



NSF Astronomy Update

Dave Boboltz (Program Officer, NSO/DKIST)

Committee on Solar and Space Physics (CSSP)

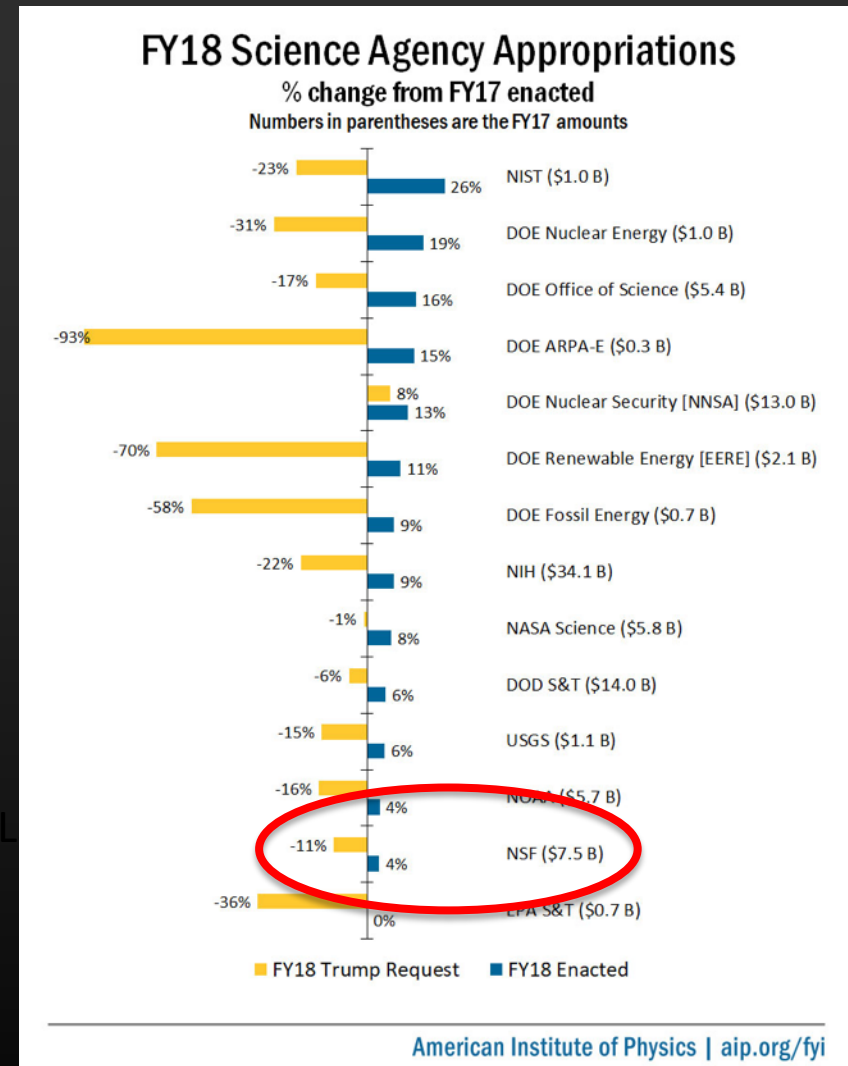
March 28, 2017



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



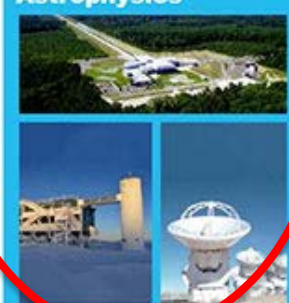
HARNESSING THE DATA REVOLUTION

Harnessing Data for 21st Century Science and Engineering

Work at the Human-Technology Frontier: Shaping the Future




