



National Science Foundation: AST Status

American Astronomical Society

Division for Planetary Sciences Agencies Night

November 9, 2015

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Outline

- Background of NSF
- Highlights, AST Budgets and overall program status
- Updates
 - Facilities & Grants relevant to planetary science
 - Planetary and Exoplanetary Program
 - NASA-NSF Exoplanet Observational Research program (NN-EXPLORE)
 - O/IR System Study
- Summary
- Types of job positions in AST



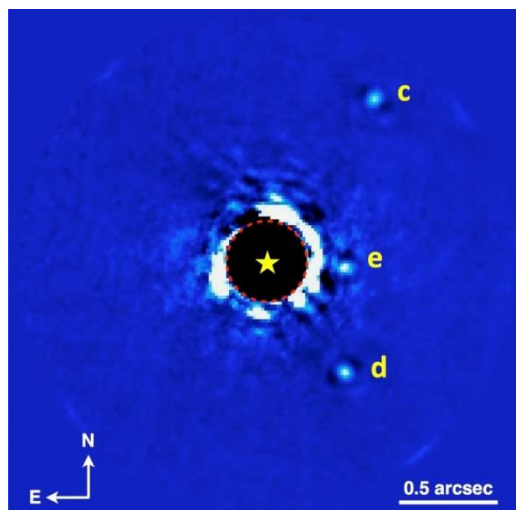
NSF Background

- Only ~100% basic research agency in federal government
- FY 2015 budget was \$7.3 billion, and President's Request Budget for FY 2016 is \$7.7 billion (+5.2%)
- AST is the lead organization for federally funded, ground-based astronomy and astrophysics, including planetary science
 - Annual budget this decade has ranged from \$232M to \$246M
 - Major construction projects (>\$130 million) are funded from a separate budget line, Major Research Equipment and Facilities Construction (MREFC)
 - Related research occasionally co-funded with Division of Chemistry, Division of Atmospheric and Geospace Sciences, and Division of Advanced Cyberinfrastructure

