National Science Foundation
AAS Town Hall
June 5, 2017

Ralph Gaume, Division Director (acting)

NSF Division of Astronomical Sciences

Jim Ulvestad, Assistant Director (acting)

NSF Directorate for Mathematical and Physical Sciences

Ed Ajhar, Deputy Division Director (acting)

NSF Division of Astronomical Sciences

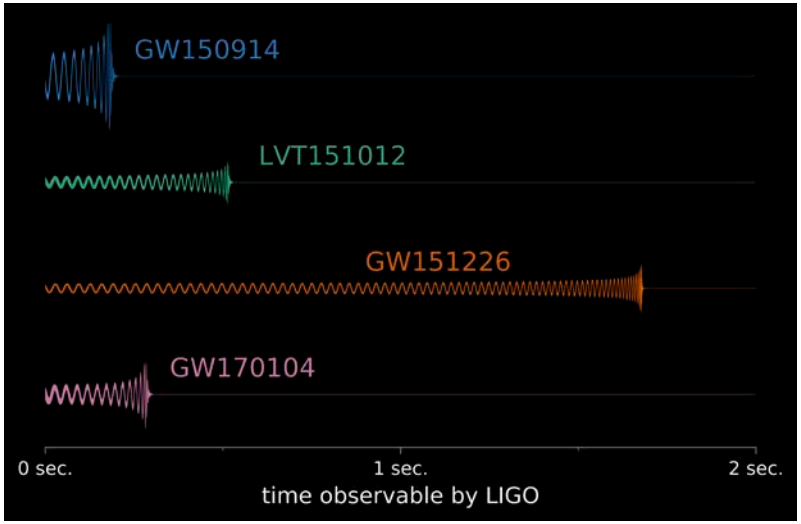
Outline

- MPS Science Highlight (Jim)
- MPS and AST Transitions (Jim)
- Federal Government Reform (Jim)
- FY 2017 and 2018 Budgets (Jim)
- AST Staff Introductions (Ralph)
- AST Science and Facility Highlights (Ralph)
- AST Individual Investigator Programs (Ed)
- AST Budget Outlook FY 2017 and 2018 (Ralph)
- AST Divestment and Environmental Reviews (Ralph)
- Questions (Ralph, Jim, Ed)

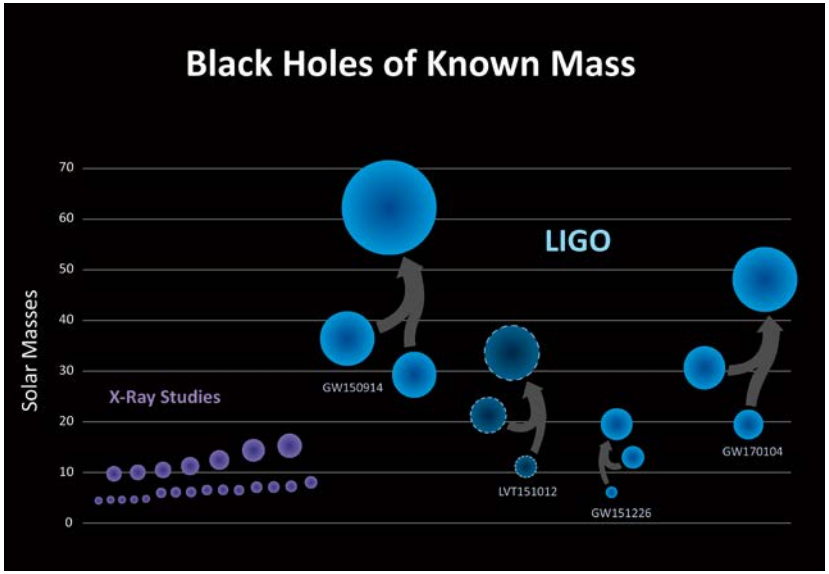
Third LIGO Detection

Third Confirmed LIGO Detection GW170104

The newfound black hole, formed by the merger, has a mass about 49 times that of our sun. This fills in a gap between the masses of the two merged black holes detected previously by LIGO, with solar masses of 62 (first detection) and 21 (second detection).



Images: LIGO.org



Original Black Holes Masses: 19 and 31 $M_{\odot}$.
Final Black Hole Mass: 49 $M_{\odot}$
Distance: 880 Mpc (z = 0.18). The farthest detection so far.

Unlike the previous two detections, it is likely that in this merger the BH spins were initially counter aligned with the orbital angular momentum

No evidence of departure from GR.

MPS and AST Transitions

- Fleming Crim returned to Wisconsin in January 2017; Jim Ulvestad is Acting Assistant Director.
- Deborah Lockhart became Deputy Assistant Director on April 3, 2016.
- Ralph Gaume is Acting AST Division Director (DD), with Ed Ajhar as Acting Deputy DD.
- Search for next AST DD began in late 2016, and aim is to have new DD in place by end of FY 2017.

Federal Government Reform

- Hiring freeze (January-April) had short-term transitory impacts on ability of NSF to staff open positions.
- OMB issued guidance on reform of Federal agencies, ending the freeze.
- Initial agency reform ideas due to OMB on June 30; “final” plans in FY 2019 Budget Request (released ~January 2018).
- Transition from ”freeze” to “reform” has caused significant staffing issues.

American Innovation and Competitiveness Act (AICA)

- New Authorization Act for NSF (and NIST), passed by Congress in early January.
- No specific funding targets incorporated.
- Supports NSF principles of merit review.
- Language relating to NSF awards being in the national interest.
- Language about facility oversight.

FY 2017 Appropriation

- FY 2017 appropriation passed by Congress in early May (with <5 months left in FY 2017).
  - Essentially flat with respect to FY 2016.
- NSF currently preparing FY 2017 plan to be submitted to Congress via OMB.
  - Expect AST budget to be approximately flat.
- Processing of awards handicapped by late budget and early financial closeout.

