



NSF Division of Astronomical Sciences (AST) Report

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Outline

- Highlights
- Budget Information
- Facility Management Competitions
- Decadal Survey Status
- Portfolio Review Status



Highlights



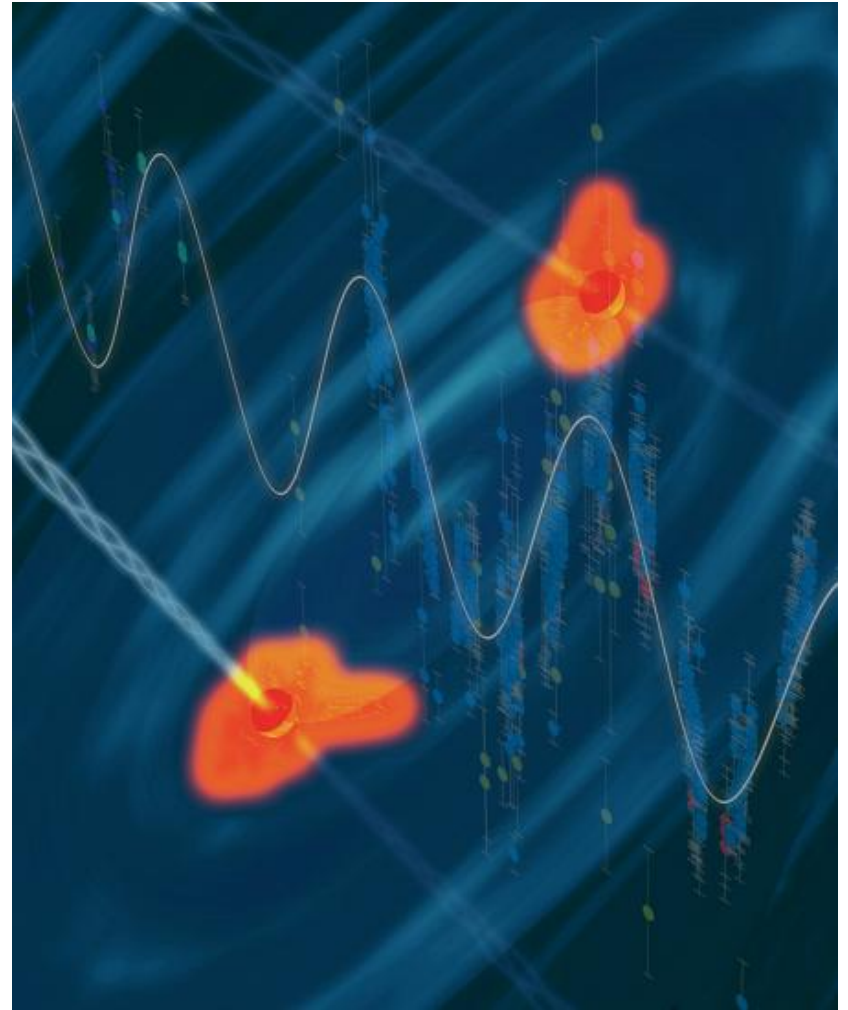
Changes Since November

- Large Synoptic Survey Telescope (LSST) “first-stone” ceremony scheduled for April 14
- NSF FY 2015 appropriation included full appropriation at request level for NSF Major Research Equipment and Facilities Construction line (includes LSST and DKIST)
- Retirements from AST
 - Craig Foltz retired on January 9; Dave Boboltz has taken over National Solar Observatory (NSO) and Daniel K. Inouye Solar Telescope (DKIST)
 - Gary Schmidt scheduled to retire on March 6; Dan Evans is taking over Gemini and the Gemini competition, with an ad open until February 2 for a program officer concentrating on Gemini