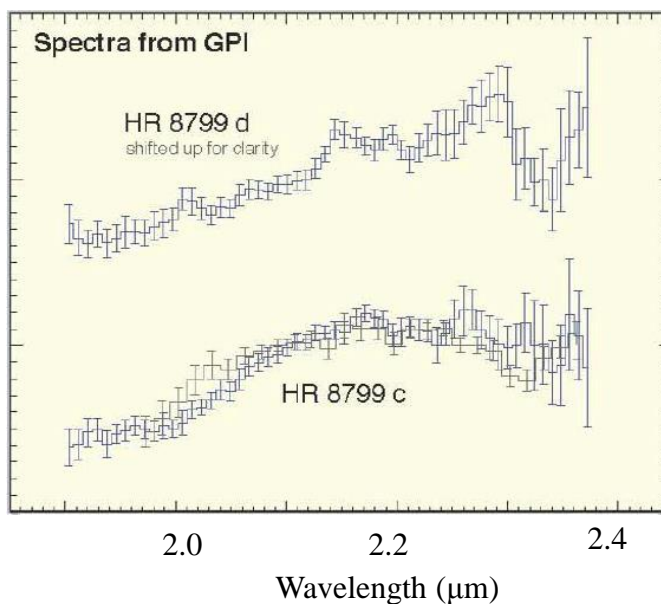


Highlights

Gemini: GPI Results



Credit: Marois, Ingraham, & GPI Team

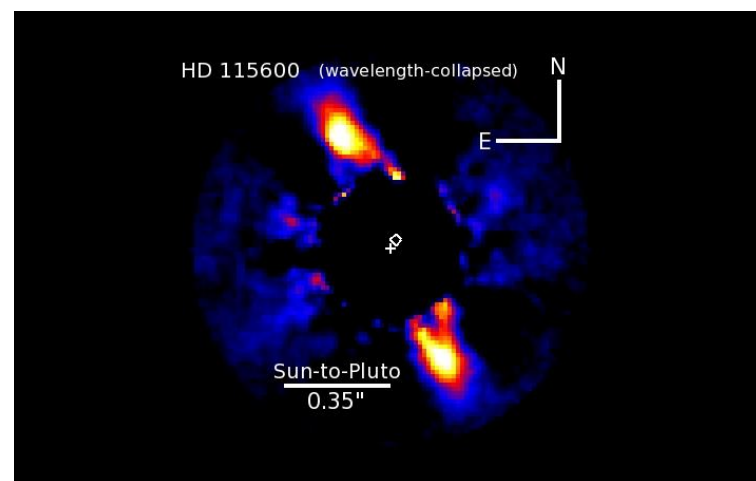


The GPI spectra, of HR8799c and d, shown here, indicate large differences in atmospheric clouds or composition

Credit: Ingraham, Marley, Saumon, & GPI Team

- Commissioning data from GPI, above left, show three exoplanets circling the nearby star HR8799