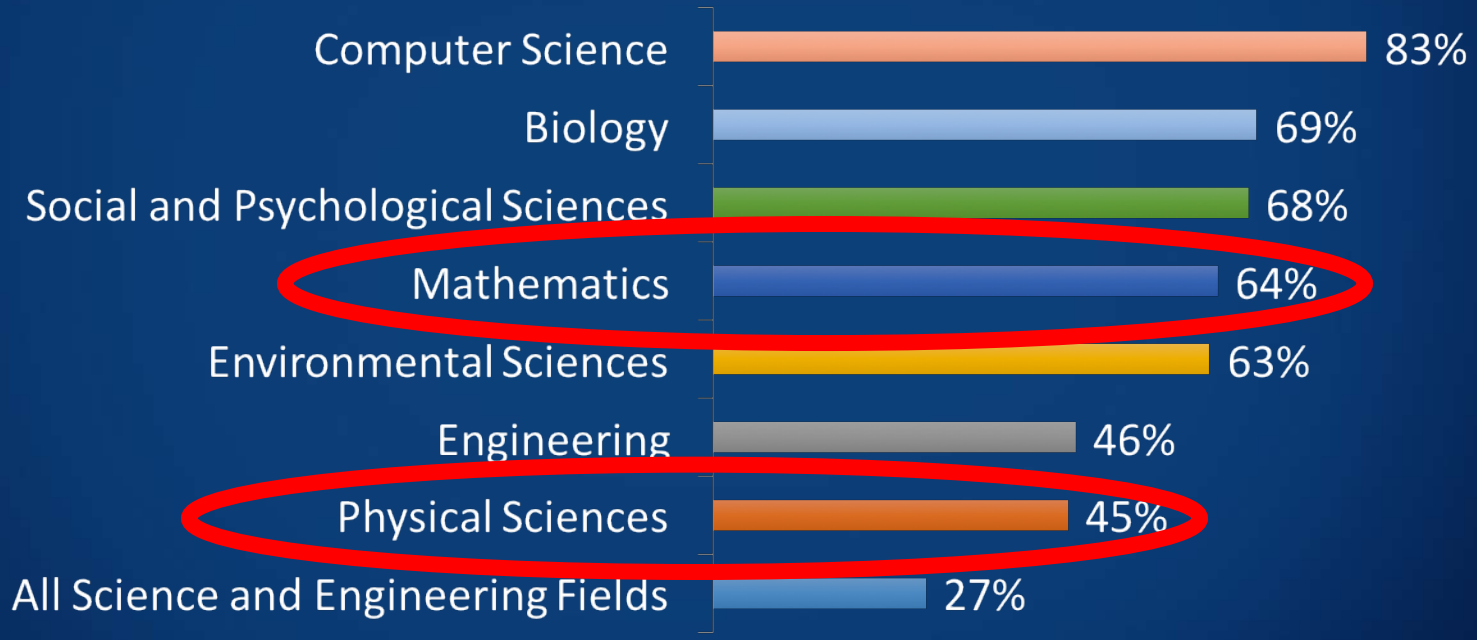
NATIONAL SCIENCE FOUNDATION

FISCAL YEAR 2018 BUDGET REQUEST

Dr. France A. Córdova
Director, National Science Foundation

NSF Support of Academic Basic Research in Selected Fields

(as a percentage of total federal support)



Note: Biology includes Biological Science and Environmental Science. Biology and Psychological Sciences exclude National Institutes of Health funding from the total amount of federal support.

Source: NSF/National Center for Science and Engineering Statistics, Survey of Federal Funds for Research and Development

NSF FY 2018
Budget Request

Total: $6.65 billion

Continued Investment in NSF Research Infrastructure

Daniel K. Inouye Solar Telescope

LSST

RCRV

LIGO

CYBERINFRASTRUCTURE

ALMA

NSF's 10 Big Ideas

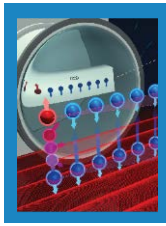
RESEARCH IDEAS

Harnessing Data for 21st Century Science and Engineering

Work at the Human-Technology Frontier: Shaping the Future

Navigating the New Arctic

Windows on the Universe: The Era of Multi-messenger Astrophysics



The Quantum Leap: Leading the Next Quantum Revolution

Understanding the Rules of Life: Predicting Phenotype

PROCESS IDEAS

Mid-scale Research Infrastructure

NSF 2026

Growing Convergence Research at NSF

NSF INCLUDES: Enhancing STEM through Diversity and Inclusion

Principles Applied for FY 2018 Request

- Continue to fund all S&E disciplines
- Support early career
- Protect the core
- Roll back “accretions” (things scaled up since 2008)
- Cross disciplinary programs are important
- Strategic and prioritized reductions within directorates

MPS Overall Funding—FY 2018 Request

$M	FY 2016 Actual	FY 2017 Request Disc.	FY 2017 Approp.	FY 2018 Request
NSF Total	7494	7564	7472	6653
NSF R&RA	5998	6079	6034	5362
MPS	1349	1355	---	1219
AST	246.6	247.7	---	221.2

Looking Ahead: FY 2018 Budget

Markup, reconciliation of appropriation bills

THE WHITE HOUSE
WASHINGTON

B U D G E T

NSF

B U D G E T

2018 Request

May 2017

U.S. HOUSE OF REPRESENTATIVES

House Budget Resolution

UNITED STATES SENATE

Senate Budget Resolution

AST Personnel

Division of Astronomical Sciences (AST)

Office of the Division Director

Ralph Gaume
Acting Division Director

Edward Ajhar
Acting Deputy Division Director

Craig McClure
Program Support Manager

Donna O'Malley
Financial & Operations Specialist

Vernon Pankonin
Senior Advisor

Elizabeth Pentecost
Project Administrator

Administration

Allison Farrow
Program Specialist

Stephanie Hill
Program Assistant (Student)

Diana Phan
Program Analyst

Matthew Viau
Program Specialist

Individual Investigator Programs and Astronomy & Astrophysics Research Grants

James Neff
Program Director
IIP Coordinator; Education & Special Programs (REU, PAARE)

