NSF/AST Mid-Scale Innovations Program (MSIP)

NRC Mid-Decade Review Committee

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Outline

- **Origin of the Mid-Scale Innovations Program (MSIP)**
- **The first round – MSIP-I**
- **Next step – MSIP-II**

History I

- Long history of funding mid-scale class projects
  - University radio facilities, ad hoc from late 1970s.
- Over the past decade +, AST mid-scale programs/projects had a variety of forms:
- ***Solicited / Competed***
  - University Radio Observatories (URO):
    - Construction and operation of medium-size radio facilities
    - 4-5 awards every 3 years, total program budget $6-10M/yr
  - Telescope Systems Instrumentation Program (TSIP):
    - Instruments for non-federal optical telescopes > 3m
    - Trade instrument funding for nights of open access for US community
    - Annual program budget ~$3M, program administered by NOAO
  - Renewing Small Telescopes… (ReSTAR)
    - Instruments on NOAO telescopes
    - Short term program, 2009 start; Total $5.4M

History II

- ***Unsolicited / Uncompeted --*** Ad Hoc Midscale Proposals
  - Individually submitted and reviewed, typically 2/yr
  - Typically $10-15M total yearly budget for ~10 different ongoing projects
  - Examples:
  - **VERITAS:** Cherenkov gamma ray telescopes
  - **Sloan Digital Sky Survey**: optical sky survey
  - **Atacama Cosmology Telescope & Polarbear**: cosmic microwave background, millimeter radio
  - **Hobby-Eberly Telescope Dark Energy Experiment (HETDEX):** cosmology, optical
  - **Virtual Astronomical Observatory**: data archive / mining standards
  - **Dark Energy Survey:** data management
  - **MWA & PAPER:** Epoch of Reionization cosmology, low frequency radio
  - **LSST**: design and development

ACT

ACT + Polarbear

Polarbear

VERITAS

SDSS

CARMA

PAPER

History III

- AST Mid-scale peaked in 2010 with a total of about $34M, including URO, TSIP, ReSTAR, and Ad Hocs
  - Other years more typically $20-25M
- 2010 Decadal Survey, New Worlds, New Horizons
  - #2 ground-based recommendation: *"a competed program that will provide the capability to respond rapidly to scientific discovery and technical advances with new telescopes and instruments."*
  - Advised ramp from $20M to $40M by end of decade
- 2012 AST Portfolio Review
  - In addition to "new telescopes and instruments" (NWNH), PR recommended telescope open access time, lab astrophysics, MREFC D&D, and long-term mid-scale facilities operations

Mid-Scale Innovations Program (MSIP-I)

- Developed following the guidelines of the Portfolio Review
- First solicitation issued June 2013
- Alternate year program; funding including two fiscal years
- Encompassed URO, TSIP, ReSTAR, Ad Hoc, plus more
- Four categories:
  - 1. **Mid-Scale Science Projects**
  - 2. **Mid-Scale Facilities**
  - 3. **Development Investments**
  - 4. **Open Access to Telescopes**
- Individual project budget upper limit: $40M
- Two-stage process: Pre-(8 pg) and Full (30 pg) proposals

MSIP-I

- Two previous programs provided “open access”
  - **TSIP** provided fixed number of nights per dollar, typically $3-4 million/yr in ~2010
  - **URO** provided 30-50% of observing time typically $6-10 million/yr in 2008-2014
  - Each got 3-6 proposals per competition, funding rates of 25-50%
  - MSIP subsumed these programs; NWNH assumed URO + TSIP would continue separately
- From FY2013 Solicitation Specific Merit Review Criteria:
  - “All proposals must show the project’s value and benefit to the US astronomical community. Examples of benefit include, but are not limited to, open-access observing time on the facility, access to data products and software, and cooperation and sharing of technology with other projects.”
  - “Except for those in Category 4 [open access] with no instrumentation, proposals must include, and will be evaluated on, a substantial component of student training and involvement of a diverse and inclusive workforce in instrumentation, facility development, or data management/analysis”

MSIP-I Results

- MSIP-I was a pilot; magnitude of demand unknown
- Received 38 pre-proposals, requesting $400M
  - Between a quarter and half classified their proposals as "Open Access" (could specify multiple categories)
  - Observing time/access offered relative to funding (aka cost/benefit) varied widely compared to either TSIP or URO standards
  - Most other proposals (and some with Open Access) involved instrumentation development
- Individual project budgets ranged from $3M to $40M
- Mostly 5-yr projects
- 12 full proposals invited; total request = $177M

MSIP-I: FY 2014/2015 $

- Awards

Awarded Proposal	PI	Total NSF Funding
Zwicky Transient Facility	Kulkarni	$9.0M
Advanced ACTPol	Staggs	$10.0M
H Epoch of Reionization Array	Parsons	$2.1M
Event Horizon Telescope	Doeleman	$6.5M
POLARBEAR	Lee	$5.0M
NANOGrav Physics Frontier Center	Siemens	$14.5M

