

NSF Astronomy (AST) Briefing to the Committee on Solar and Space Physics: DKIST Construction

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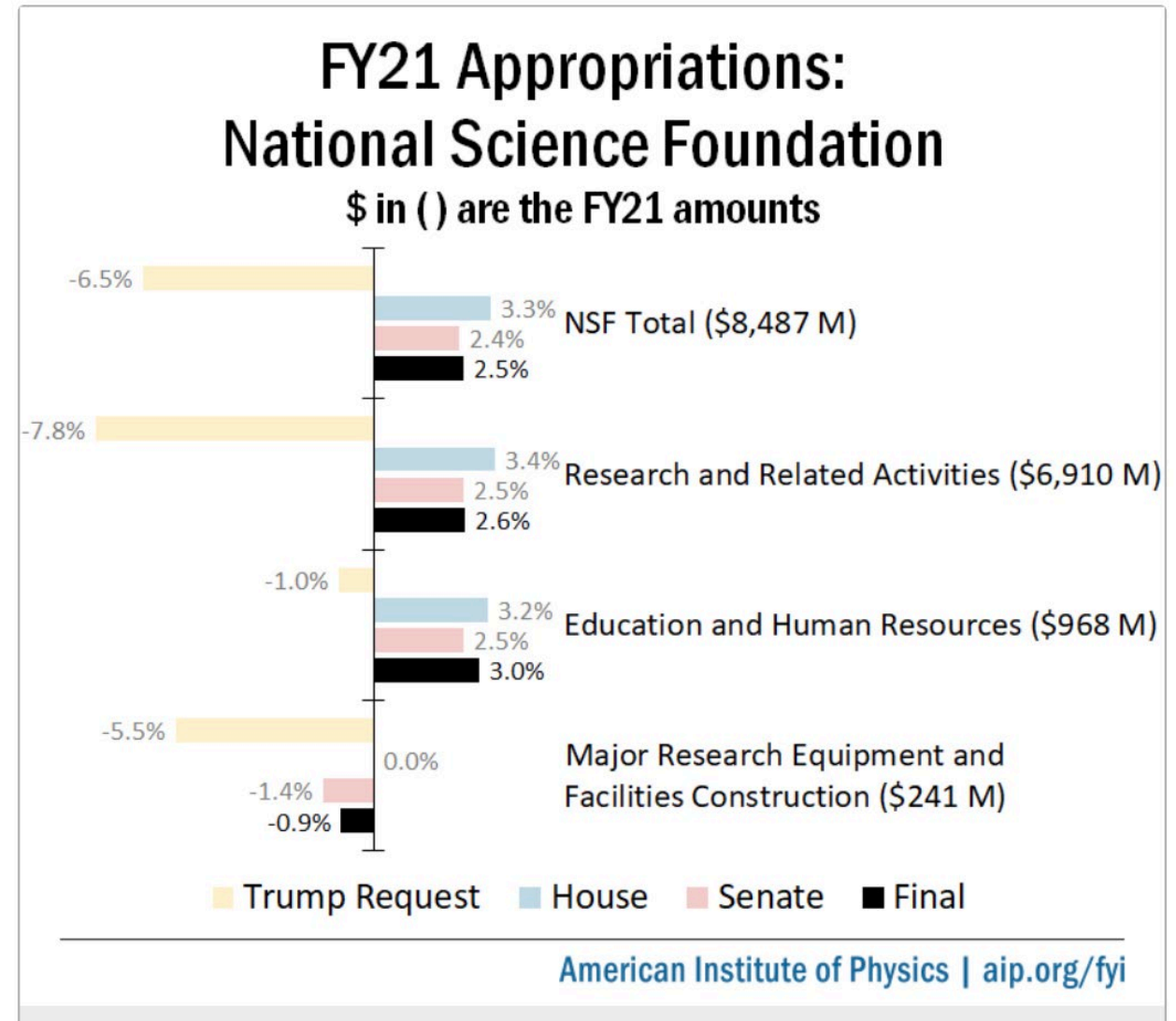
NASEM CSSP meeting

March 24, 2021



FY 2021 Appropriation

- NSF top line \$8.487B
 - up ~2.5% (\$209M) from FY20
 - At least level support for “[core research](#)”
 - Use its set of cross-disciplinary [Big Ideas](#) initiatives as a “focusing tool.”
- AST
 - Core research includes “existing observational networks and research infrastructure, including [astronomy facilities](#) ... [federally funded research and development centers](#) ...”