Richard Barvainis
Program Director
Extragalactic Astronomy & Cosmology

Glen Langston
Program Director
Galactic Astronomy

Harshal Gupta
Program Director
Astronomy & Astrophysics Postdoctoral Fellowships

Joan Wrobel
Program Director
CAREER; Extragalactic Astronomy & Cosmology

Faith Vilas
Program Director
Solar and Planetary Research Grants

Hans Krimm
Program Director
Stellar Astronomy & Astrophysics

Peter Kurczynski
Program Director
Advanced Technologies & Instrumentation, Major Research Instrumentation

Linda French
Program Director

Facilities, Mid-Scale, & MREFC Projects

Christopher Davis
Program Director
Gemini Observatory

Philip Puxley
Program Director
National Radio Astronomy Observatory

David Boboltz
Program Director
National Solar Observatory

Nigel Sharp
Program Director
Large Synoptic Survey Telescope

Edward Ajhar
Program Director
Green Bank Observatory, Long Baseline Observatory

Joe Pesce
Program Director
Arecibo Observatory

Vernon Pankonin
National Optical Astronomy Observatory

Richard Barvainis
Mid-Scale Innovations Program

Philip Puxley
Atacama Large Millimeter Array

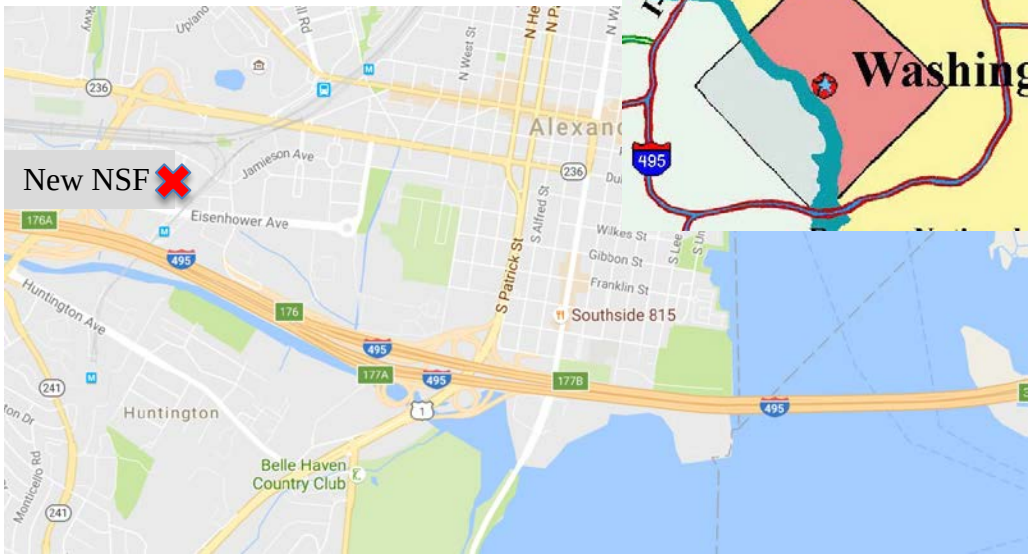
ESM

Thomas Wilson
Program Director

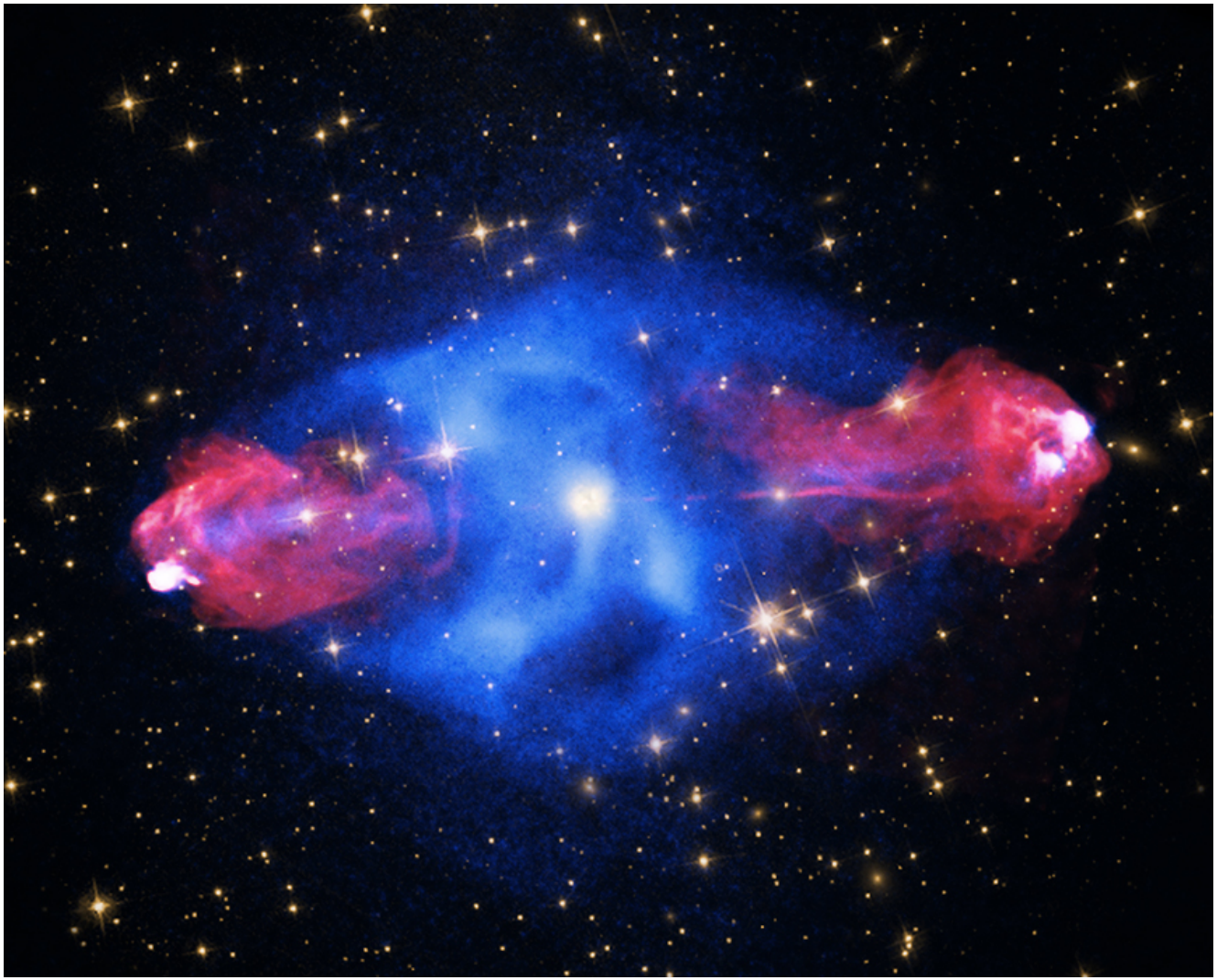
Joe Pesce
Program Director

NSF is Moving !