Windows on the Universe: The Era of Multi-messenger Astrophysics




The Quantum Leap: Leading the Next Quantum Revolution



Understanding the Rules of Life: Predicting Phenotype





Navigating the New Arctic

PROCESS IDEAS

Mid-scale Research Infrastructure




NSF 2050



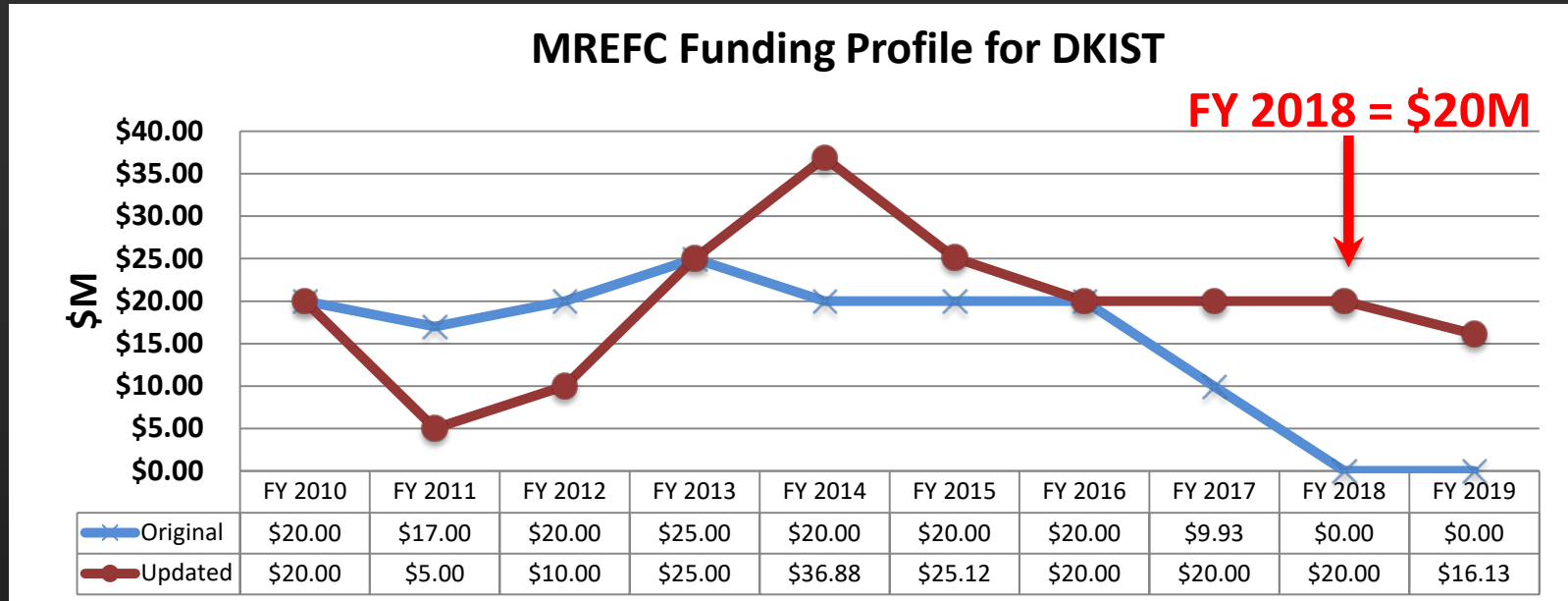


Growing Convergent Research at NSF



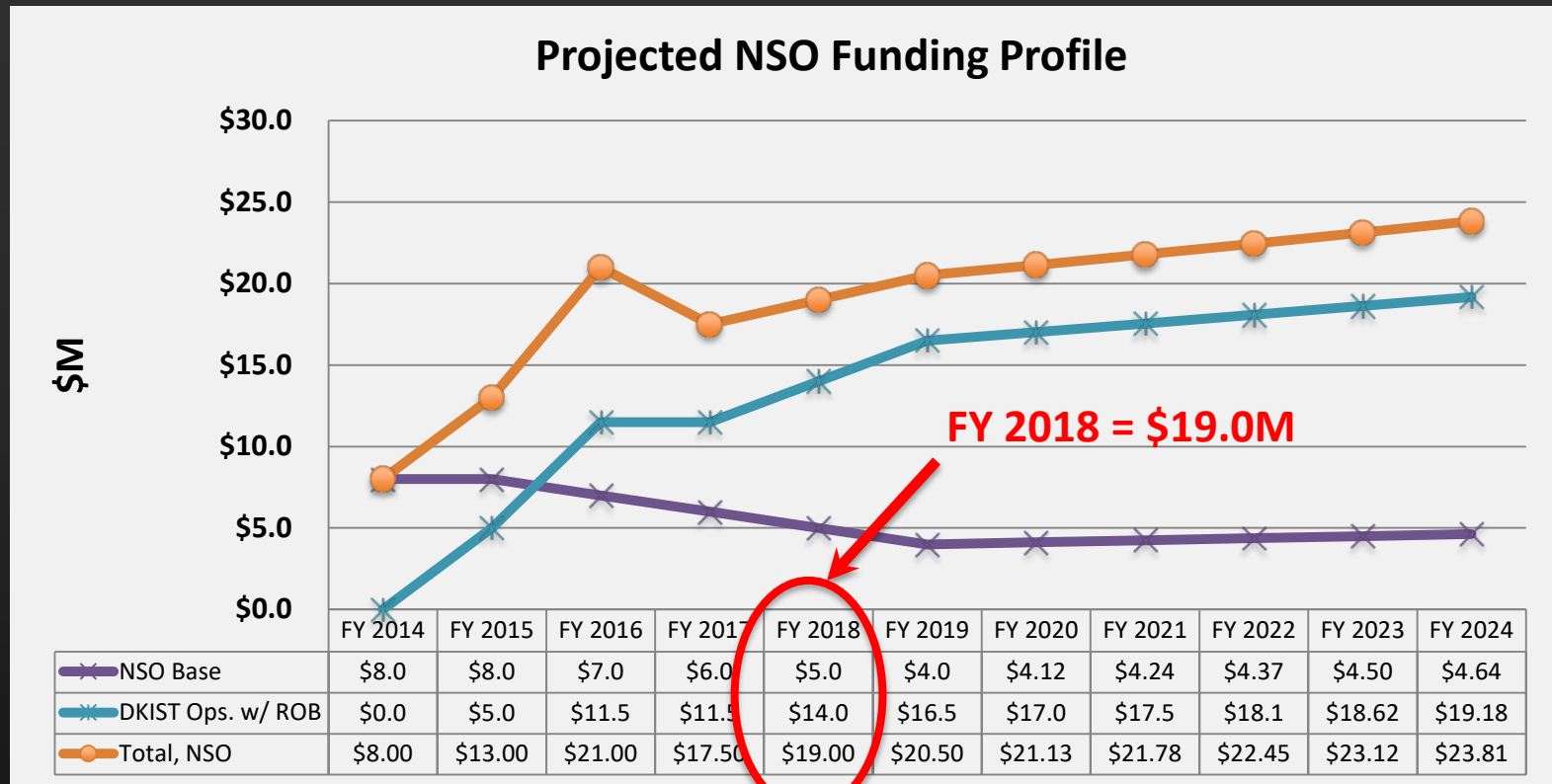
NSF INCLUDES: Enhancing STEM through Diversity and Inclusion