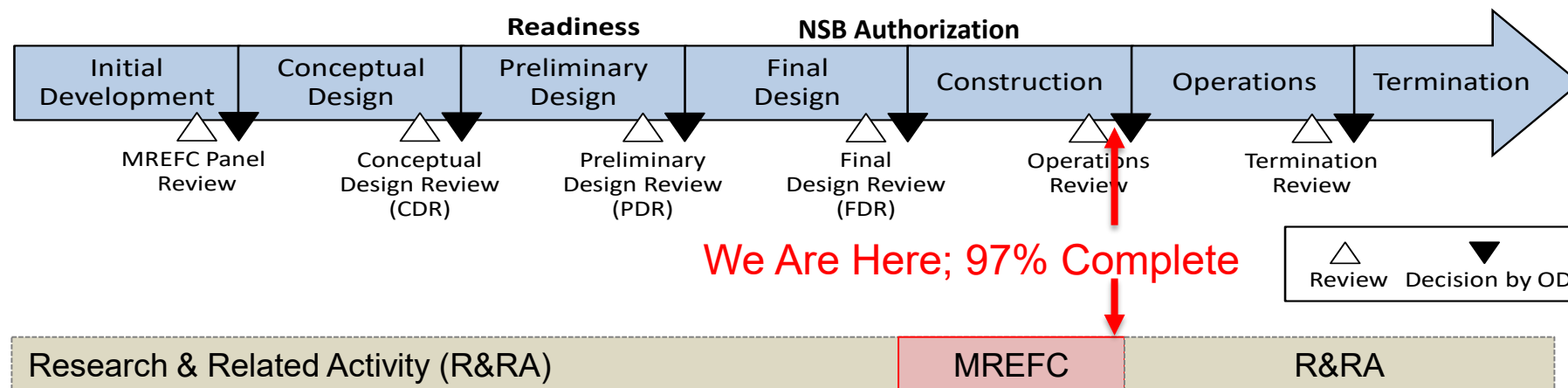


Impacts of COVID-19 on DKIST Construction

- **March 17, 2020:** DKIST site construction halted and access to the DSSC offices closed to all non-essential personnel.
- **May 29, 2020:** Restart review held. DKIST site construction approved for Phase I restart
- **June 4, 2020:** DKIST site construction restarted; ~30% efficient
- **June 22, 2020:** NSF Acting Director **authorized Management Reserve**
 - COVID-19 impacts are an **unforeseeable risk** that was realized
 - Contingency not applicable
- **July 6, 2020:** Project transitioned to a modified phase 1 (phase 1b) return-to-work that allows for two overlapping shifts of approximately 35 personnel per shift
- **October 15, 2020:** Governor of Hawaii's two-week quarantine requirement for travelers to Hawaii lifted. However, negative COVID test required within 48 hour of travel; results required upon arrival.
 - Continues to impact construction activities



DKIST in the NSF Facility Lifecycle



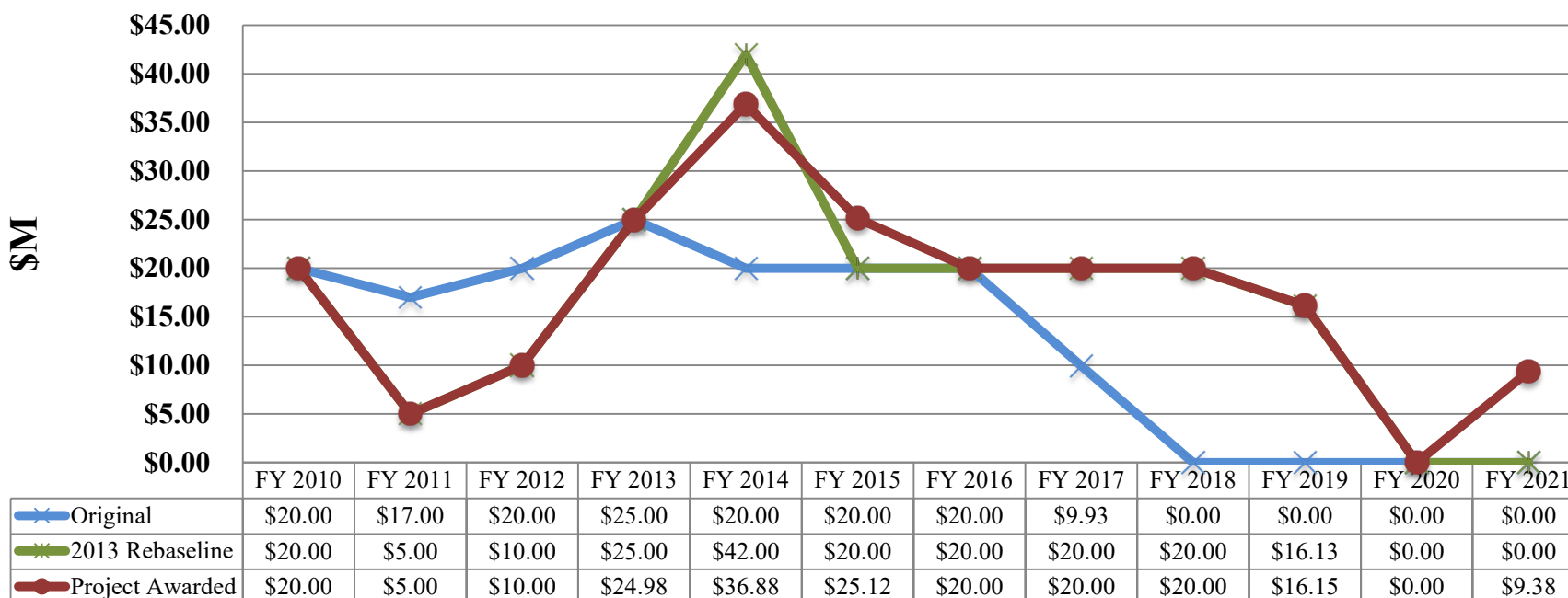
Reasons for Continued Delays due to COVID-19

- Continued Travel Restrictions (State and Organization imposed)
- Delivery Delays of Critical Construction Components
- Temporary Loss of Key Summit Construction Staff
- Permanent Loss of Key Summit Construction Staff & Inability to Recruit Replacements
- Addition of Required Maintenance Activities
- Decreased On-Site Work Efficiency



