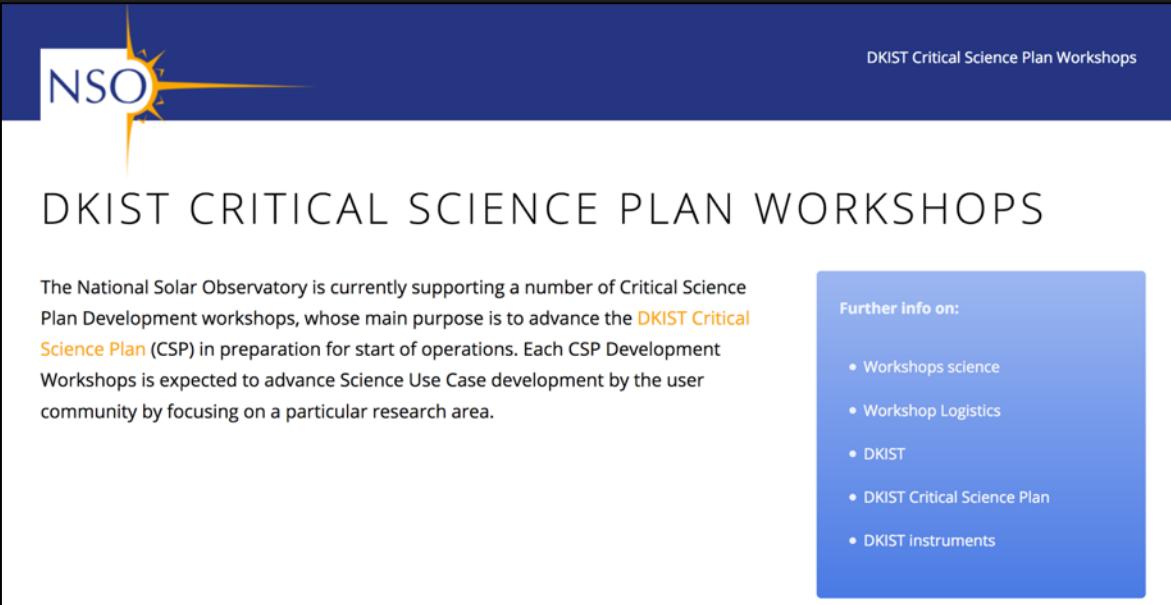


DKIST ROB Construction Progress



DKIST Critical Science Plan Workshops

- Reconnection; UAH, Huntsville, AL; Nov. 13-15, 2017
- Magnetic Connectivity; CUA, Wash. DC; Jan. 1-8, 2018
- Photospheric Mag. Fields; KIS, Germany; Jan. 16-18, 2018
- Joint PSP/SolO; JHU-APL Laurel, MD; **Mar. 13-15, 2018**
- Wave Gen. & Prop.; Newcastle upon Thyne, UK; Apr. 9-11, 2018
- Flares & Eruptive Phen.; Rice U., Houston, TX; May 15-17, 2018



The screenshot shows a dark-themed website for the DKIST Critical Science Plan Workshops. At the top, the National Solar Observatory (NSO) logo is on the left, and the text "DKIST Critical Science Plan Workshops" is on the right. The main title "DKIST CRITICAL SCIENCE PLAN WORKSHOPS" is centered below the header. A text block explains the purpose of the workshops: "The National Solar Observatory is currently supporting a number of Critical Science Plan Development workshops, whose main purpose is to advance the [DKIST Critical Science Plan](#) (CSP) in preparation for start of operations. Each CSP Development Workshops is expected to advance Science Use Case development by the user community by focusing on a particular research area." To the right, a blue sidebar titled "Further info on:" lists links to "Workshops science", "Workshop Logistics", "DKIST", "DKIST Critical Science Plan", and "DKIST instruments".

Public Outreach

- In conjunction with CSP Workshop at JHU-APL
- Public screening of documentary featuring DKIST and PSP
- Moderated by John Grunsfeld



Astronomy Decadal Survey

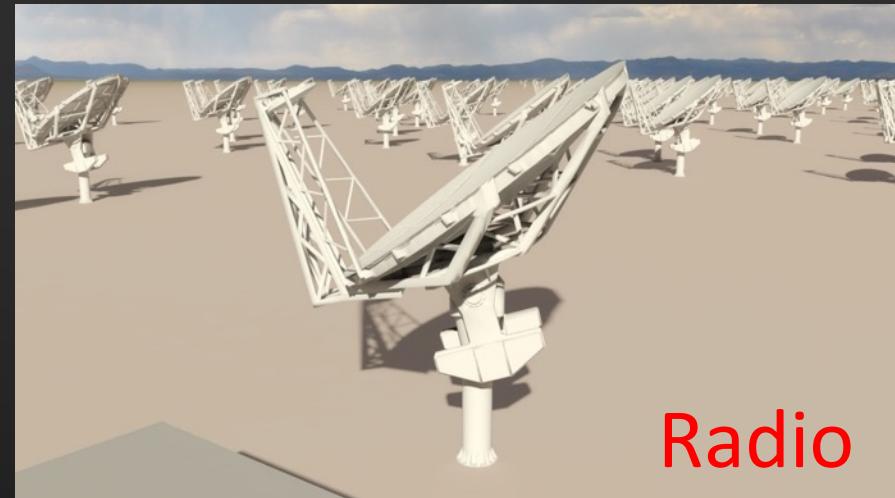
- Planning is now well underway for the next Decadal Survey
- NSF/AST and NASA Astrophysics Division are the primary sponsors of the survey
 - DOE Cosmic Frontier in the Office of Science is also a sponsor.
- Agencies provide a charge to the National Academies for implementation of the Decadal
 - Anticipate an NAS proposal this Spring
 - Proposal will be reviewed jointly on behalf of NSF/AST and NASA Astrophysics

Preparations Already Underway

OIR



Radio



CMB



Solar?

- Discussions:
 - GBOD meeting Friday
 - SPD session in May

Astronomy Decadal Survey

- We are now approaching the end of the current decade, with LSST development as a notable success.
- Other large projects in the 2010 queue will need to compete for a new prioritization in the 2020 survey.
- Reasonable expectation from recent past experience is that only the top-ranked large project will have a chance to be supported in the coming decade.
- Scheduling: Helpful for Astro2020 to finish as soon as possible so that top-ranked have opportunity to compete for early-decade MREFC funding.