



COVID-19 IMPACT ON NSF MAJOR FACILITIES

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May 6, 2020



NSF Operating Facilities

- **Most major facilities** progressed through partial operation to complete **shutdown** from ~March 10 to ~April 3.
- Still in operation:
 - Several radio telescopes, with skeleton crews on site.
 - Polar stations and IceCube Neutrino Observatory.
 - Some distributed sensor networks.
 - High-performance computing (Frontera, Cheyenne).
- **Recovery after months of down time will be quite complex.**



Impacts on Operating Facilities

- **Loss of science**, and breaks in continuous data sets.
- **Awardee staff** morale and potential overwork on return.
- **Hardware impacts** caused by long shutdowns.
- Challenges keeping COVID-19 out of **remote locations**.
- Some **facility upgrades** have paused or slowed.
- Delays and other impacts on **future competitions**.



Major Facilities in Construction

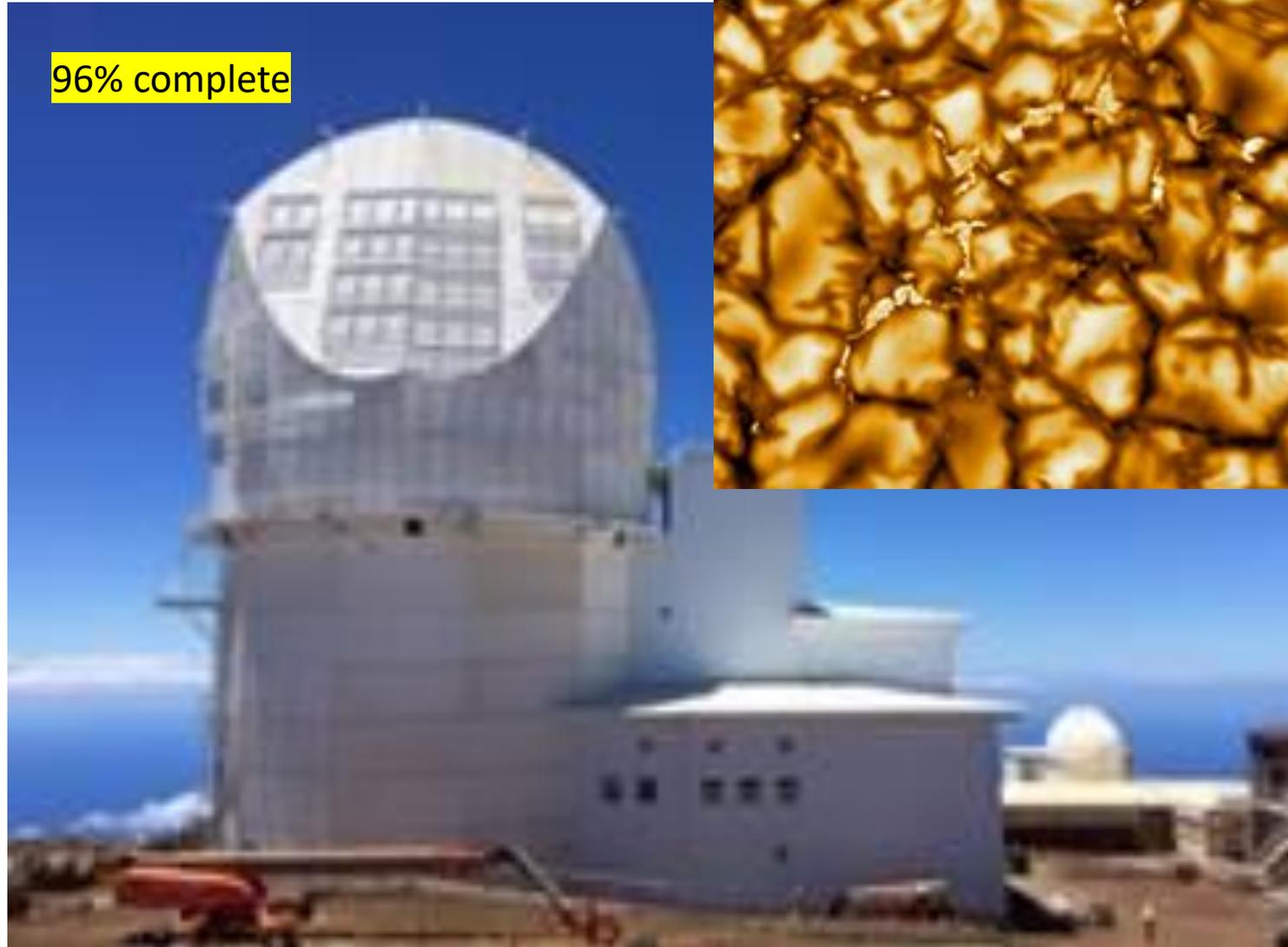
- Daniel K. Inouye Solar Telescope (DKIST)
- Vera C. Rubin Observatory
- Regional Class Research Vessels (RCRV)
- Antarctic Infrastructure Modernization for Science (AIMS)
- High-Luminosity Large Hadron Collider (HL-LHC)