DKIST MREFC Funding Profile

MREFC Funding Profile for DKIST



- DKIST Re-baselined Total Project Cost = \$344.13M
- Total MREFC awarded thus far \$344.13M + \$9.38M
- Additional Management Reserve authorized by NSB – Feb. 2021

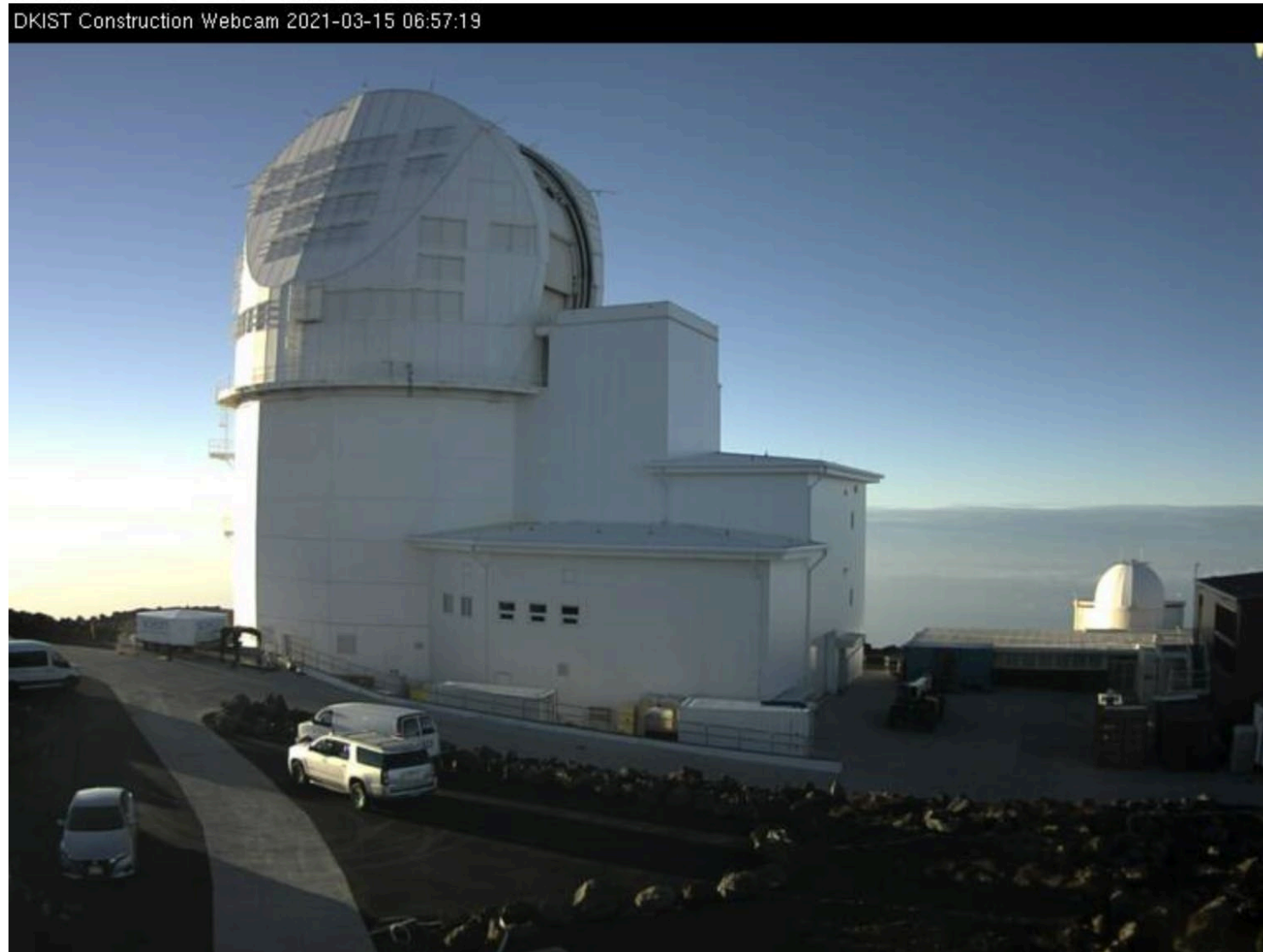


DKIST Cost and Schedule Status (as of Dec. 31, 2020)