Supermassive Black Hole Binary

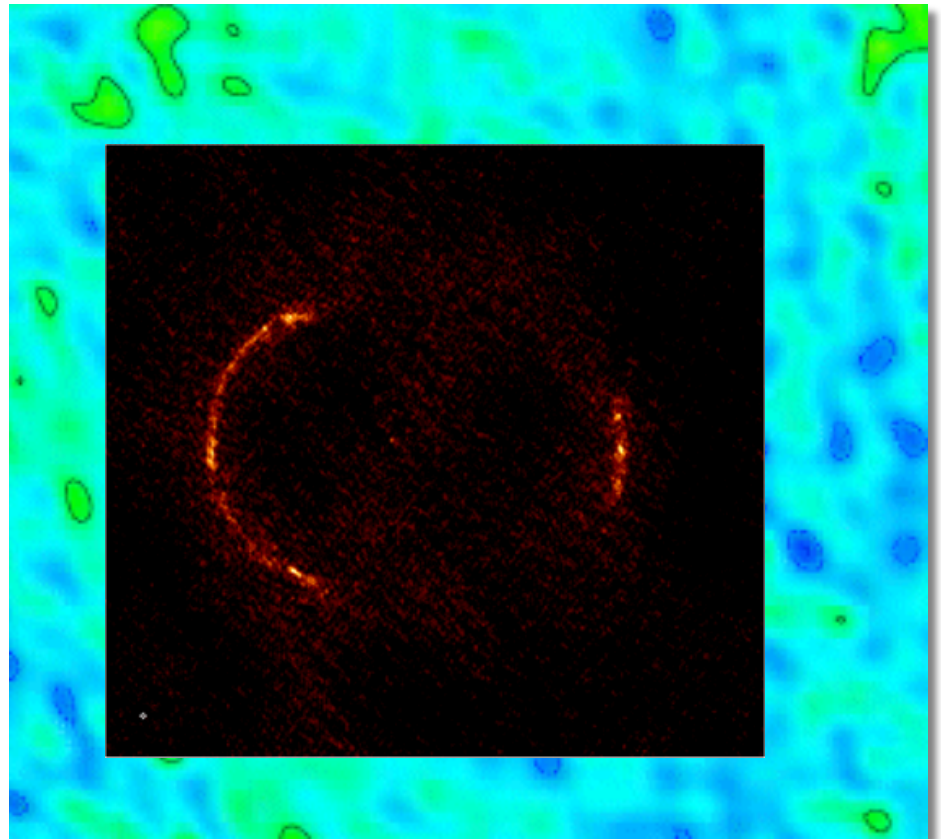
- Catalina Real-Time Transient Survey detected apparent periodic variability in quasar PG 1302-102
 - Period ~ 5 yr, with amplitude of ~ 0.2 magnitudes
 - Periodicity attributed to supermassive black hole binary, with several possible physical mechanisms
- Graham et al., Nature, 7 January 2015
- Award AST-1313422



Credit: Santiago Lombeyda/Caltech Center for Data-Driven Discovery

ALMA in Early Science Cycle 2

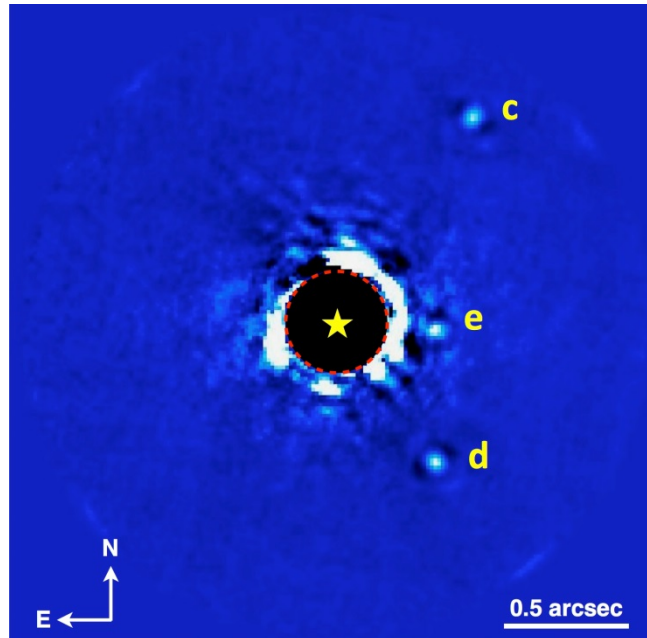
- Capabilities (number of antennas, angular resolution etc.) and available observing time steadily increasing
- Received >1500 proposals from 3400 investigators
- Long-baseline campaign produced spectacular images



