NSF AST Thoughts on Astro2010 and Astro2020

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Jim Ulvestad, Division Director, MPS/AST

@UlvestadNSF

What Worked Well?

- Science-focused assessment and survey of field
- Process of science frontiers panels feeding to program prioritization panels generally viewed favorably
- Existence of CATE process, and the rational assessment of large projects
  - Despite limitations in analogues and data bases for study, the CATE process appears to NSF to have gotten its assessments mostly right for LSST, GSMT, and SKA
- General increase in community engagement and input
- Clear prioritization among large projects
  - NSF would never have started MSIP without the explicit, high-priority recommendation
- Recommendation to carry out senior review

What Worked Less Well?

- Budget assumptions were overly optimistic, and there was inadequate consideration of alternatives for lower budget scenarios
  - Use multiple budget scenarios and give clear recommendations for each
  - The short “what-if” summary on p. 238 was not enough
- Re-consider how the infrastructure studies (ISGs in Astro2010) are formulated and whether their outcomes should be part of the official decadal survey product
- Main report was not always internally consistent in wording, thus causing some agency difficulty in interpretation
- U.S. economic state was evolving rapidly during the two-year study, and this was not tracked well

What Should be in Astro2020 Charge?

- Little sentiment for consideration of operating facilities in prioritization—this requires much more agency interaction than usual in an NRC study
  - But, list clearly the capabilities that are needed to deliver on particular science questions
- Serious consideration of the State of the Profession is needed, with actionable recommendations
- Boundaries of decadal surveys have largely been set according to the organization chart of NASA SMD, but these are not necessarily appropriate for NSF and DOE
  - E.g., are these in or out? Ground-based gravitational waves, dark matter, ground-based solar physics, astroparticle physics, planets and exoplanets. Non-"Astro" decadal surveys have made "free" recommendations to NSF to do everything, without limitations by budget scenarios

How should Astro2020 approach Large Ground-Based Construction Projects?

- Consider prioritizing among "large midscale," as these might need to be approached as MREFC-like strategic projects
  - Given large operations commitments to facilities, there may be no other way to reach the upper end of the mid-scale range recommended in Astro2010
- Be clear about where the U.S. should seek to compete, lead, or leave something to others
- Continue to seek balance between an "aspirational" program and a program that is executable with budgets that are potentially much lower