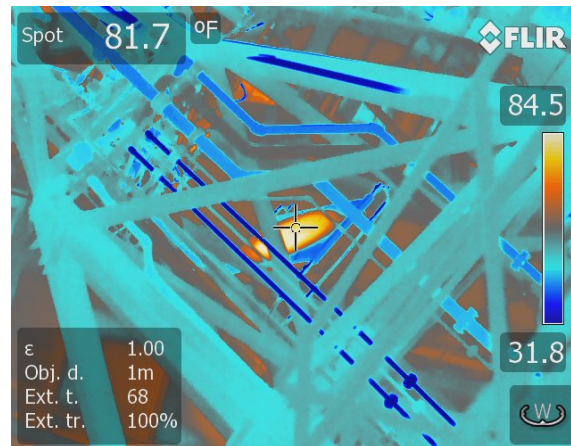
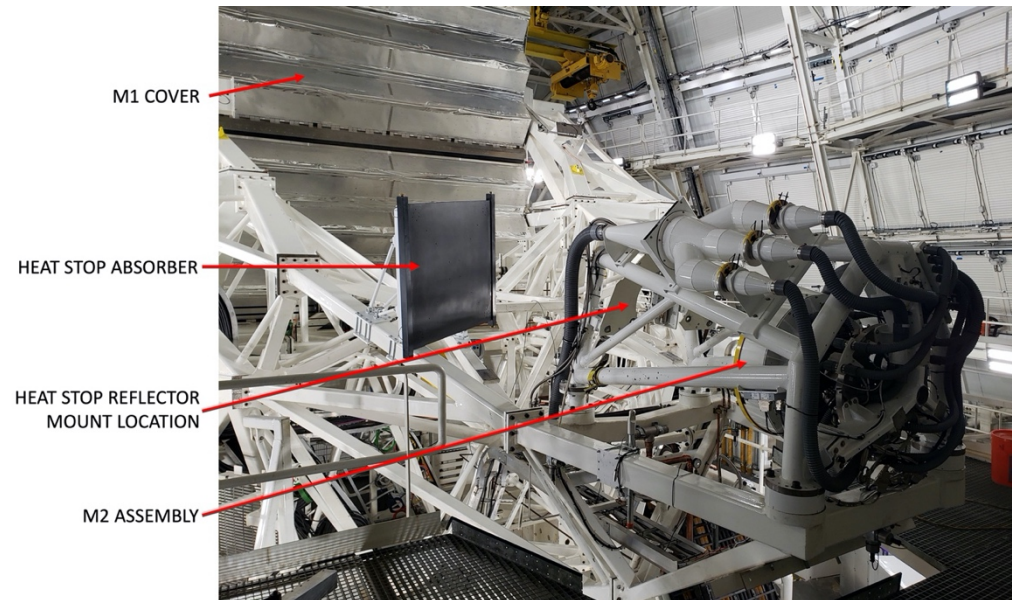
- Project 97% complete
- Budget
 - TPC = \$353.53M (includes \$9.4M in authorized management reserve)
 - NSF Funding to date = \$344.13M (\$146M ARRA)
 - Actuals + Commitments = \$341.2M
 - Earned Value = \$337.8M
 - Budget Contingency = \$3.72M
- Risk - currently 25 high-level risks
 - Risk to contingency ratio = $\$2.74/\$3.72\text{M} = 74\%$
- Schedule
 - CSA Expiration Date = [June 30, 2021](#)
 - Project Baseline Completion date = [April 7, 2021](#)
 - Estimated Project Completion date = [Nov. 15, 2021](#)



Construction Site - March 2021



New Heat Stop



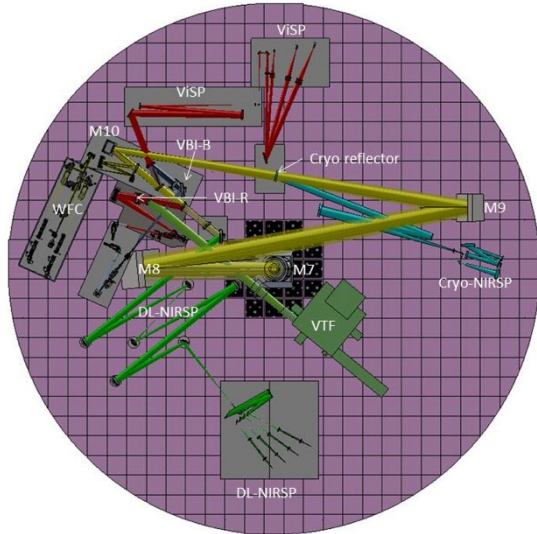
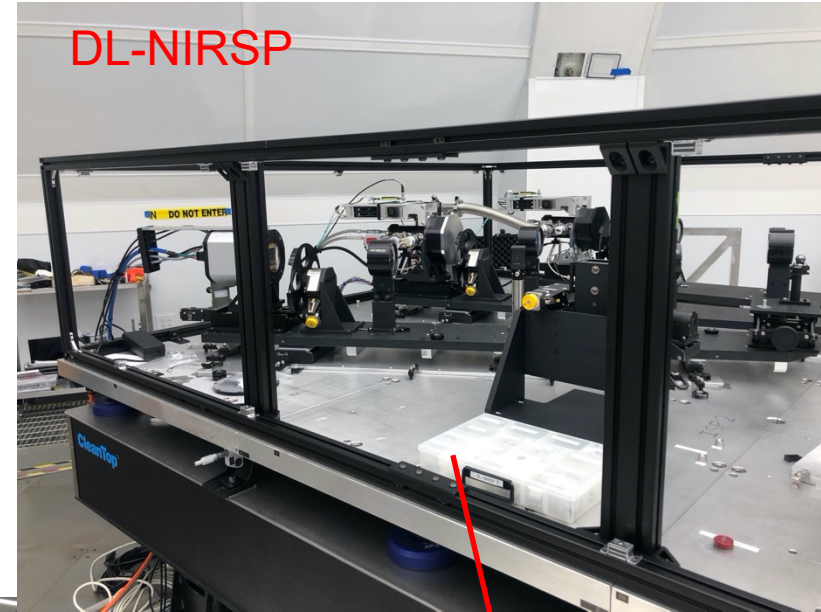
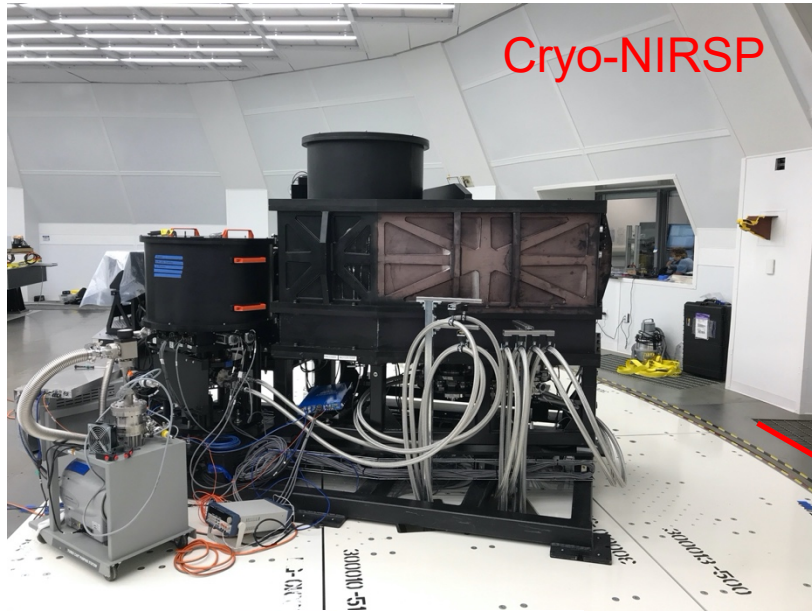
new absorber plate in action on Sun