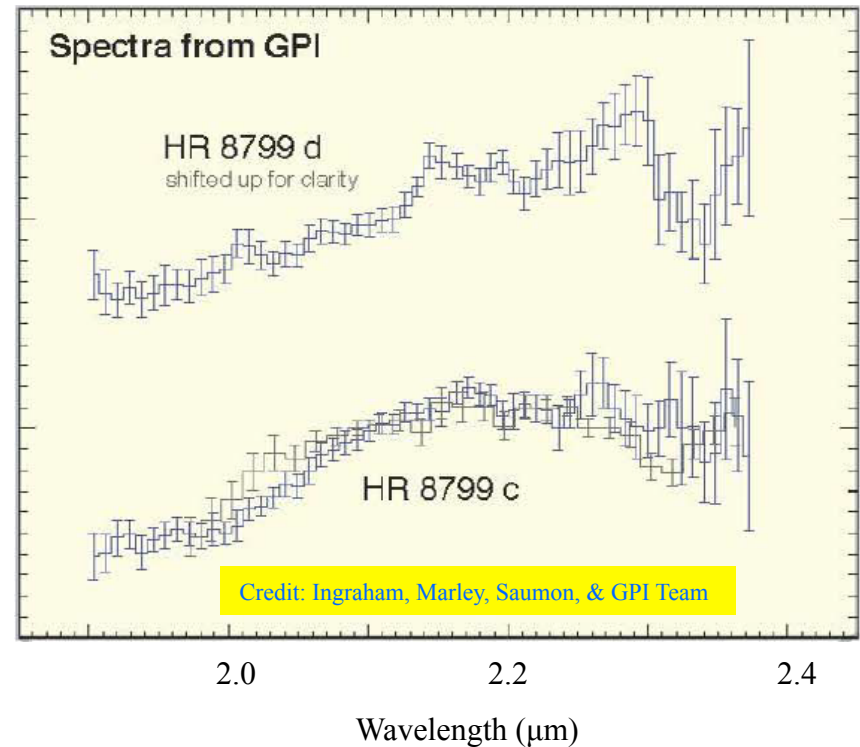
SDP.81 – spatially resolving galaxies in the distant Universe



