NATIONAL ACADEMIES Sciences Engineering Medicine

Update from the Committee on Astronomy and Astrophysics

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MAY 2024 CAA

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CAA Fall 2024 Meeting Concluding Thoughts

- Great to hear about recent successful partnerships between NSF/AST and private foundations.
- Concerned about the delay in the NSF's decision-making process regarding the US ELT program, and the lack of clarity in when and how decisions will be made.
- Encouraged by DOE's attention to programmatic balance, with implementation of DMNI and ASTAE programs.
- Happy to see that SSERVI will explicitly include astrophysics in future lunar science calls.
- In tight budget times, it's good to see that NASA can work to accomplish decadal science priorities by exploiting the range of mission sizes.
- Good to see that there are short term solutions for SMD communications needs. NASA really needs an agency-wide strategic plan for communications.
- Enjoyed hearing about efforts underway to develop joint products and systems for coordinating among data centers. Future mission and observatory archive coordination seems well-matched to what we separately heard about how private philanthropy can enable cross-agency and internationals efforts.
- Welcomed the news that the CMB-S4 project will investigate an all-Chile location in light of limitations at the Pole. This is another area where public-private partnerships could be effective.

Adapting to Budget Declines

Astro2020 had a spectrum of recommendations with different budgetary implications

- Agency transparency in decision making is key to retaining the trust of the community
- Efficiency of decision making and management decisions essential
- Provide clear on- and off-ramps for projects in the face of uncertain technology & mission development in addition to budget landscape

7.6.1.2 Criteria and Decision Rules for Investment in the U.S. ELTs

It will be necessary for NSF to commence with an external review with a target completion in 2023 in order to evaluate the financial and programmatic viability of both proposed U.S. ELT projects, with the level of federal investment in at least one of the projects determined at the end of the review. Federal investment in either project should be predicated on:

1. Demonstration of financial viability with agreed-upon commitments from partners for all of the necessary capital and operations money, pending only NSF investment.
2. Final site selection in the case of the TMT.
3. A public share of telescope time (run through NSF's NOIRLab) roughly equivalent to the total federal investment of construction and operations expenses.
4. Full public archiving of all data taken by the ELTs, after a reasonable proprietary period. This applies to both federal and consortium telescope time.
5. Development of a management plan and governance structure for the joint project, agreed by all parties including the relevant observatory corporations and NSF.

Approval of the project is also subject to the recommendation in Section 5.1.1 that makes the initiation of any new astronomy MREFC project contingent on NSF developing a plan for managing the operations costs of the new facilities within its projected budget envelope.

Recommendation: The National Science Foundation (NSF) should conduct an external review of the U.S. extremely large telescopes, with a target completion date of 2023. If only one of the Giant Magellan Telescope or the Thirty Meter Telescope can meet the conditions enumerated above by the time of NSF's review, NSF should proceed with investment in that project alone.

Depending on the outcome, the decision rules for NSF are the following: In the case that only one project can proceed, NSF's investment of up to a 50 percent share in the project should be undertaken if doing so will ensure that the project has the financial resources to come to fruition. If NSF investment can only fund partnership in one telescope, but both are viable, NSF's investment should factor in complementarity to the ESO ELT, the ability to address the science questions of the Astro2020 survey, and the relative advantages of a larger diameter (D), which increases the sensitivity ~ D^2 to D^4 (depending on the science application), versus a larger field of view, which increases survey speed and the number of targets per observation.

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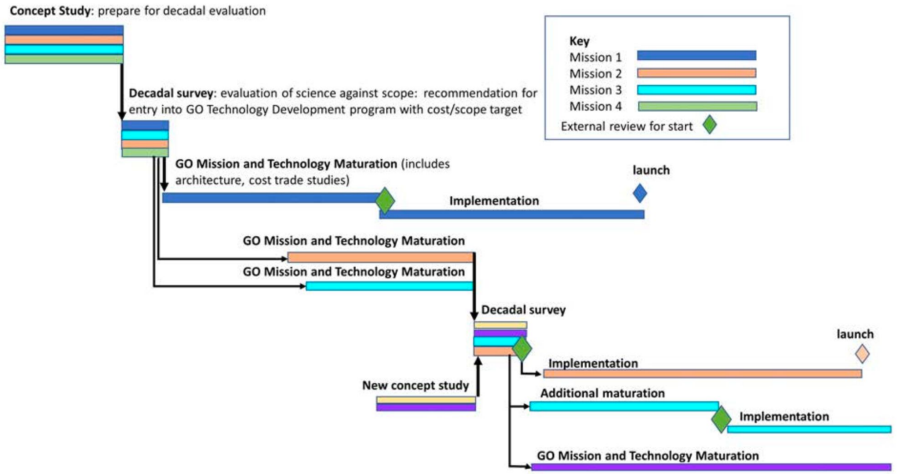

Finding: For a decadal survey to confidently recommend implementation of a strategic mission as its highest priority, the mission's technology and architecture needs to be developed to a level of maturity that allows a reasonable assessment of budget profile, scientific performance, and technology risk. The mission's cost range and development timescale must be deemed appropriate for the scientific scope.

Expanding Outreach and Engagement

Expand visibility of NASEM committees

- AAS splinter session ideas, e.g.
  - “Getting to Know Your FACA Committees” (Differences between CAA, AAAC, APAC)
  - “The Upcoming Mid-decadal Survey in Astronomy”
- Make content of recorded meetings more accessible (hours-long vimeo stream not amenable to finding a specific talk/discussion)

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Thank You!