Status of Instrument Subsystems

Instrument	Procurement & Fabrication	Lab Assembly	Lab Acceptance Test Plan (LAT-P)	Lab Acceptance Test (LAT)	Delivery to Summit	Site Integration, Test, & Commission. (IT&C)	Site Acceptance Test Plan (SAT-P)	Site Acceptance Test (SAT)	Science Verification Plan (SV-P)	Science Verification (SV)
Visible Broadband Imager (VBI)	Complete	Complete	Complete	Complete	Complete	Complete	Complete	Mostly Complete	Complete	Partially Complete
Cryogenic Near-IR Spectropolarimeter (Cryo-NIRSP)	Complete	Complete	Complete	Complete	Complete	Complete	Complete	Partially Complete	Complete	Not Started
Diffraction-Limited Near-IR Spectropolarimeter (DL-NIRSP)	Complete	Complete	Complete	Complete	Mostly Complete	Underway	Complete	Not Started	Complete	Not Started
Visible Spectropolarimeter (ViSP)	Complete	Complete	Complete	Complete	Complete	Complete	Complete	Complete	Complete	Not Started
Wavefront Correction System (WFC)	Complete	Complete	Complete	Complete	Complete	Mostly Complete	Complete	Underway	n/a	n/a
Polarization, Analysis & Calibration System (PA&C)	Complete	Complete	Complete	Complete	Complete	Complete	Complete	Mostly Complete	n/a	n/a