Gemini Planet Imager: HR 8799



Credit: Marois, Ingraham, & GPI Team



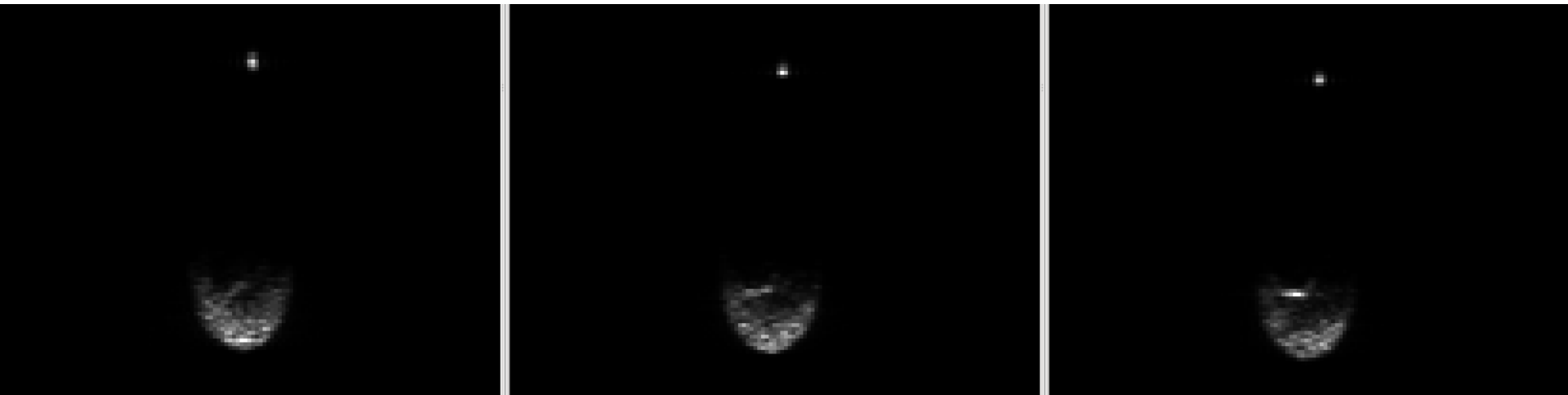
- HR 8799 image and exoplanet spectroscopy at 2.2 μm
- Planets have similar colors, but the spectral shapes indicate significant differences in atmospheric clouds or composition
- Data from early commissioning run of GPI



Asteroid 2004 BL86

- Passed 1.2 million km from Earth on Monday
 - Arecibo & Goldstone (2.3 GHz) monostatic observations
 - Confirmed as binary asteroid, with 330m primary and ~60m secondary

Images courtesy of Arecibo Observatory



- Bistatic observations involving Arecibo:
 - VLBA (Arecibo transmission, VLBA receive)
 - Goldstone transmission (DSS14 at 8 GHz, DSS13 at 5 GHz)
Arecibo receive (technical problems)



Major Construction Projects





NSF Relocation: 2018



- NSF Building under construction in Alexandria



Management Competitions

- National Science Board (NSB) policy states that periodic competitions of managing organizations for national facilities are important for providing fresh ideas and acquiring most efficient delivery of science for the taxpayer dollars invested
 - NOAO competition reaching its conclusion, new cooperative agreement to begin October 2015
 - NRAO proposal deadline in November 2014
 - New cooperative agreement, October 2016
 - Gemini proposal deadline in February 2015
 - New cooperative agreement, January 2017
- Three related information items at NSB meeting next week



Budget Primer and Status



President's Budget Request—A Primer

OMB sets NSF budget level, includes initiatives

NSF holds out funds for initiatives, distributes rest to Directorates

Directorates divide among Divisions, using fancy algorithms based on past spending, play in new initiatives, etc.

Strong constraints on how Divisions can allocate funds

AST discusses priorities throughout year, focusing on NRC and Advisory Committee recommendations

Responsible stewardship of national facilities

Some allocations directed to priorities such as mid-scale

For flat budgets, flexibility is at the margins



What Can Happen

- Congressional appropriation similar to President's Request (e.g., FY 2010, FY 2015)
 - NSF will execute program similar to Request
- Congressional appropriation well below President's Request (e.g., FY 2011-FY 2014)
 - Some initiatives/programs go away or are cut significantly, while others are protected
 - Most programs reduced relative to Pres. Request
- Example, MPS in FY 2013 sequestration year
 - Interdisciplinary initiatives protected: CHE, DMR
 - Facilities protected: AST
 - Consequence: PHY and DMS took very heavy cuts



FY 2015 Appropriation

- Congress received request for FY 2015 in Feb. 2014
- Congressional committees met over summer, reported out bills for various subsets of government
 - Included language mandating spending levels on some favorite or unfavorite programs
- “Cromnibus” appropriation passed in mid-December
 - Note: AST is not a “line” item in budget, included in “Research & Related Activities” line item
 - NSF has 45 days to submit Plan to Congress
 - Committee language mandatory if not superseded
 - Congress has 30+ days to approve or not
 - Hence, no “Approved” public plan until March 2015
 - This has been as late as May/June in recent years



Expectations for AST in FY 2015

	FY14 Req	FY14 App	App/Req	FY15 Req	FY15 App	App/Req
NSF Total	7626	7172	0.940	7255	7344	1.012
NSF R&RA	6212	5809	0.935	5808	5934	1.022
MPS	1386	1300	0.938	1296	???	???
AST	244	239	0.980	236	???	???