- NSF will move from its current location in Arlington, Virginia to a location in Alexandria, Virginia in July-September 2017.
- The Directorate for Mathematical and Physical Sciences, including AST, is scheduled to move over the extended Labor Day weekend in September (Sept 2-4).



A Second Supermassive Black Hole in Cyg A?



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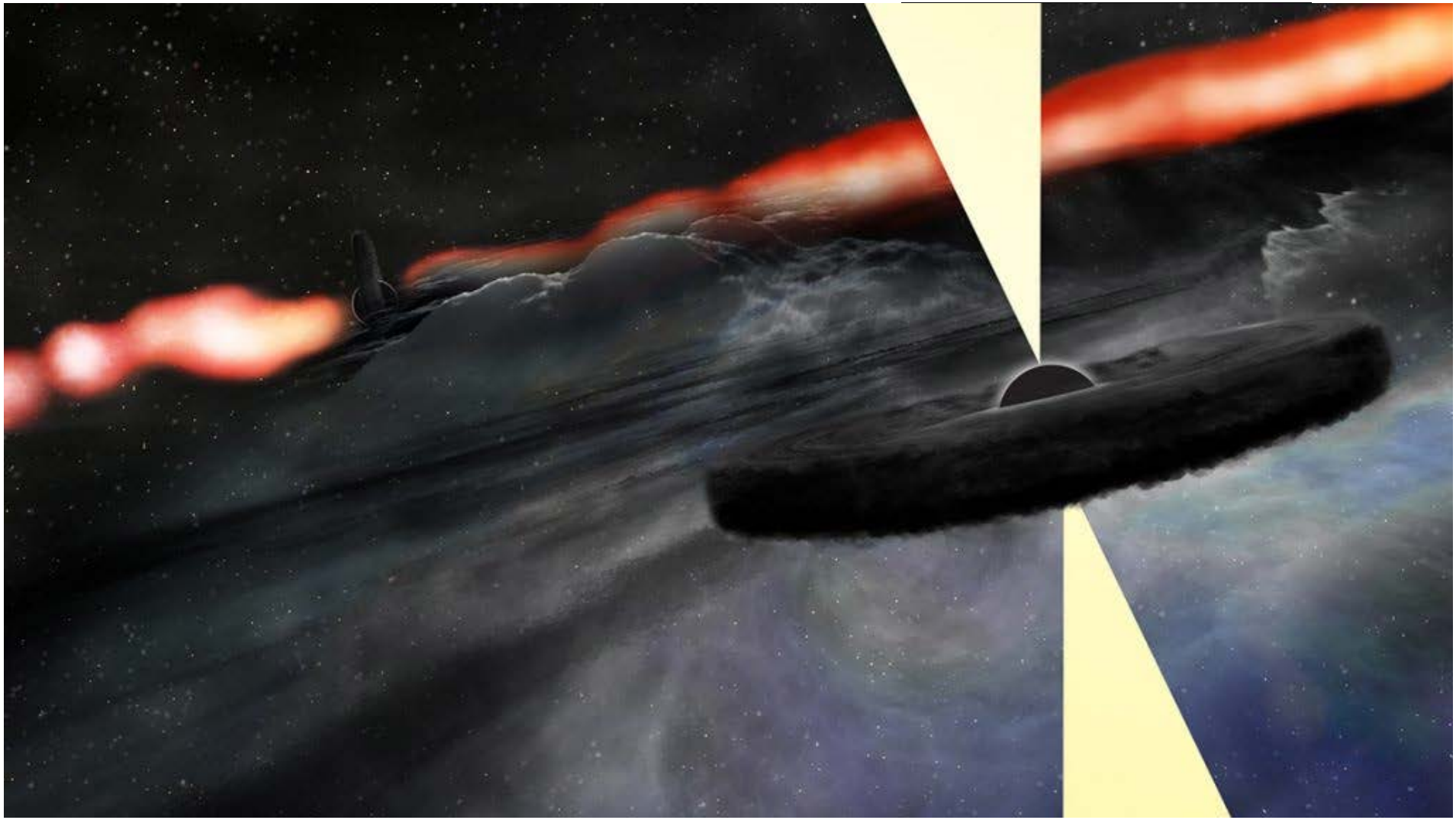
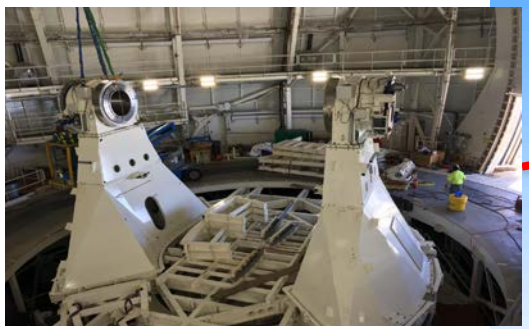
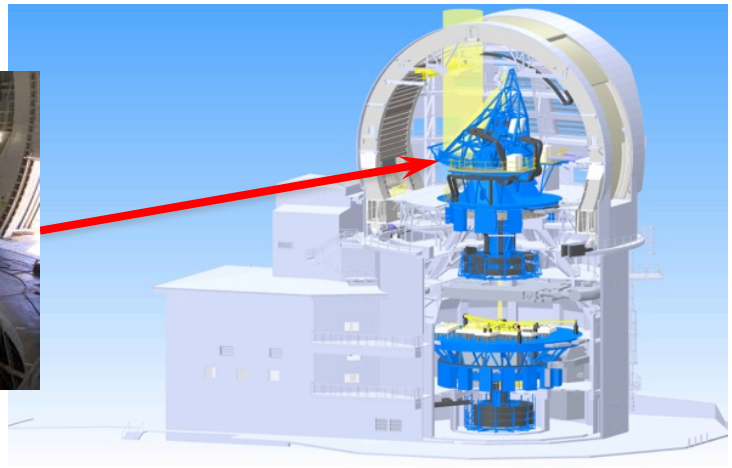