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

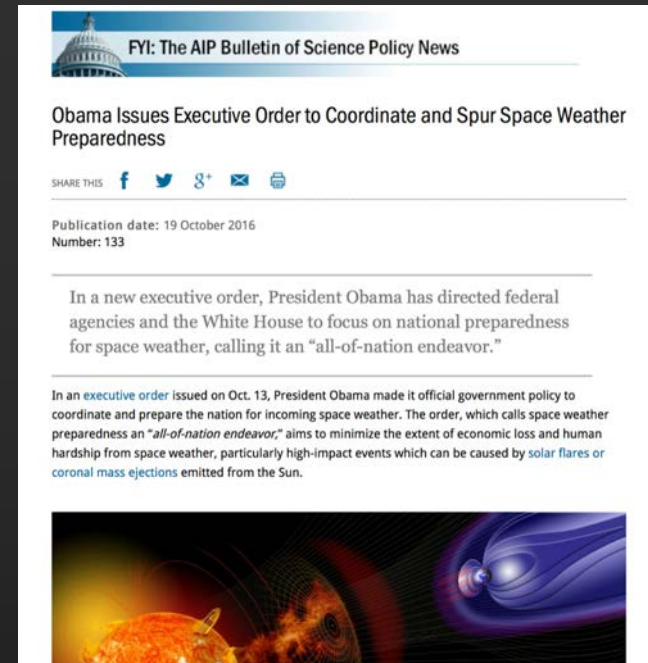
- Recommended for divestment by the 2012 AST Portfolio Review
- AURA/NSO released an RFP for McMath
 - July 1, 2017
 - The one proposal received was deemed to be not financially viable
 - Back-up plan could involve NOAO Visitor Center
- Vacuum (SOLIS) tower
 - FY 2017 funds awarded to AURA to investigate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