- Image of HD 115600 showing a bright debris ring viewed nearly edge-on and located just beyond a Pluto-like distance to the star. One or more unseen solar system-like planets are causing the disk center (diamond) to be offset from the star's position (cross).

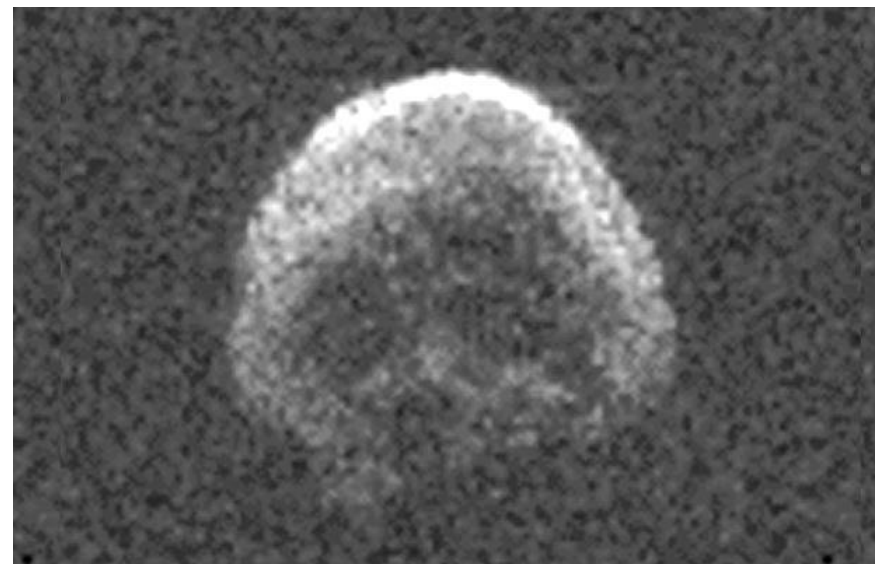
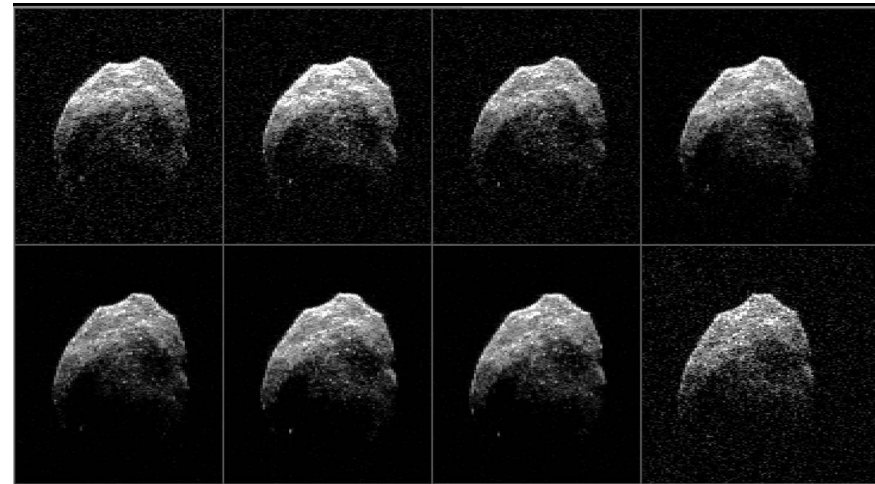
Credit: T. Currie