Total AST FY14/15: $27.1M; Other NSF: $20M

Next Step – MSIP-II

- Considered comments/advice
  - Committee of Visitors (COV) – Feb 2015
  - NRC OIR System Report – Apr 2015
- Lessons learned from MSIP-I
- Solicitation ***NSF 15-580*** for FY 2016/2017 funds
  - Posted June 2015
  - Pre-proposals due September 16, 2015
  - Invited full proposals due February 22, 2016

MSIP-II Structure

Four Categories

1. **Mid-Scale Science Projects:** Self-contained, limited term projects with well-defined construction and science utilization phases.
2. **Mid-Scale Facilities**: Construction or operation of stand-alone, long-term, mid-scale facilities.
3. **Development Investment**s: Design and development for future large mid-scale and large-scale facilities.
4. **Open Access Capabilities:**
   a) New instruments for existing telescopes, both national and private, in return for US community access.
   b) Provision of observing time for US community access on existing telescopes (e.g. providing open access nights in return for partial support of operational costs of a facility).
   c) Data archiving and data management projects leading to public access to data resource

Individual project budget upper limit: $30M

Two-stage process: Pre (8 pg) and Full (30 pg) proposals

Summary

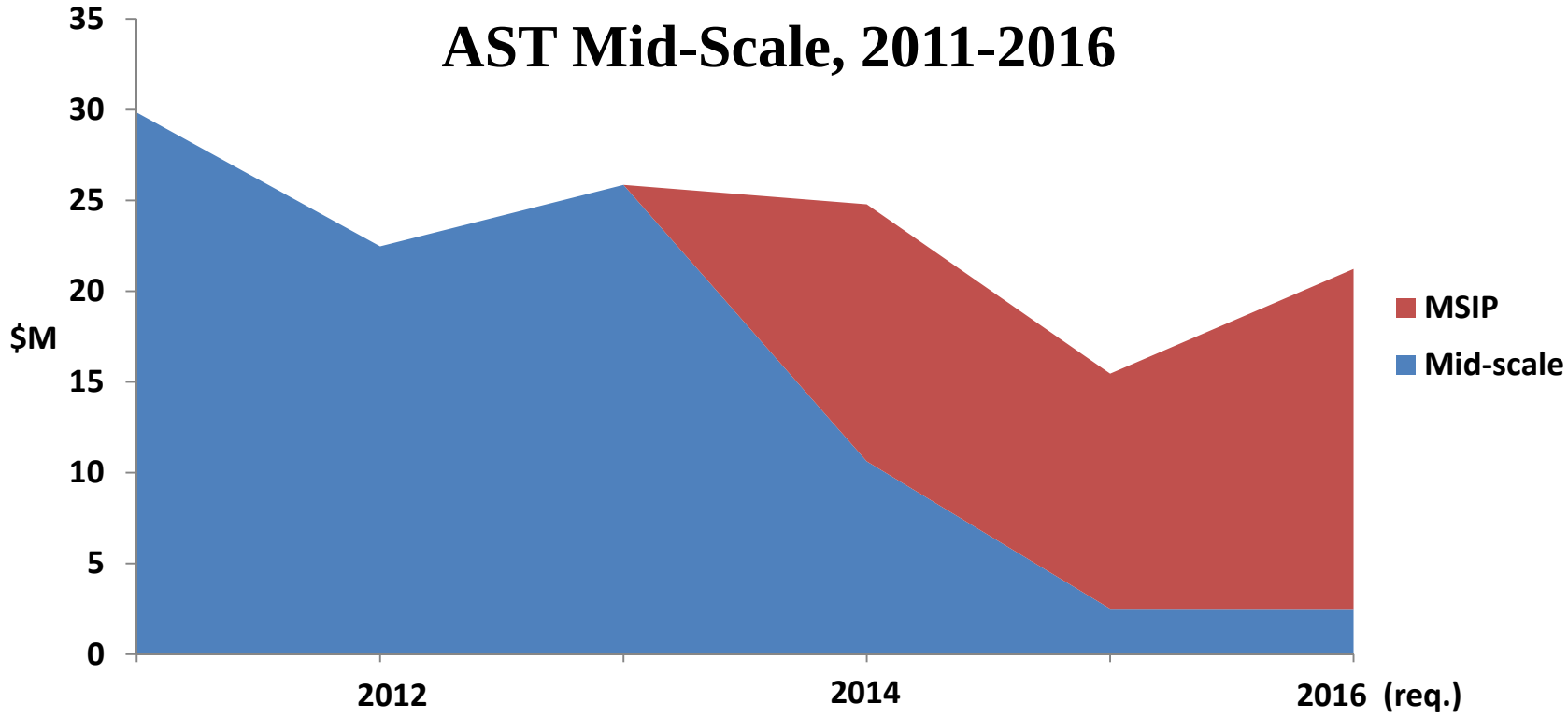

Chart shows AST funds only

"Mid-scale"= general mid-scale + TSIP + URO+ MREFC development

NWNH target = $40 million/yr by decade end

Remaining gap for projects >$30M to <$135M