Daniel K. Inouye Solar Telescope

First Sun-Light

96% complete





Vera C. Rubin Observatory



Telescope mount tarped



Electrical boxes, equipment and materials tarped in dome



M1M3 Cell, coating facility, M2 system, Hexapods, all secured and shutdown



Regional Class Research Vessels





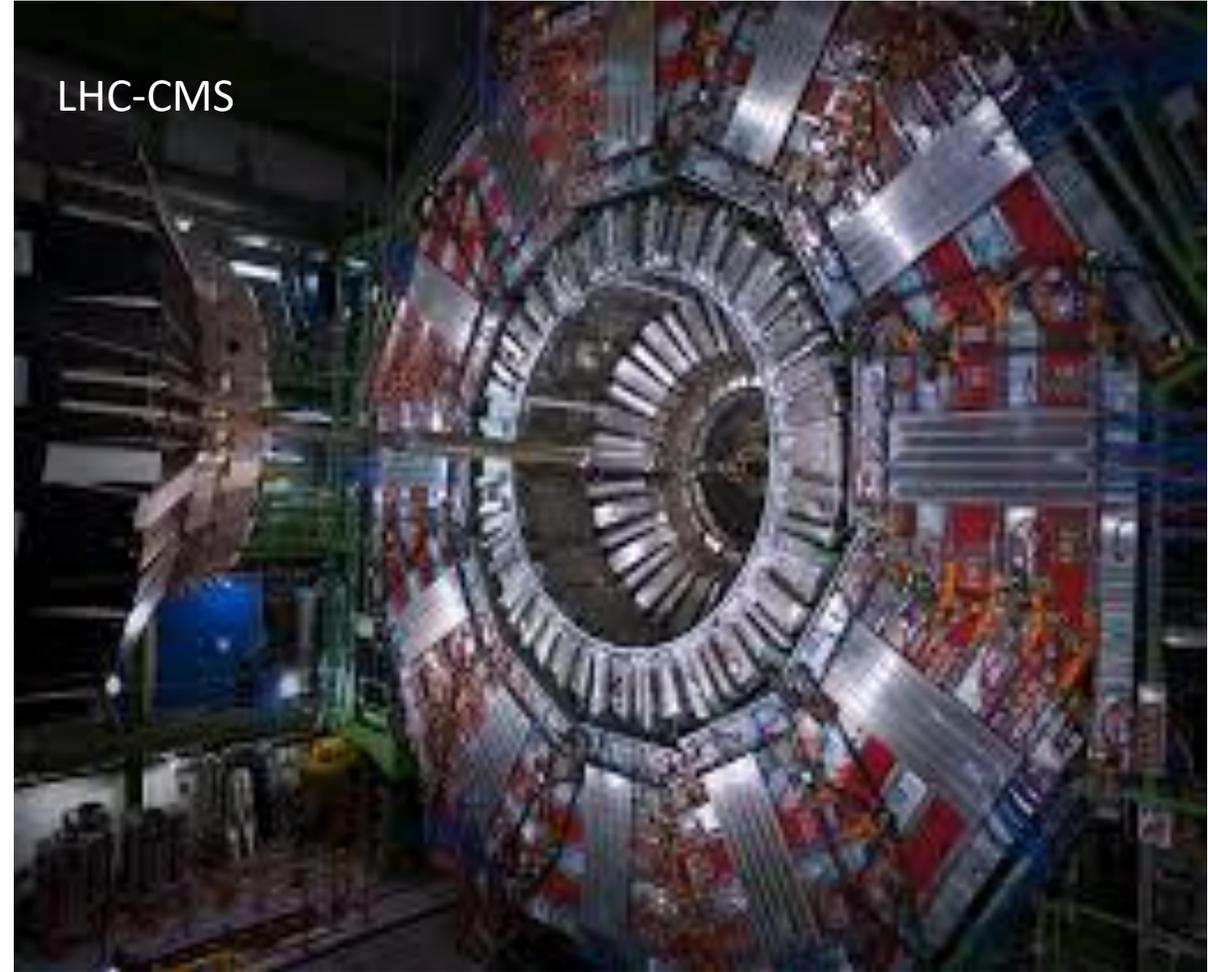
AIMS





High-Luminosity LHC

<1% complete





Overall Construction Impacts

- COVID-19 is causing **delays and cost increases**.
- Total Project Costs were set based on rigorous contingency estimation for **known risks under control of the projects**.
 - No Cost Overrun Policy requires “adequate **contingency** to cover all **foreseeable risks**.”
 - **COVID-19** is realization of an “**unknown unknown**” risk not covered in contingency estimation.
- **Near-term cost increases** possible/likely for DKIST and Vera C. Rubin Observatory in FY 2020 and/or FY 2021.
- AIMS (and perhaps RCRV and HL-LHC) will need **re-baselining**, and additional funding in FY 2022 or later.



Summary

- Managing organizations are successfully handling the COVID-19 challenge.
- Recovery will be complex, but manageable.
- NSF anticipates asking NSB to authorize increased amounts for several awards (construction and operations) over next ~18 months.