NSF's Daniel K. Inouye Solar Telescope (DKIST)

- Science Driver: Determining the nature of solar magnetism and how these magnetic fields drive the phenomena collectively know as space weather.
- Location: Haleakala, Maui, Hawai'I
- Hawaii Supreme Court affirmed construction permit (October 2016)
- Planned Completion: Early 2020

DKIST will be the world's flagship facility for ground-based solar astronomy.





Large Synoptic Survey Telescope

- 10 year survey of 10s of billions of objects in space and time
- F1.2, 8.4m primary, FOV 3.5d (9.6 sq d)
- 3.2 Gpixel camera, 2 sec readout, ~15 TB per night
- 825 visits per pointing (main survey = 18,000 sq d)
- ~10 M alerts per night, 60 sec latency
- Construction progressing, late 2022 start date for survey.

Recent construction image

… compared to artist's impression

Individual Investigator Programs

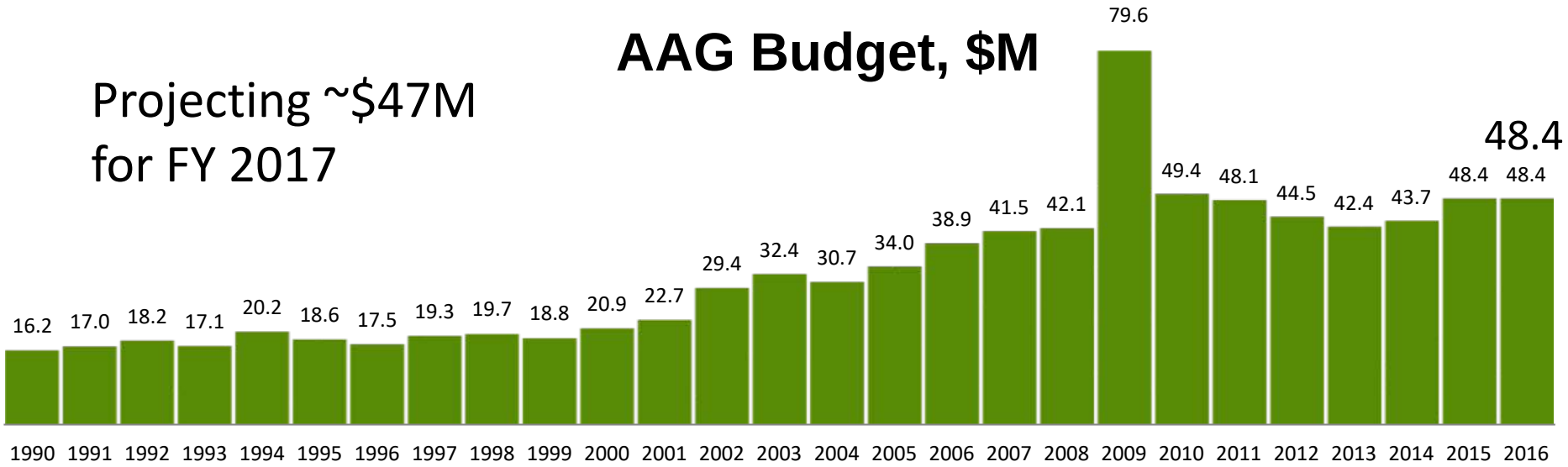
FY 2017 Status

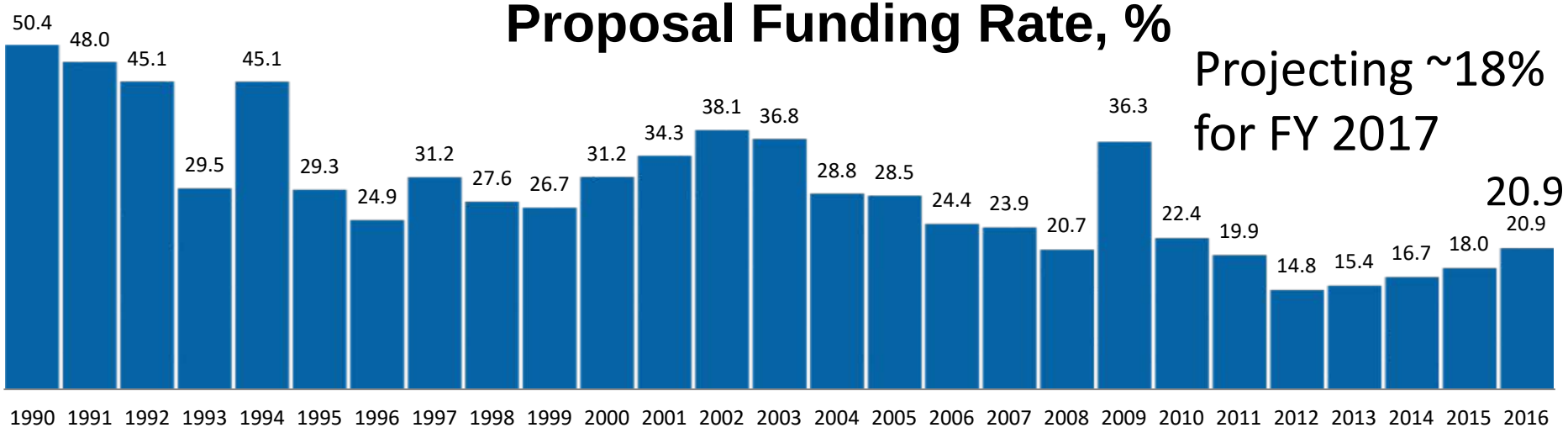
- NSF has a goal of achieving "Division Director concurrence" on 75% of all proposals within six months of submission deadline (up from 70% previously).
  - In FY 2017, AST achieved 78% on AAG, nearly 100% on AAPF and CAREER, over 60% on the Advanced Technologies and Instrumentation (ATI) program.
  - Currently in process of completing the balance of awards and declines.
- AST continues its strategic review of instrumentation programs to evaluate potential overlap in the goals of the programs.