FY 2016 Budget Request

- President's Budget Request will be submitted to Congress next week

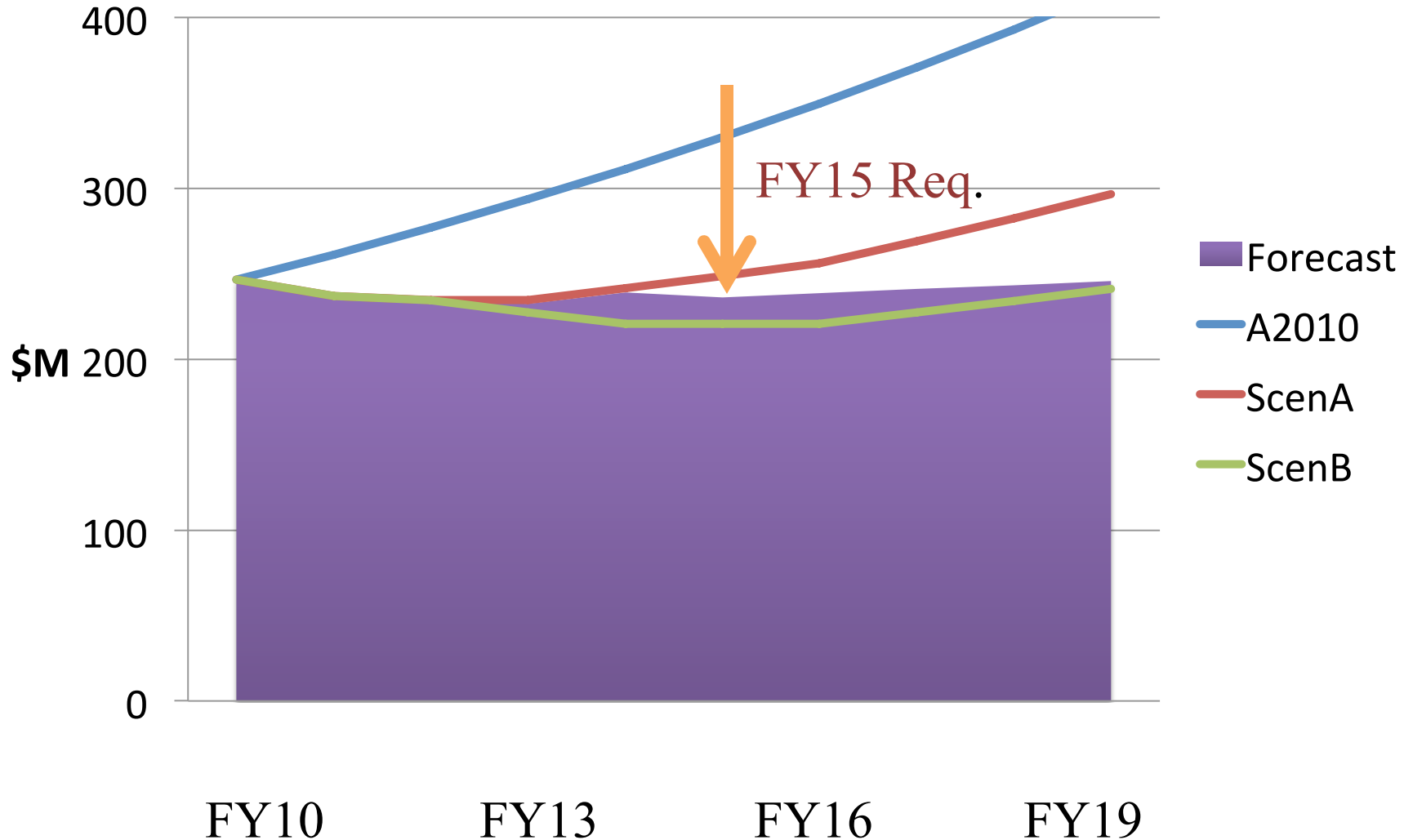
- At present, “sequestration” is still the law for FY 2016
 - Agreement between Congress and Administration covered only FY 2014 and FY 2015
 - Budget Control Act limited discretionary spending to 0.2% increase in FY 2015, and another 0.2% increase in FY 2016
 - Pending possible Congressional action, expectations of large FY 2016 budget increases should be tempered