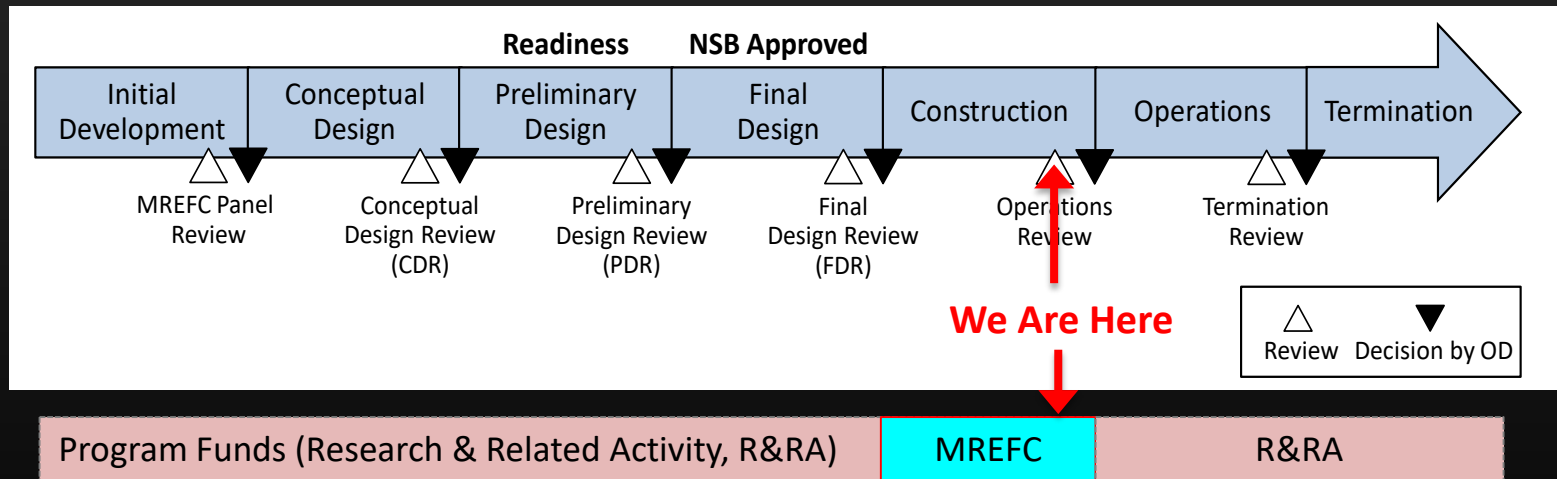


NISP: SOLIS Status

- 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



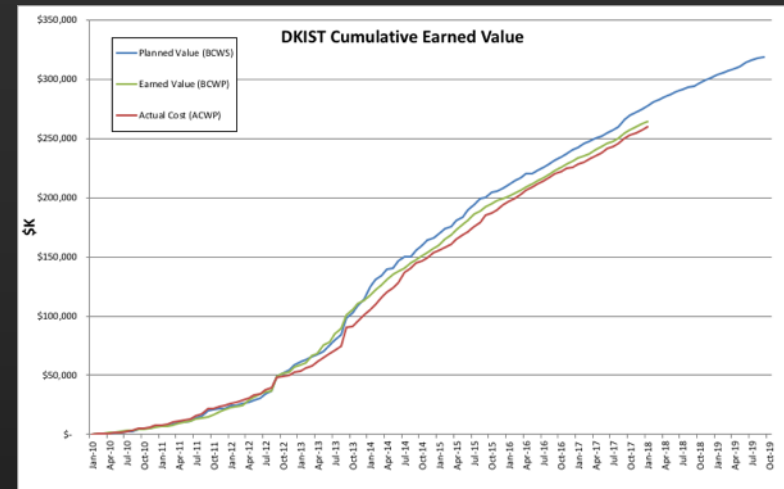