Greenbank and Arecibo Image the Halloween Comet

Credit: ASA/JPL-Caltech/GSSR/NRAO/AUI/NSF

- Asteroid 2015 TB145's high-resolution radar images of the asteroid; used antenna at Goldstone, California, to transmit high-power microwaves toward the asteroid. The signal bounced off the asteroid, and its radar echoes were received 100-meter Green Bank Telescope .
- Asteroid 2015 TB145's "skull" imaged by the planetary radar system at Arecibo Observatory.
- Asteroid 2015 TB145 is spherical in shape and approximately 2,000 feet (600 meters) in diameter; rotation period of approximately 5 hours and velocity of 35 km/s.

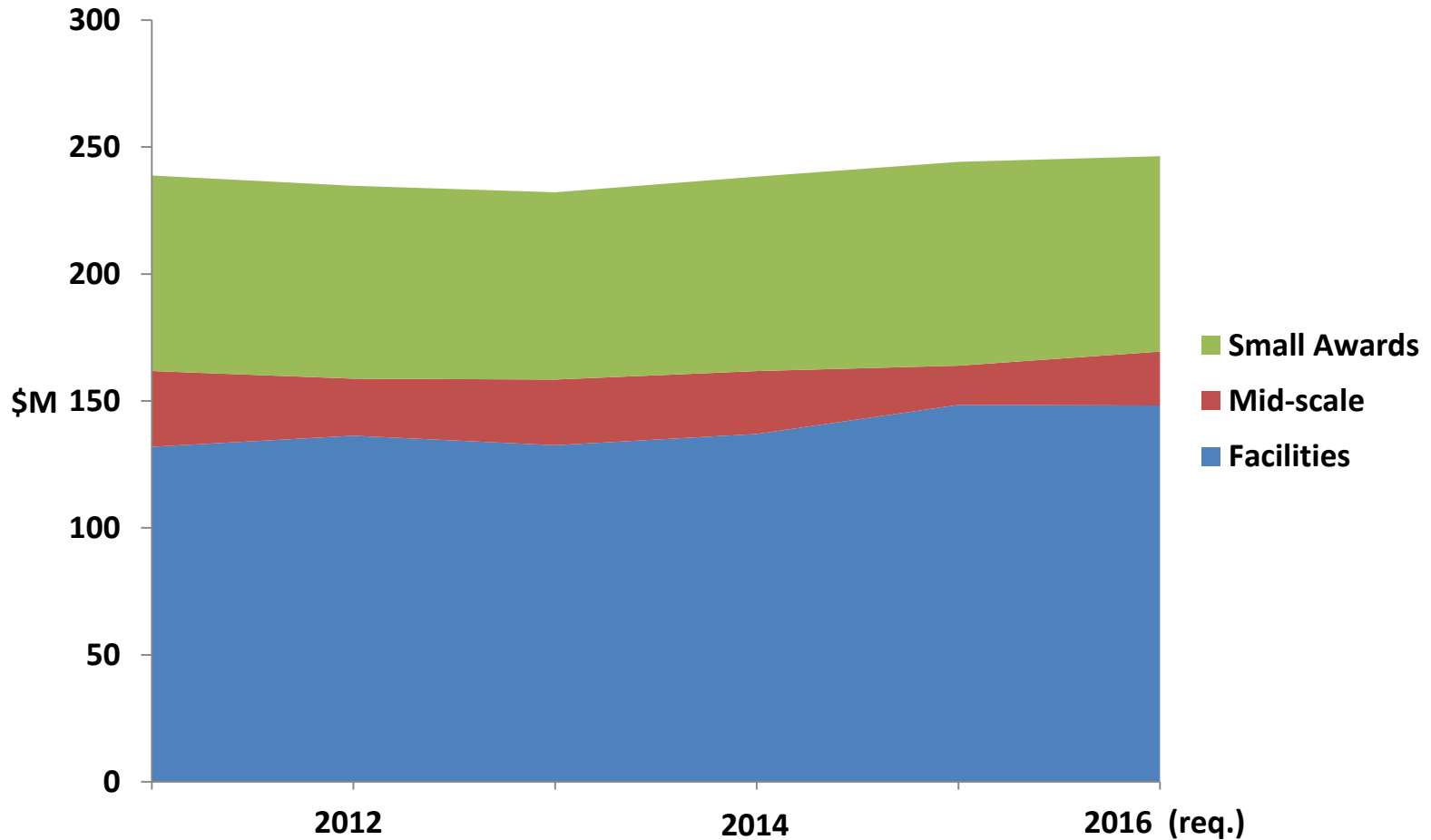




AST budgets and overall program status



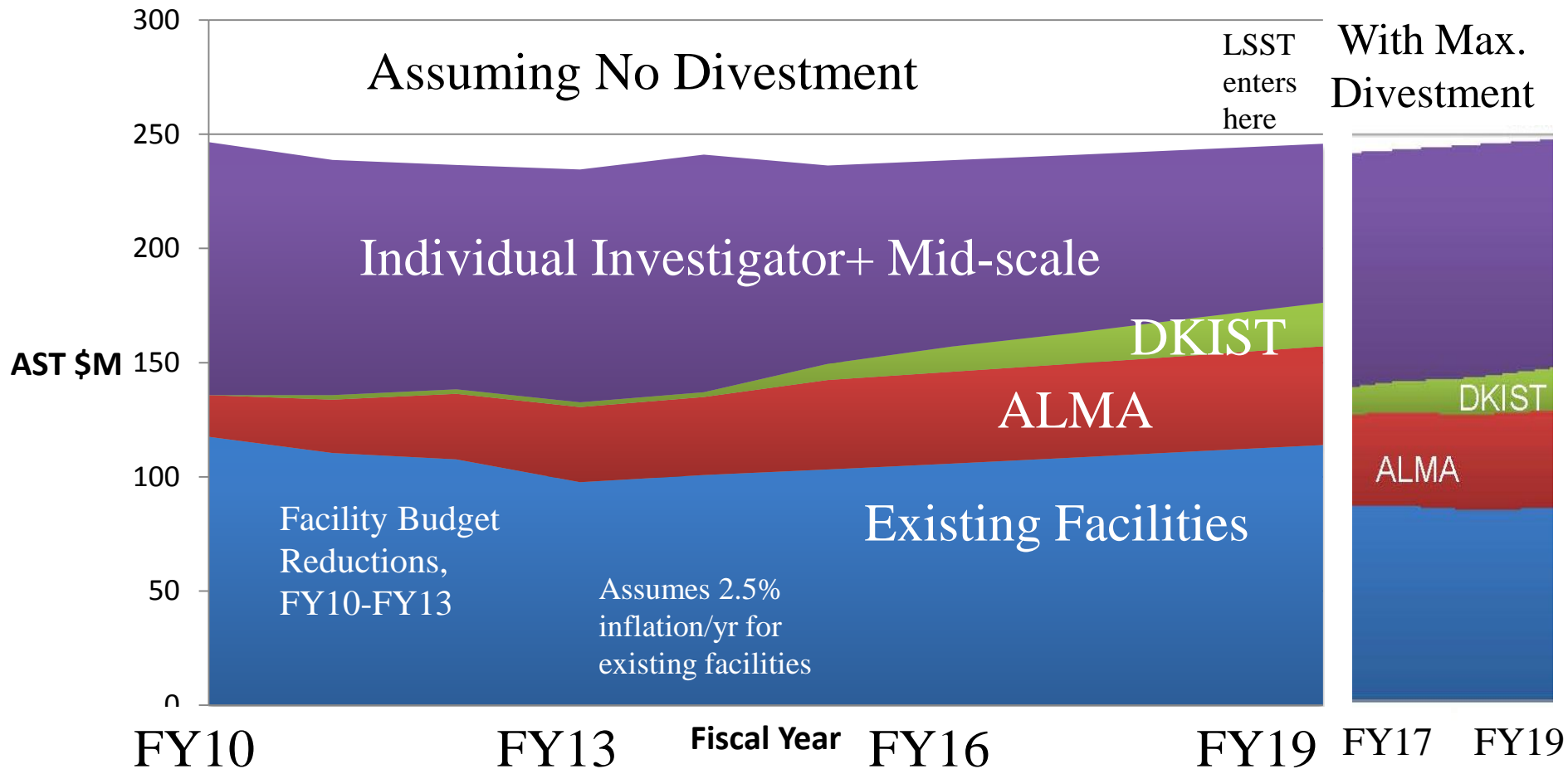
AST Budget Breakdown, 2011-2016



- Facility fraction increased from 56% in FY 2011 to 60% in FY 2016 request.