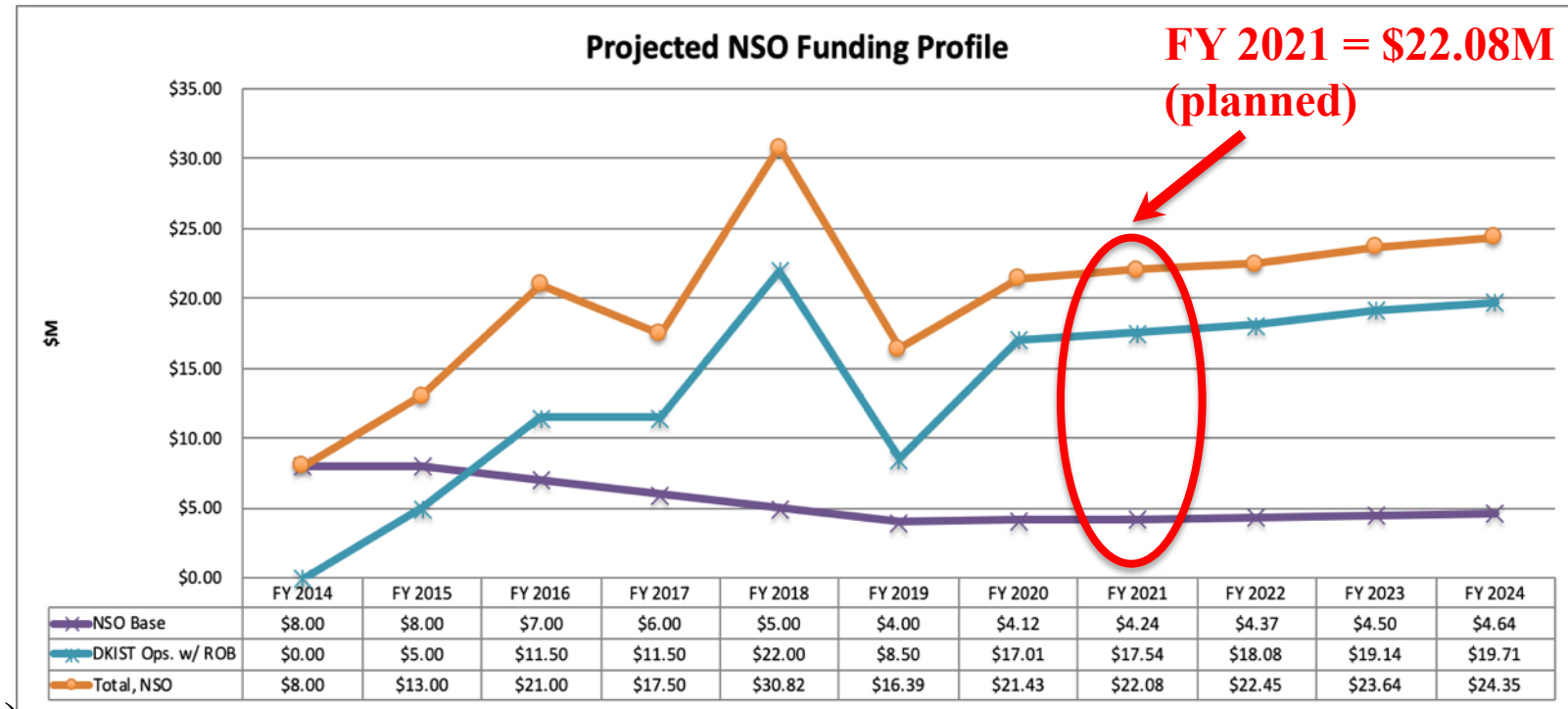


Recent Construction Pics - Instruments



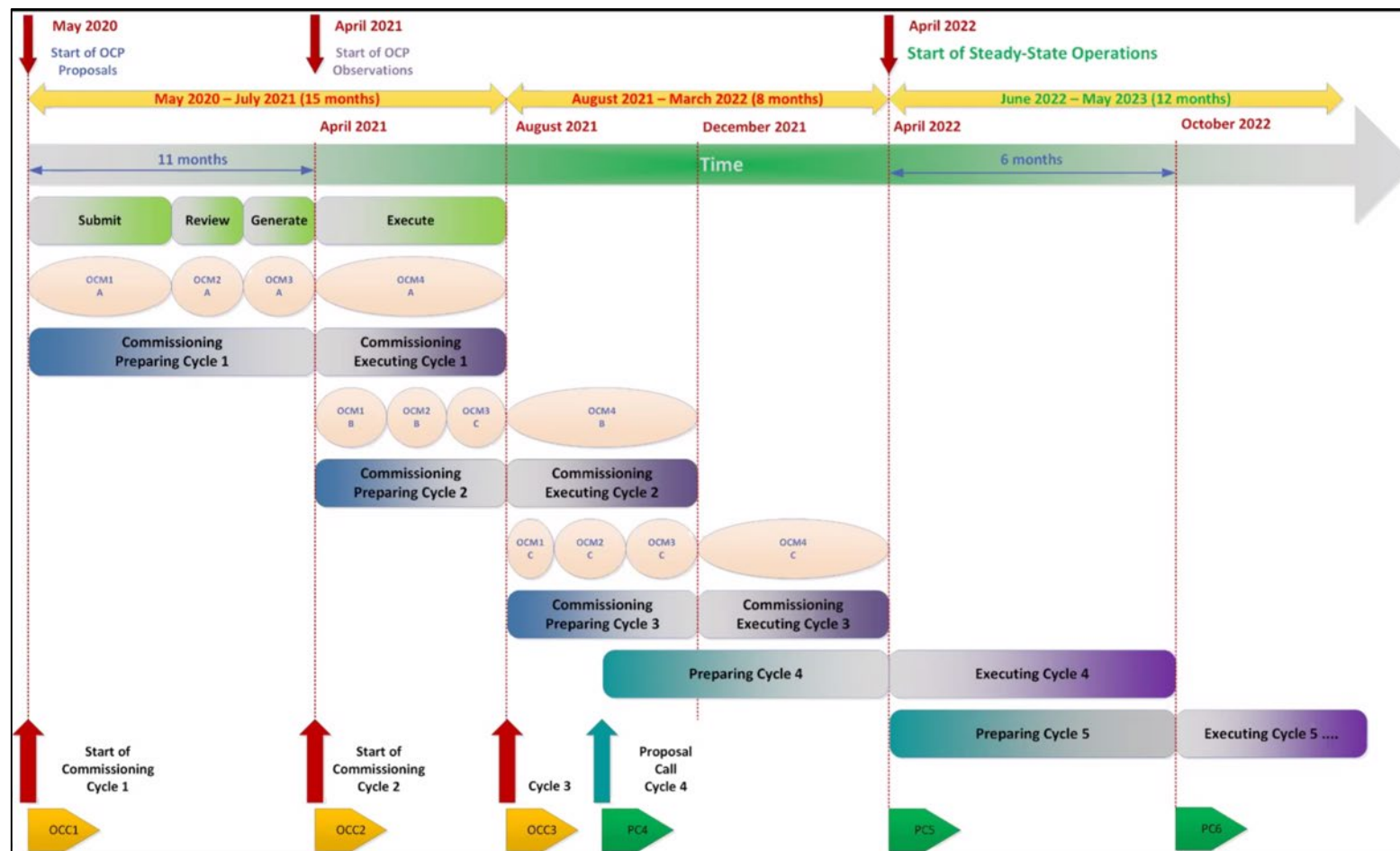
NSO Operations & Maintenance

- FY 2019 O&M = \$16.4M
 - DKIST Level-2 Data Products = \$3.5M
 - Legacy facilities = \$400K
- FY 2020 O&M = \$21.4M (planned)
 - Sac Peak ops = \$300K
 - Relocatable houses = \$350K
 - WoU-MMA = \$480K
- FY2021 O&M = \$21.8M (planned)
 - Sac Peak ops = \$300K