Decadal Survey Status



NWNH Budget vs. Actual Budget





NWNH Response Summary

- Complete summary of AST response to NWNH is in a Dear Colleague Letter (DCL) that is currently in NSF clearance
 - Includes status of all major, actionable recommendations, plus status of Portfolio Review response



NWNH “Large” Ground Projects

- Large Synoptic Survey Telescope (LSST)
 - Construction award in August 2014; “first stone” in April
 - Spun up NRC committee to study OIR system in LSST era
- Mid-Scale Innovations Program (MSIP)
 - FY13 solicitation; categories modified from *NWNH*

Awarded Proposal	PI	Amount (AST)	Funded
Zwicky Transient Facility	Kulkarni	\$9.0M	FY 2014
Advanced ACTPol	Staggs	\$10.0M	FY 2014
H Epoch of Reionization Array	Parsons	\$2.1M	FY 2014
Event Horizon Telescope	Doeleman	\$6.5M	FY 2015
Two More Proposals	Pending	Co-funds, \$7.5M	Pending



*NW*NH “Large” Ground Projects-2

- 25% federal investment in one Giant Segmented Mirror (GSMT) candidate—MREFC
 - No construction funding available this decade
 - Issued a solicitation for a planning award for community participation in GSMT, awarded to TMT after thorough review

- \$100M federal share (~1/3 AST) in Atmospheric Cerenkov Telescope Array (ACTA)—non-MREFC
 - AST informed CTA-US team that they need to compete in MSIP
 - Recent HEPAP P5 subcommittee report



NWNH Medium Projects

- CCAT (formerly Cerro Chajnantor Atacama Telescope)
 - Recommended AST investment of \$37 million in a \$140 million project, plus \$7.5 million annually in operations support
 - NSF funded final CCAT design at \$4.5 million in FY 2011-2014, plus another \$0.25 million supplement in FY 2015
 - Since funding CCAT as a strategic investment would leave no funds for an MSIP competition, CCAT team was told that they needed to compete in MSIP



NWNH Small Programs-1

- \$8M (17%) increase in AAG from ~\$46M base
 - \$49.4 million in FY 2011, now \$43.7 million in FY 2014
- \$5M (50%) increase in ATI from ~\$10M base
 - Held at \$10.5 million through FY 2012, then reduced to \$8.5/7.5M in FY 2013/2014 to make room for MSIP.
- \$2M increase in Gemini contribution subject to restructuring; increased U.S. observing share
 - Restructured after 2012 U.K. withdrawal; U.S. share went from 50% to 65% with no increase in contribution



NWNH Small Programs-2

- \$1.5-2M increase in Telescope Systems Instrumentation Program (TSIP)
 - No funds to maintain TSIP and start MSIP
 - TSIP was folded into MSIP as recommended by PR
- \$2.5M for Theory & Computation Networks
 - Initiated NSF/NASA program (TCAN) in FY 2013 with \$1.5M/yr for three years for each agency