Astronomical Sciences

CSSP Meeting

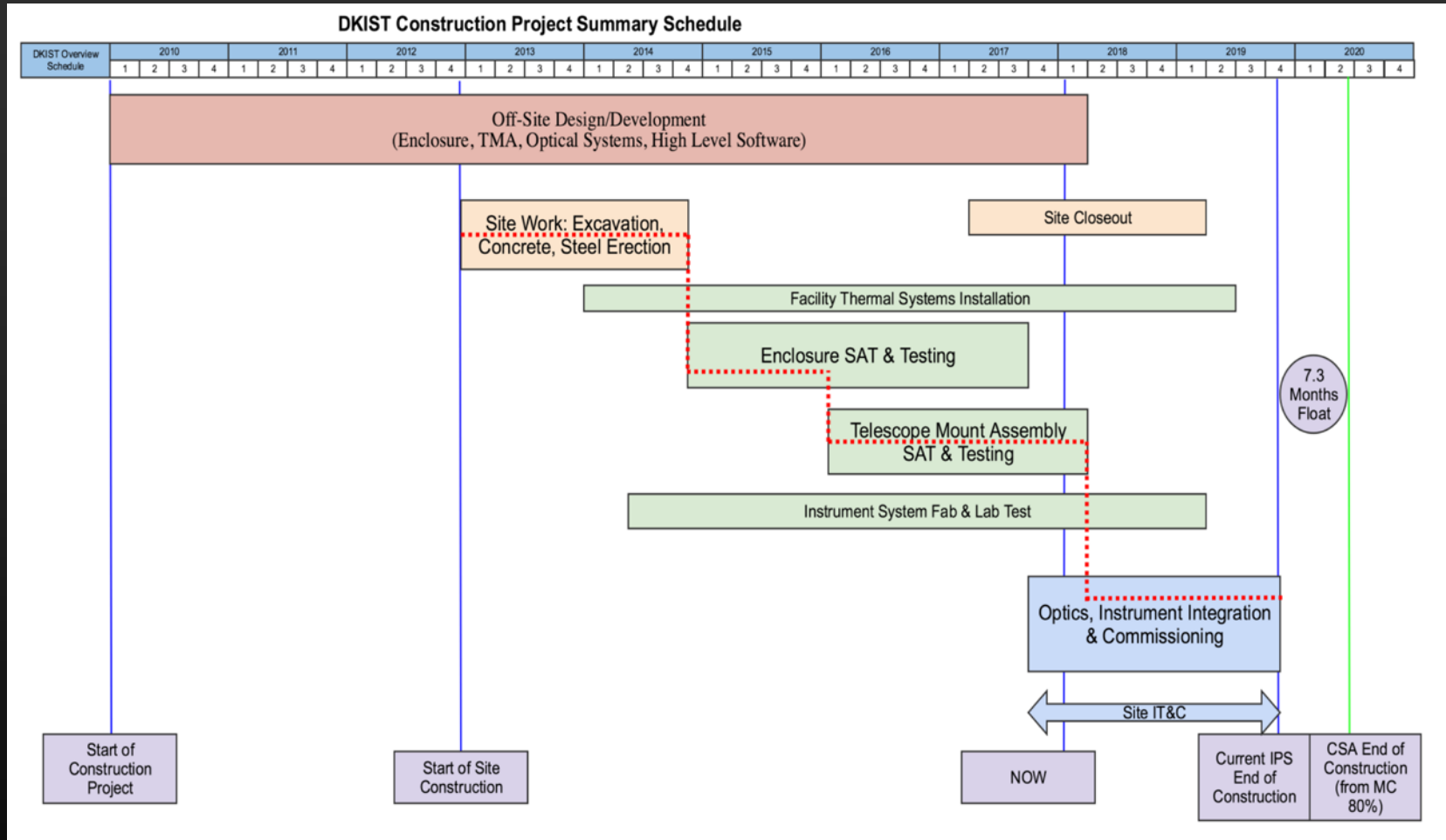
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DKIST Cost and Schedule Status (Jan. 31, 2018)