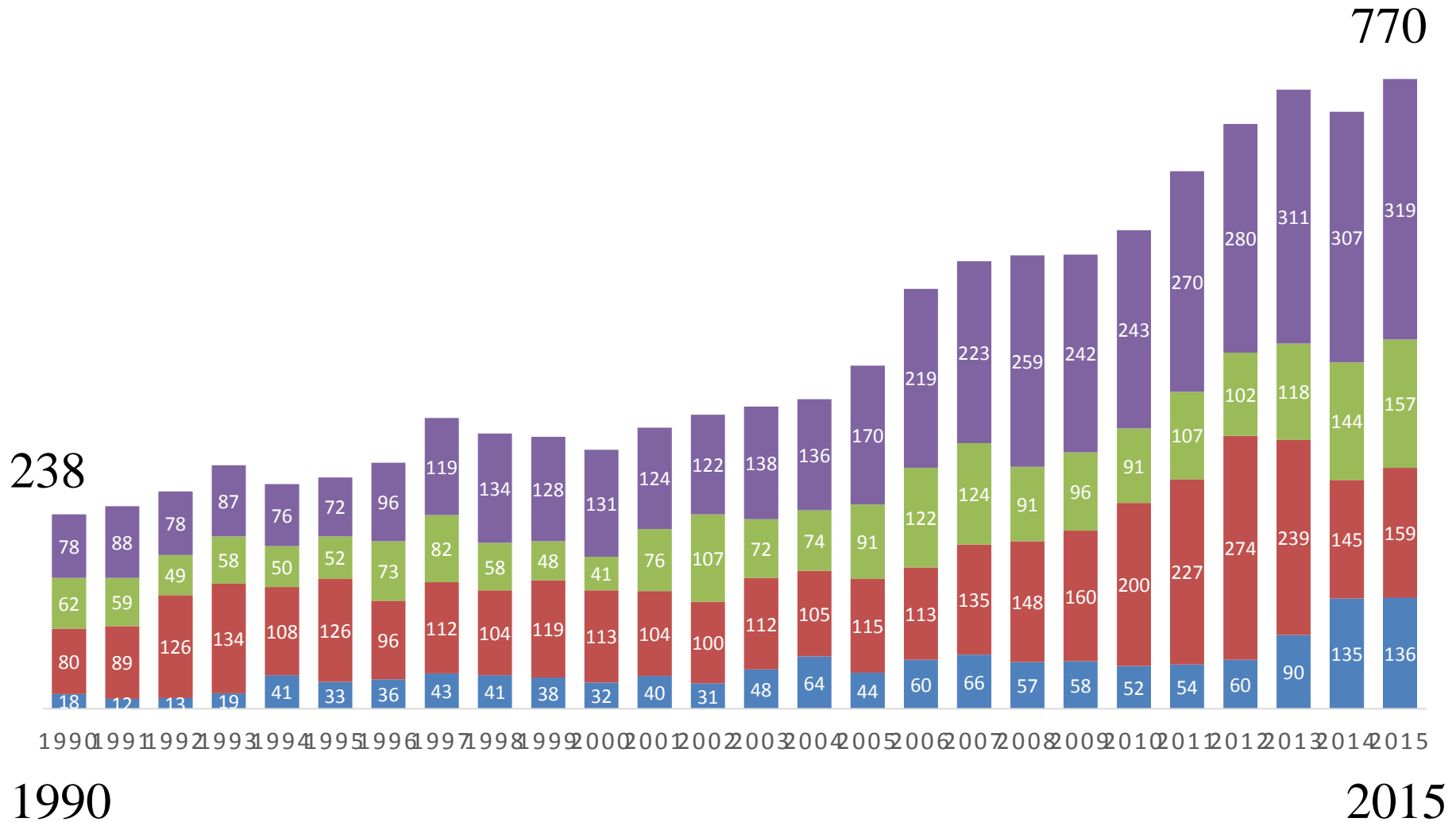
AST Portfolio Scenarios



- Chart above shows the maximum impact of divestment (or non-divestment) within a likely budget scenario



Proposals in AAG, 1990-2015





Arecibo Status

- Arecibo has three scientific missions: Radio Astronomy, Aeronomy & Solar System Astronomy, funded by a combination of NSF-AST, NSF-AGS (Atmospheric & Geospace Sciences), and NASA.
 - All stakeholders are keenly interested in Arecibo Observatory's continued long-term productivity, each provides ~1/3 of funding.
- Dear Colleague Letter is part of the re-evaluation process recommended by that Portfolio Review Committee.
 - The 2012 AST Portfolio Review recommended AST's involvement be reevaluated later in the decade.
 - A similar DCL was issued in the spring of 2013 for GBT and VLBA for exploring new ideas for their operation.
 - AGS is carrying out its own review of its geospace facilities; that process is expected to be completed early in 2016.
- Once all information is in-hand, NSF will define feasible options to move forward; *No decisions have been made at this point.*



FY 2016 Budget Status

- President's Request Budget for NSF was \$7.72 billion
 - Congressional committee marks were \$7.39 billion (House) and \$7.34 billion (Senate)
- Recent Congressional action on discretionary budget levels relieves sequester caps for FY 2016 and 2017
 - Funding marks not yet given to individual committees
- President's Request Budget for AST in FY 2016 is \$246.5 million, a \$2.4 million increase over FY 2015, and essentially equal to the AST budget in FY 2010
 - Also \$120 million in MREFC line for DKIST and LSST
- Appropriation bills needed by the time the Continuing Resolution expires on December 11



Specific Updates



Facility Capabilities for Planetary Science: An Abbreviated List

- ALMA – planetary system evolution
- Gemini/GPI – imaging exoplanets, proto-planetary disks, exoplanet atmospheres
- Arecibo & GBT – planetary radar imaging
- Daniel K. Inouye Solar Telescope (DKIST) – heliophysics, impact of solar environment on planetary atmospheres, space weather
- Large Synoptic Survey Telescope (LSST) – NEOs and census of the solar system