Other NSF Recommendations-1

- Decadal Survey Implementation Advisory Committee
 - Some functions to NRC Committee on Astronomy and Astrophysics
 - NRC committees typically advise on strategy, not implementation
- International Collaboration and Open Access
 - “Principles for Access to Large Federally Funded Astrophysics Projects and Facilities” developed in conjunction with AAAC
- International Science Community Forum
 - Would require more future commitments to facility operations
- Data Handling and Data Curation
 - LSST, DES, national facilities, “Principles for Access”
- Maintain/increase funding for lab astrophysics
 - Instituted 1-2 panels focused on lab astro



Other NSF Recommendations-2

- Restructure Gemini, consider NOAO/Gemini consolidation
 - Not feasible to simply “combine” NOAO and Gemini
 - AURA consolidated administrative services
 - NSF increased NOAO engagement in Gemini
 - NRC OIR Committee considering science coordination needs
- Solar astronomy program (operations, multidisciplinary)
 - Space weather discussions
 - First DKIST operations increment in FY 2015 budget request
 - Relocation of NSO headquarters to Boulder
- NASA & NSF—high-precision radial velocity surveys
 - Joint NN-EXPLORE program using NOAO share of WIYN 3.5-m telescope, will start in FY 2015
 - NASA ROSES update for extreme precision Doppler spectrometer released last week



Broadening Participation

- NWNH (Chapter 4) contains “Conclusions” but no specific recommendations regarding gender equity and under-represented minorities
- AST and MPS have developed new web pages describing all the programs and opportunities available in these areas, including direct links to some of the prominent programs funded by AST
 - Partnerships in Astronomy & Astrophysics Research & Education
 - Research Experiences for Undergraduates
 - Astronomy & Astrophysics Postdoctoral Fellowships
 - CAREER
 - Education & Special Programs unsolicited proposals

http://www.nsf.gov/mps/ast/broadening_participation/index.jsp

http://www.nsf.gov/mps/broadening_participation/index.jsp



Next “Senior Review”