Solar and Planetary Research Grants (SPG) Pilot Program

- In FY 2017, AST is running a pilot program with NO PROPOSAL DEADLINE for SPG (NSF 16-602).
  - Purposes: Understand and resolve issues with proposal handling, merit review, and funding; alleviate impact of life events for proposers; investigate impact on proposal load over the year; enable proposal file updates for minor errors.
  - Declined proposals may not be resubmitted for 12 months
  - So far, 76 proposals received, 66 reviewed on 3 panels

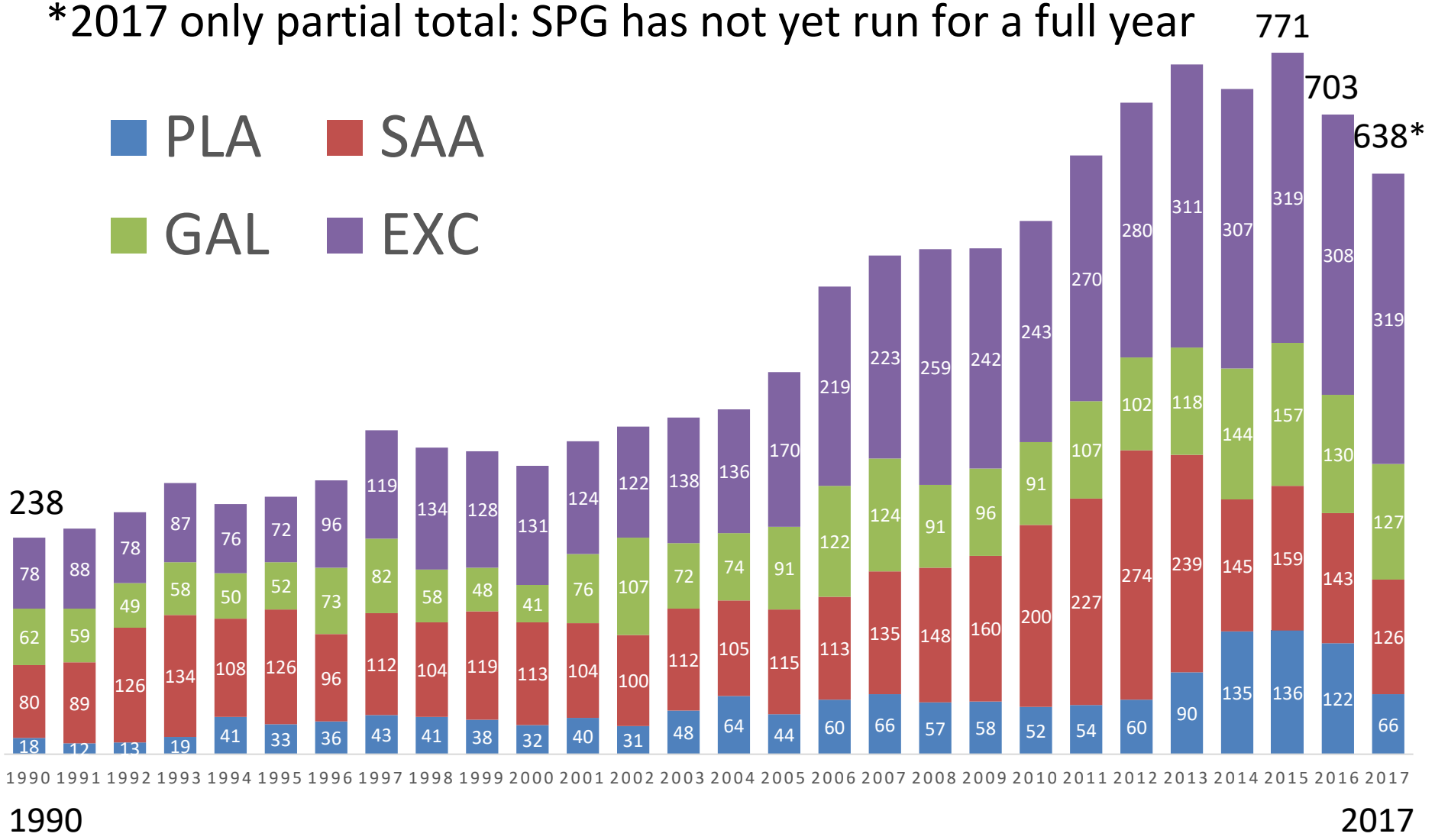
AAG Funding History, 1990-2016





Proposals in AAG, 1990-2017

*2017 only partial total: SPG has not yet run for a full year



1990 2017

FY 2017 & 2018 Budgets

FY 2017/2018 Budget

$M	FY16 Funding	FY17 Pres. Budget	FY18 Pres. Budget
AST Total	246.4	247.7	221.2
Facility Operations	149.1	155.2	154.8
AAG+ATI	57.4	51.4	41.2
Education/CAREER	10.5	10.9	9.6
MSIP	19.3	18.0	6.0
Other (mostly grants)	10.1	12.2	9.6
MREFC	113.0	87.1	77.8

FY 2018 Pres. Budget Request

- Pres. Budget Request is 1st step in budgeting process.
- AST FY 2018 Request will
  - Largely preserve facility budgets
  - Preserve existing CGIs (multi-year grants)
  - Reduce AAG budget to $40.0, down from $43.4
  - Reduce MSIP budget to $6M, down from $18M
  - ATI program delayed