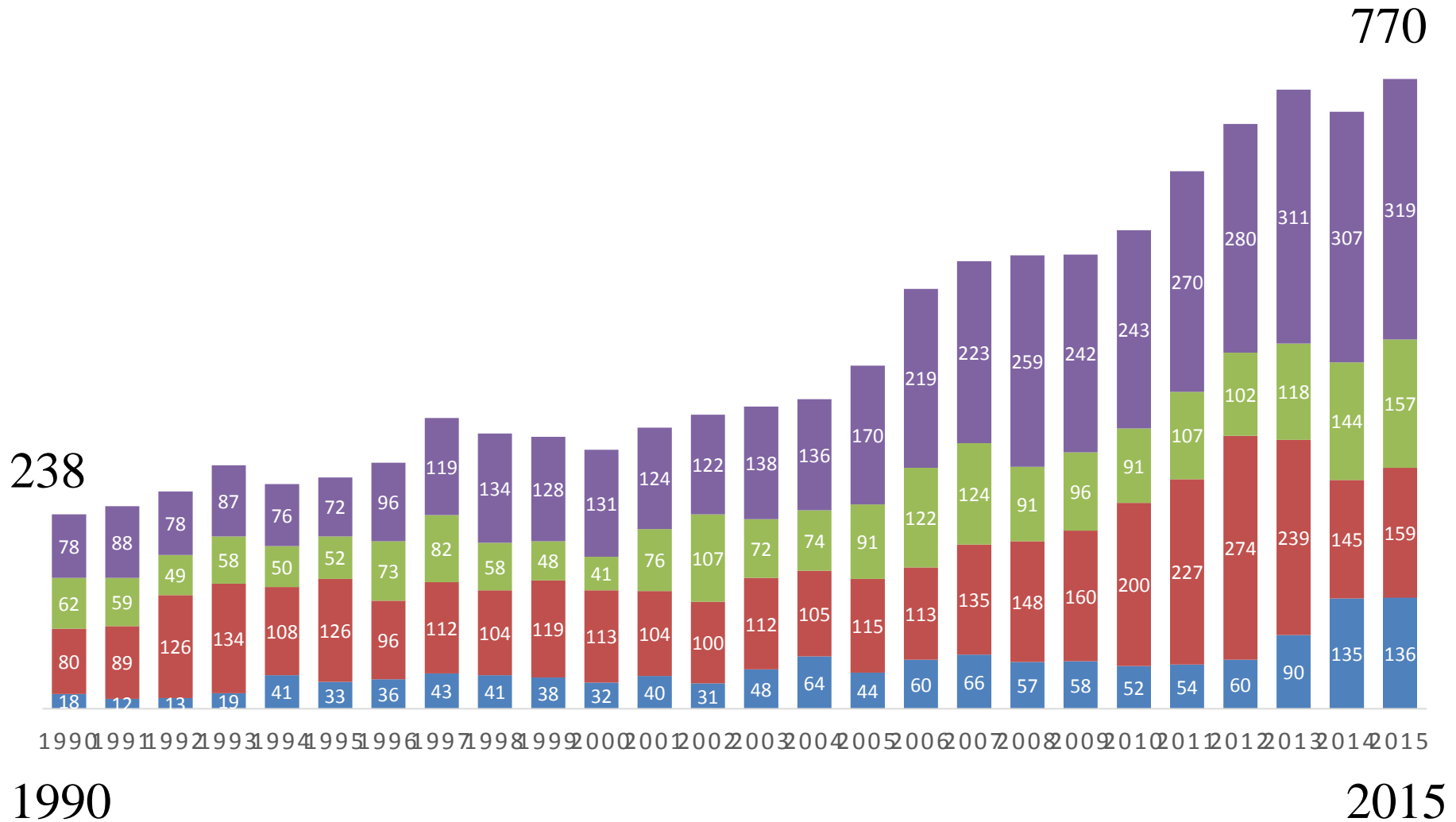


Grants Relevant Planetary Science

- Research: growing presence of exoplanet proposals
 - Astronomy & Astrophysics Postdoctoral Fellowships (AAPF)
 - Astronomy & Astrophysics Grants (AAG) Program
 - Re-organized Stellar and Planetary so that extrasolar planetary now lives under Planetary
 - Separate Lab Astrophysics panel each year
- Instrumentation:
 - Advanced Technologies & Instrumentation (ATI)
 - Major Research Instrumentation (MRI)
 - Mid-scale Innovations Program (MSIP)



Proposals in AAG, 1990-2015



AAG: Planetary and Extrasolar planetary Astronomy

- Program description: Studies of solar system and extrasolar planets; the detailed characterization, structure and composition of the surfaces, interiors, and atmospheres of planets and satellites; the nature of small bodies (asteroids, comets, and Kuiper-belt objects); the inter-planetary medium; and the origin, formation, and development of the Solar System and other planetary systems.
- ~92 active awards
- *Note: NSF and NASA are beginning to discuss ways to avoid duplication of proposals.*