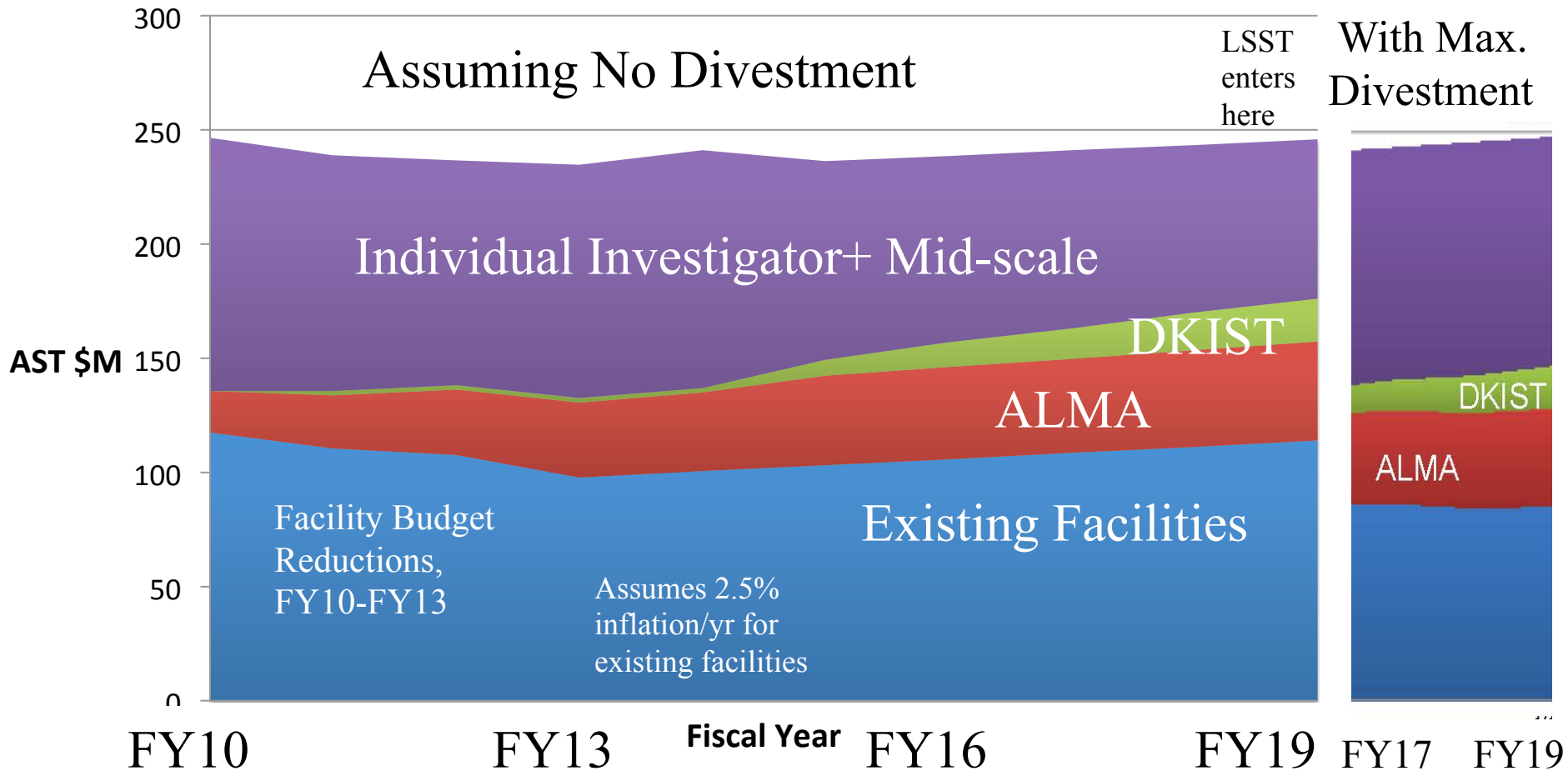
- *NWNH*, p. 32:
 - “NSF-Astronomy should complete its next senior review before the mid-decade independent review that is recommended elsewhere in this report, so as to determine which, if any, facilities NSF-AST should cease to support in order to release funds for (1) the construction and ongoing operation of new telescopes and instruments and (2) the science analysis needed to capitalize on the results from existing and future facilities.”
- This became the AST Portfolio Review (PR)



Portfolio Review Status



AST Portfolio Scenarios



AST budget assumption: FY15=Request, 1%/yr growth thereafter



Generic Divestment Response Process

- Pursuing partnerships with universities, institutes, and federal agencies through meetings & negotiations
- AST issued Dear Colleague Letter NSF 14-022 on December 20, 2013
 - Lays out future steps for all telescopes that were either recommended for divestment in the near term or for future consideration
- In 2014, NSF (Office of General Counsel) hired an engineering firm for all NSF environmental contract work
 - Undertaking engineering feasibility and baseline environmental review to identify feasible alternatives for facilities
 - Will be followed (2015-2016) by formal environmental review processes, leading to preferred alternatives for facilities that do not have viable partnerships in view



Facility Futures

Telescope	Status
KPNO 2.1m	Open ops ended; proposals for new operator under evaluation
Mayall 4m	Slated for DESI, pending DOE funding; bridge from NSF
WIYN 3.5m	NOAO share to NASA-NSF Exoplanet Research Program
GBT	Partner discussions in progress; engineering study under way
VLBA	Partner discussions in progress; engineering study under way
McMath-Pierce	Bridging to university-led consortium; engineering study
GONG/SOLIS	SOLIS moved off Kitt Peak; GONG partner discussions in progress
Dunn Solar Tel.	Partner discussions in progress; engineering study under way
Arecibo	Post-2016 status in discussion; engineering study under way
SOAR	Post-2018 status to be reviewed



Questions / Discussion