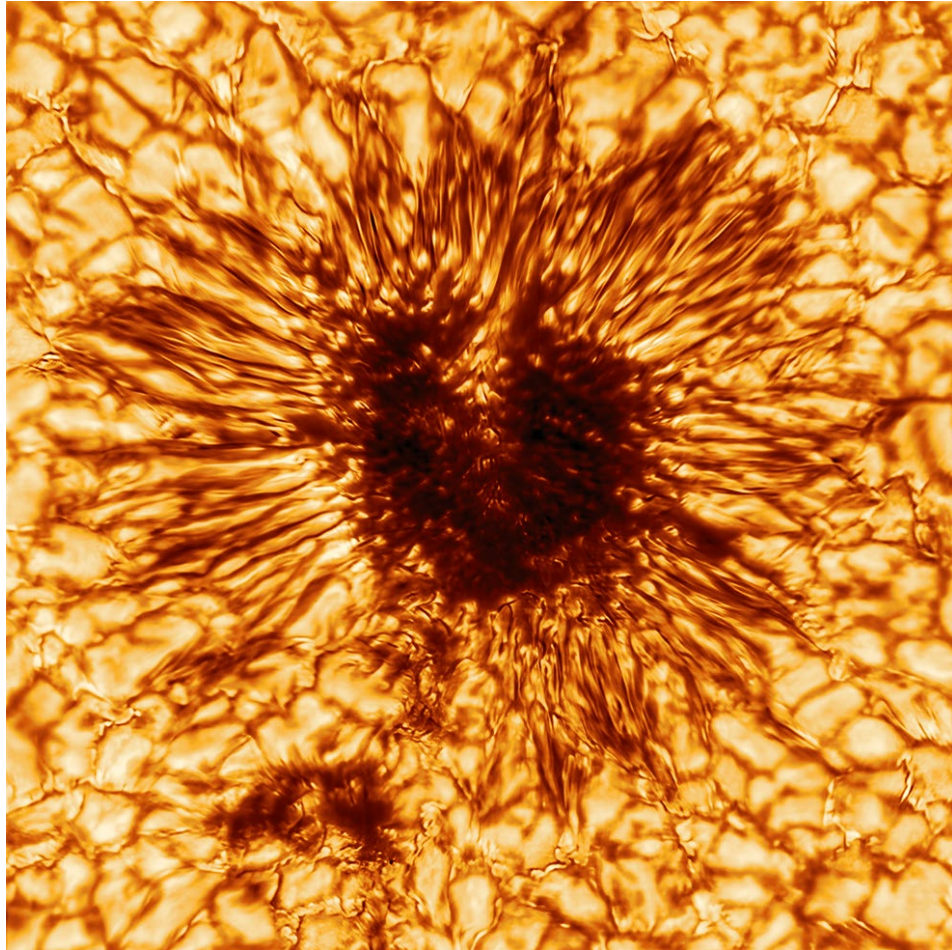


Plan for DKIST Operations Commissioning

- 1-year Operations Commissioning Phase (OCP)
 - Cycle 1 call for proposals – **May 1, 2020**
 - Shared-risk observations
 - Limited instruments/modes
- **Schedule likely pushed out by ~1 year due to COVID-19**
- Anticipating start of Steady-state observations
 - **November 2022**



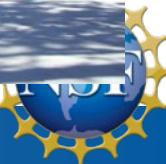
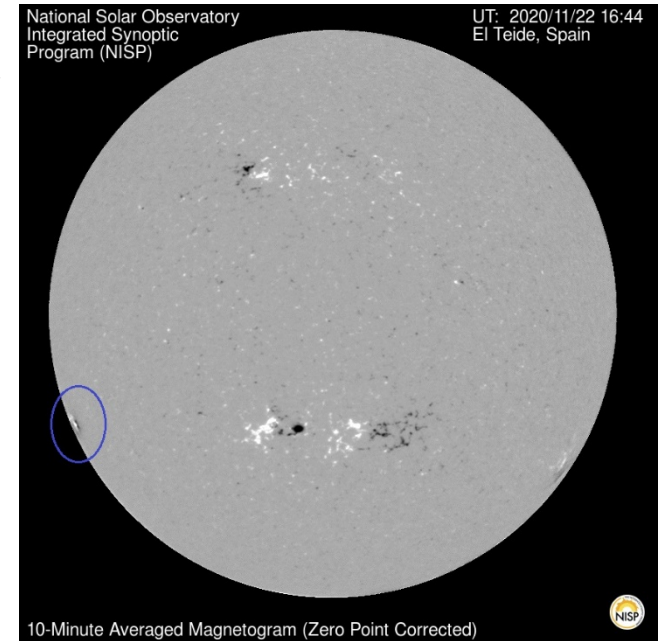
NSO Press