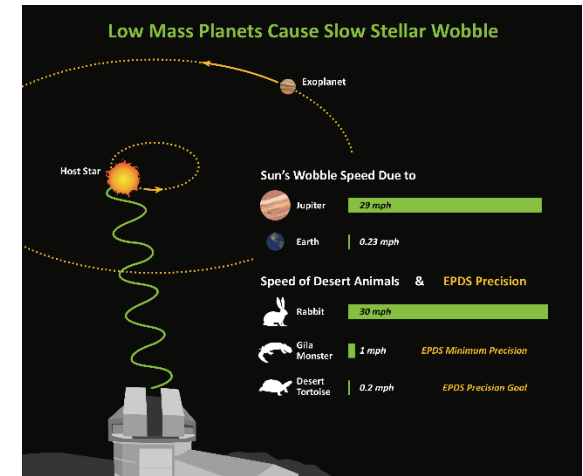


NRC/CAA OIR System Study

- “A Strategy to Optimize the U.S. Optical and Infrared System in the Era of the Large Synoptic Survey Telescope (LSST)”
- Recommended by AAAC in 2013
- Committee chaired by Debra Elmegreen, Vassar College
- Three face-to-face meetings
 - July 31/August 1; October 12-13; December 2-3
- Report delivered in April 2015
- NSF initial response in Dear Colleague Letter NSF 15-115, issued in August 2015
 - Extensive discussions and planning ongoing, with both NOAO and LSST

NN-EXPLORE

- Use WIYN 3.5m telescope for innovative community-based exoplanet program
- Second round of proposals using existing instruments received
- NASA competition for Extreme Precision Doppler Spectrograph underway



Instrument	#proposals	#nights
NASA-GO 15B	16	59
HYDRA	8	37
DSSI	6	17
WHIRC	2	5
NASA-GO 16A	18	85
HYDRA	9	46
DSSI	4	14
WHIRC	4	15
ODI	1	10



Summary



Status Summary

- Outstanding new science opportunities
 - ALMA, EVLA, Gemini/GPI, Blanco/DECam, DKIST, LSST
 - ~110 research awards/yr in AAG, plus MSIP, ATI, AAPF, REU, PAARE
 - Interagency: DES, DESI, NN-EXPLORE (plus LSST, of course)
 - Beyond AST division budget, NSF spent over \$100 million on construction of AST facilities in FY 2015
- No expectation for significant budget increases this decade
 - Divestment process to date does not cover ramp to DKIST ops
 - LSST operations will begin ramp in FY 2019 to ~\$25M/yr by FY 2023
 - Potential AST budget shift to >70% facilities
- Partnerships with NASA and DOE have strengthened
- Data-enabled science continues to grow in importance
- Challenges are many, but our community continues to make progress at the science frontiers



Some Upcoming Strategy Issues

- Impact of facility divestment
 - Positive: some financial resources freed up; intellectual benefits of increased partnerships
 - Negative: partnership complexity, loss or restriction of some community capabilities
- Relation among NSF OIR observatories in Chile after initiation of LSST operations?
- Future relationships among telescopes on Maunakea?
- Facility choices take 5-10 years to implement, and are based on unknowable budgetary futures. What level of risk to grant funds is the community willing to accept in order to commit to operations of additional new facilities?
- What assumptions should be made for next decadal survey?



Types of AST Positions

- Program Officer/Director
 - Permanent Federal Employee
 - Must be a U.S. citizen or seeking citizenship
 - Rotators
 - Intergovernmental Personnel Act (IPA)- remain an employee of home institution
 - 1 - 3 years (in rare cases, 4 years)
 - Visiting Scientist, Engineer, and Educator Program (VSEE)
 - 1 -2 years
 - Must be a U.S. Citizen or able to demonstrate seeking citizenship
- Temporary Federal Employee (FedTemp)
- Expert - usually short term, few months to 1 yr
- AAAS Policy Fellow
- Science Assistant - usually BA or MA level



Thank You!



A. Pasten, A. Gomez
and NOAO/AURA/NSF

09 Nov 2015

AAS DPS Meeting