- 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

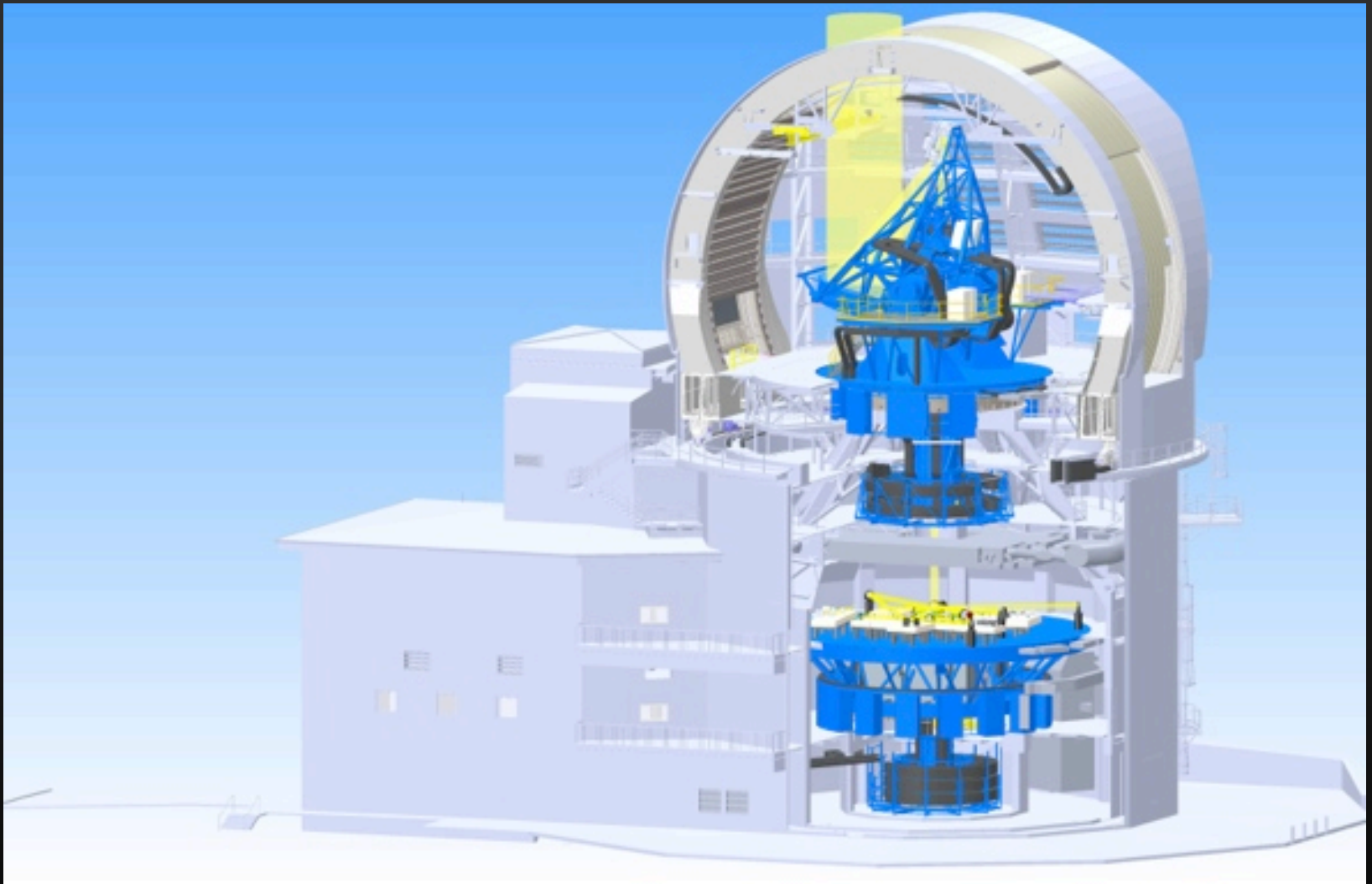


Current Construction Site

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 & Erruptive Phen.; Rice U., Houston, TX; May 15-17, 2018



DKIST Critical Science Plan Workshops

DKIST CRITICAL SCIENCE PLAN 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 Workshop is expected to advance Science Use Case development by the user community by focusing on a particular research area.

Further info on:

- Workshops science
- Workshop Logistics
- DKIST
- DKIST Critical Science Plan
- 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

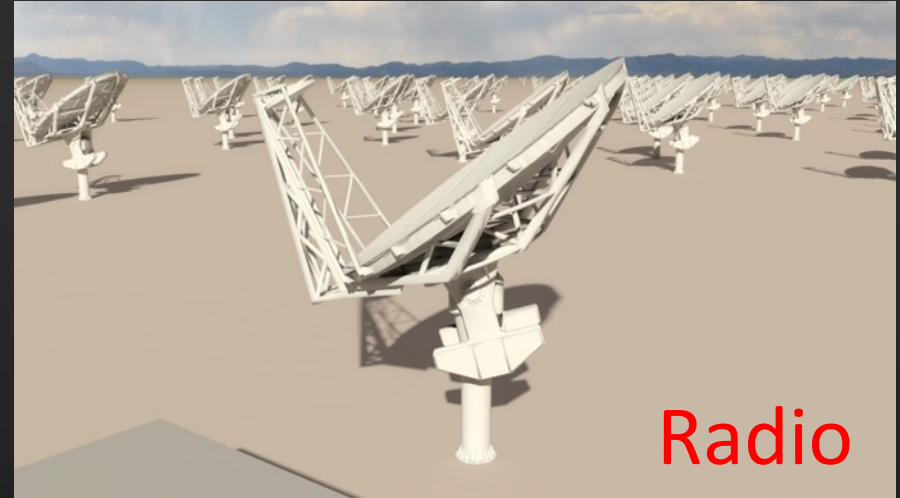
- Planning is now well underway for the next Decadal Survey
- NSF/AST and NASA Astrophysics Division are the primary sponsors of the survey
 - DOE Cosmic Frontier in the Office of Science is also a sponsor.
- Agencies provide a charge to the National Academies for implementation of the Decadal
 - Anticipate 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.