AST Budget Pressures

- Must plan for possibility of no budget increases for the balance of the decade or perhaps decreases of >10%
- Need to balance facilities, small and mid-scale programs and individual investigator grants
- Mid-decadal survey report stated:
  - *"The LSST operations cost of $8 million at first, growing to $25 million, will be an additional burden on the AST budget in the first half of the next decade. The committee strongly supports the goal of a balanced program that includes facilities, medium scale initiatives, and small-scale initiatives. Maintaining this balance is a challenge at the current level of funding."*

Background: AST Divestment[1]

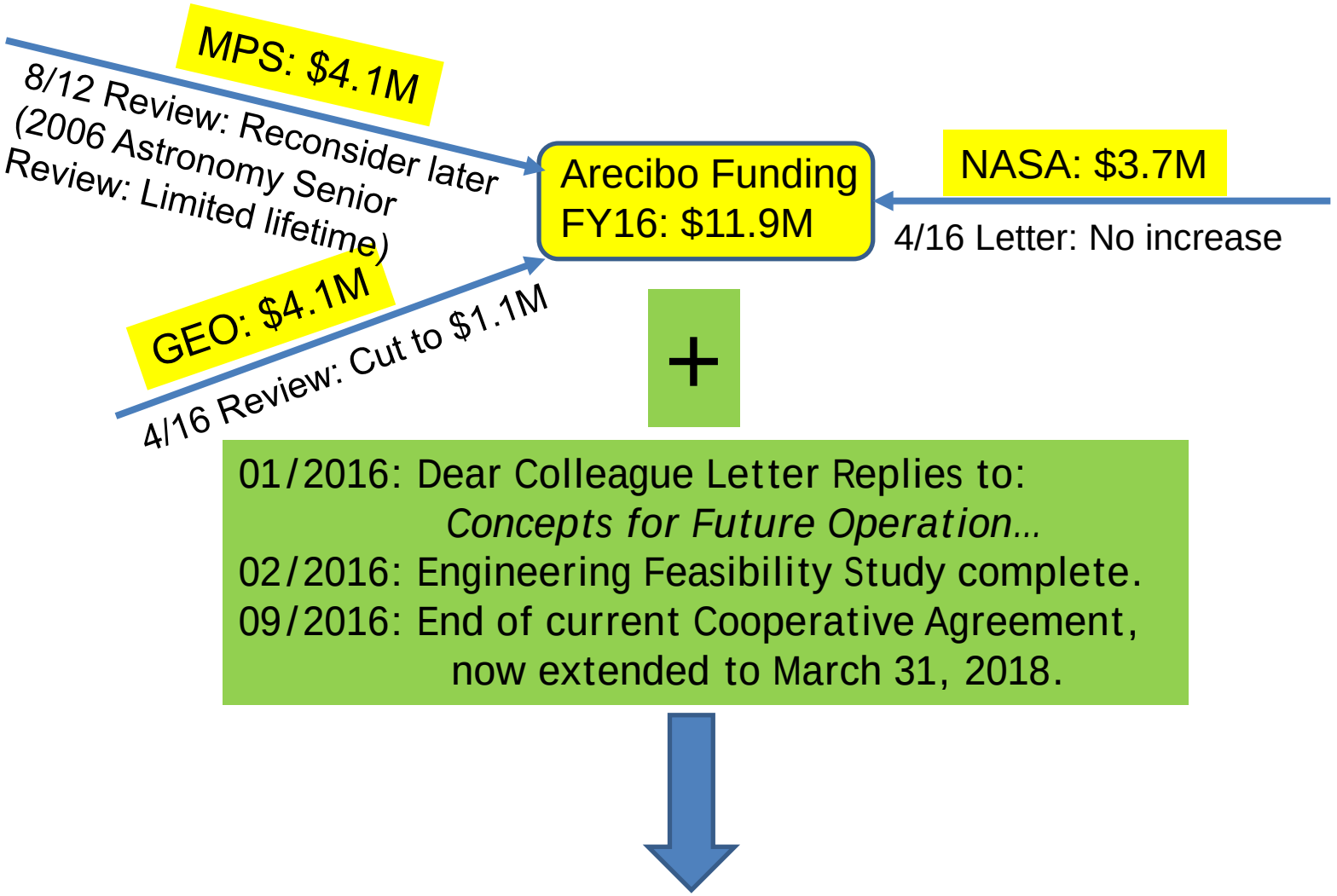
- AST Portfolio Review Report (MPSAC subcommittee), in August 2012, recommended divesting a number of telescopes from AST budget.
- Divestment needed to enable pursuit of highest-priority frontier science and balance the types of science opportunities.
- Subsequent AST actions:
  - Pursued funding collaborations aggressively.
  - Solicited input on innovative operations models.
  - Carried out engineering feasibility studies and baseline environmental reviews for many facilities.
  - Have embarked on preparation of formal Environmental Impact Statements (EIS) as part of the decision process for three facilities: Arecibo, Green Bank, Sacramento Peak (Arecibo process six months ahead of others)

[1] Current status documented by NSF Dear Colleague Letter 17-079, April 27, 2017.