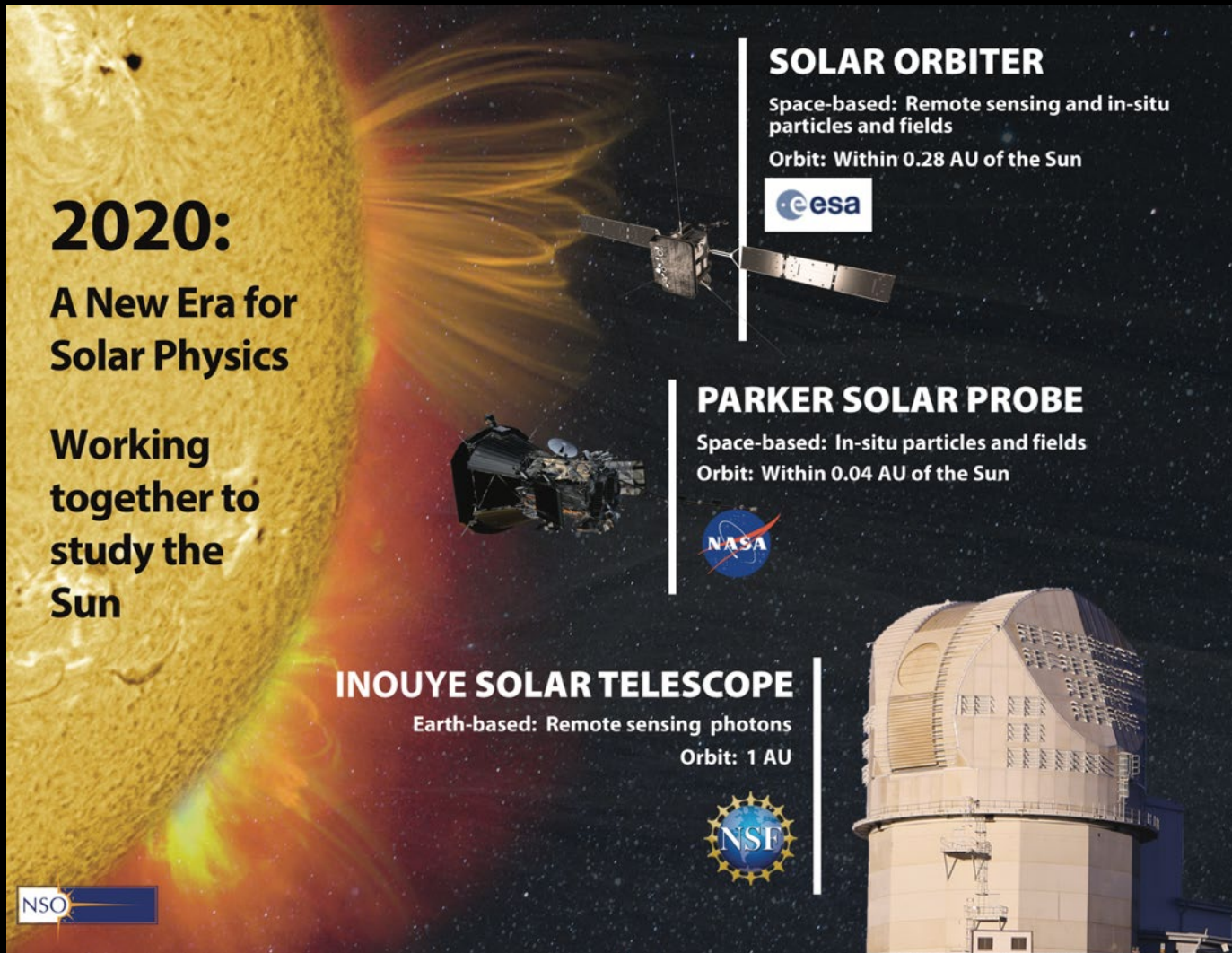
GONG measures
sunspot for
Thanksgiving.
(NOAA AR12786)

DKIST First
Sunspot
See Rimmele et al.
Solar Physics
volume 295, issue
12, 2020

Sac Peak relocatable
housing units to be
transferred to White
Sands Habitat for
Humanity



Era of Multi-Messenger Solar Physics



- Facility Supplement opportunities arise from time to time
 - AST facilities encouraged to submit supplement proposals to the NSF-wide WoU-MMA opportunity
 - NSO submitted a proposal for upgrades to the DKIST distribution optics and Cryo-NIRSP to enhance spectral coverage and efficiency for joint observations with PSP and SoO
 - Highly rated; truly MMA proposal
 - Awarded \$481K – [Sept. 17, 2020](#)
- Also a priority for grants programs



2023 and 2024 Solar Eclipse

- Science Grants Accepted in these programs
- Get them in soon!

Astronomy and Astrophysics Research Grants (AAG)

PROGRAM SOLICITATION
NSF 18-575

REPLACES DOCUMENT(S):
NSF 16-574



National Science Foundation

Directorate for Mathematical & Physical Sciences
Division of Astronomical Sciences

Submission Window Date(s) (due by 5 p.m. submitter's local time):

October 01, 2018 - November 15, 2018

October 1 - November 15, Annually Thereafter

IMPORTANT INFORMATION AND REVISION NOTES

Proposals about the astronomy and astrophysics of our Sun, the rest of our Solar System, and/or extrasolar planets will be handled under this solicitation. The Solar and Planetary Research Grants program will now be reintegrated into the Astronomy and Astrophysics Research Grants program (this solicitation).

Collaborators & Other Affiliations Information: When completing Table 4, you may list only the first three (3) co-authors.

Advanced Technologies and Instrumentation (ATI)

PROGRAM SOLICITATION
NSF 18-576

REPLACES DOCUMENT(S):
PD 08-1218



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Questions?