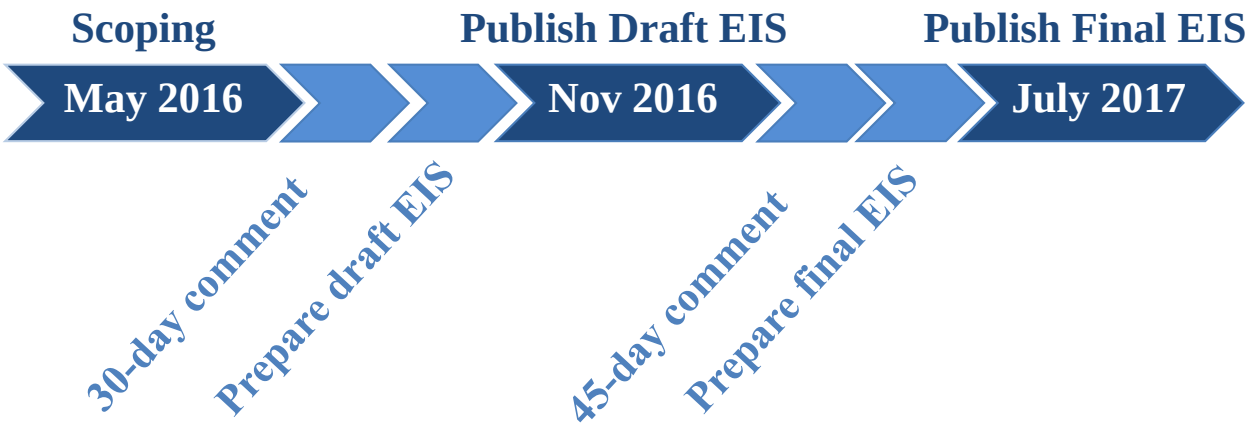
Divestment Summary

Telescope	Status
KPNO 2.1m	Caltech-led consortium (Robo-AO) operating for FY 2016-2018.
Mayall 4m	Slated for DESI; bridge from NSF to DOE; NSF/DOE MOU for transition.
WIYN 3.5m	NOAO share to NASA-NSF Exoplanet Observational Research Program; NSF/NASA MOU in place; NASA instrument selected.
GBO	~25% collaboration for basic scope; started Environ. Impact Statement (EIS) process on October 19. DEIS under prep
LBO/VLBA	Separation from NRAO in FY 2017; MOA with US Navy in place
McMath-Pierce	No obvious partner opportunities; very small user community.
GONG/SOLIS	SOLIS is off Kitt Peak; GONG refurbishment; Interagency Agreement with NOAA signed (NOAA sharing GONG operations costs).
Sacramento Pk.	University consortium in development, and NSF funded NMSU for transition to consortium; started EIS process; completion in 2017.
Arecibo	Formal EIS process under way, and issuance of Record of Decision targeted for 2017. Draft EIS released October 28. Final EIS under prep.
SOAR	Post-2020 status to be reviewed.

Arecibo Observatory: Lead Up to the EIS



Arecibo: Environmental Impact Statement timeline



Arecibo Draft EIS Alternatives under Consideration:

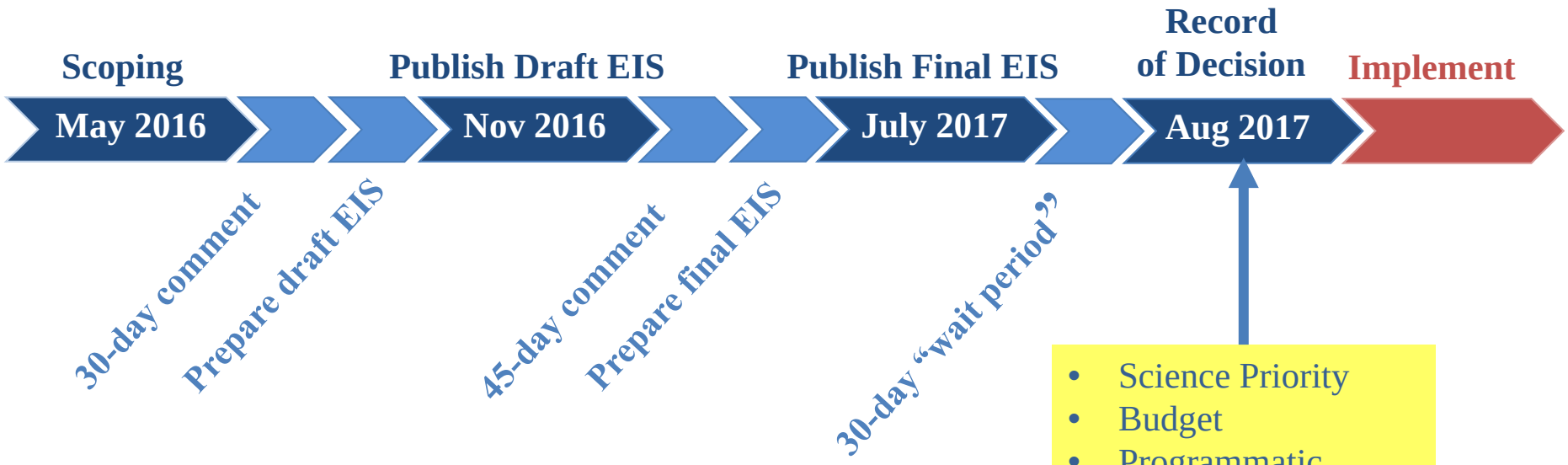
- Continued NSF investment for science-focused operations (No-Action Alternative).
- Collaboration with interested parties for continued science-focused operations (Agency Preferred Alternative).
- Collaboration with interested parties for transition to education-focused operations.
- Mothballing of facilities.
- Partial deconstruction and site restoration.
- Full deconstruction and site restoration.

Arecibo Management Solicitation

- Intended to inform the EIS Agency Preferred Alternative: Collaboration with interested parties for continued operations.
- MPS/GEO Dear Colleague Letter 16-144, Sept 30, 2016: *Intent to Release Solicitation Regarding Future Continued Operations of Arecibo*
- Solicitation Released 25 January, 2017.
- Proposals were due early May, 2017.
- Reduces NSF support from $8.2M/yr (FY16) to $2M/yr over 5 year award.
- Includes NASA Letter of continued support.
- Award made if and only if Record of Decision selects Collaboration alternative.

Project Year	FY	NSF		
		MPS/AST	GEO/AGS	**TOTAL**
1	18/19	$3,600,000	$3,550,000	**$7,150,000**
2	19/20	$2,500,000	$2,500,000	**$5,000,000**
3	20/21	$1,750,000	$1,750,000	**$3,500,000**
4	21/22	$1,250,000	$1,250,000	**$2,500,000**
5	22/23	$1,000,000	$1,000,000	**$2,000,000**

Arecibo: How the Parts Fit Together



Management Solicitation

National Historic Preservation Act Consultation

Endangered Species Act Compliance

Record of Decision will define the "Way Forward", which should be implemented (including any transition) by 31 March 2018.

Questions?