



# NSF AST Programs and Budget Update

AAAC Meeting

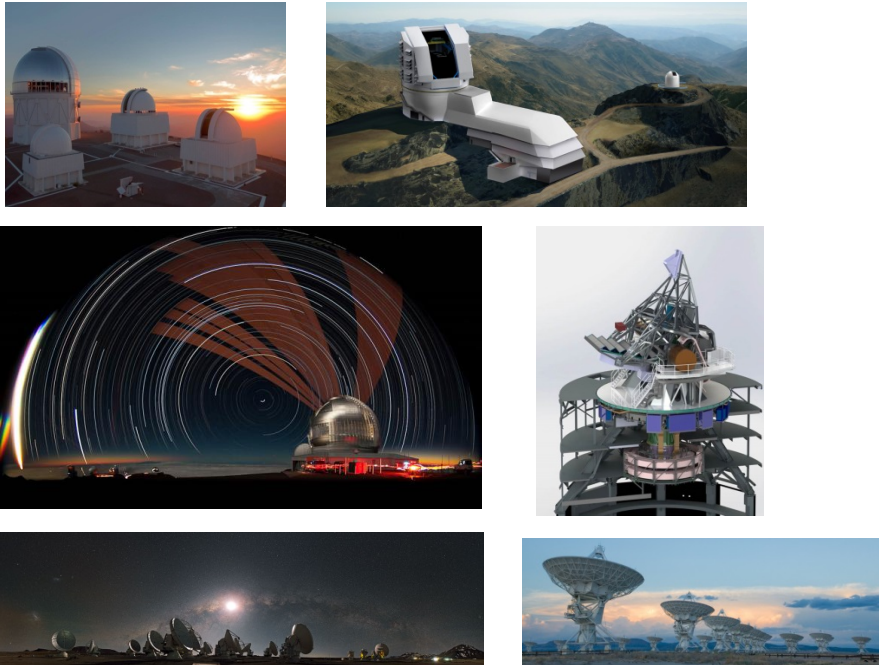
February 3, 2014

Jim Ulvestad, NSF MPS/AST



# AST Strategy to 2020 and Beyond

## Major Facilities



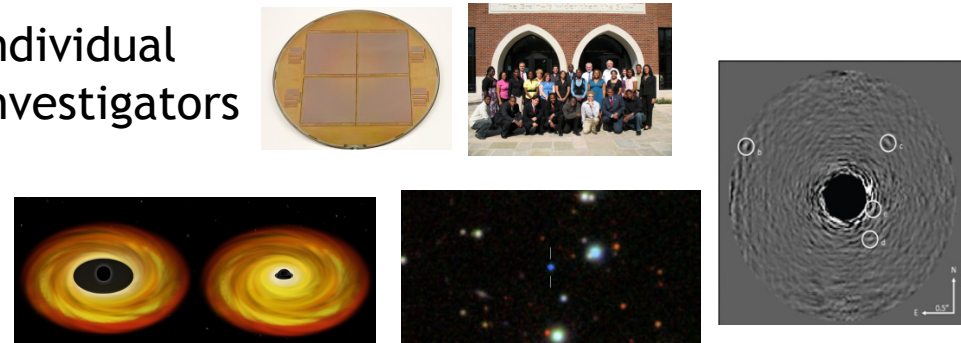
## Divestment/ Partnership



## Mid-Scale Innovations



## Individual Investigators



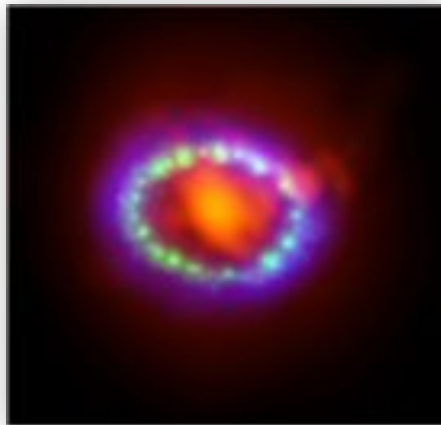


# Key AST Events Since Nov. 2013

- November: ALMA Cycle 2, ~1400 proposals received
- November: GPI first light on sky
- December 2-6: LSST Final Design Review held
- December 15: ATST renamed to Daniel K. Inouye Solar Telescope
- December 20: Released Portfolio Review Dear Colleague Letter, NSF 14-022
- January 6: Discussion of “Access Principles” at CAA Town Hall at AAS Meeting
- January 13: Earthquake off Puerto Rico, cable damage at Arecibo
- January 14: Invited 12 groups to submit full proposals to Mid-Scale Innovations Program
- January 18: Congress passed FY 2014 NSF appropriation



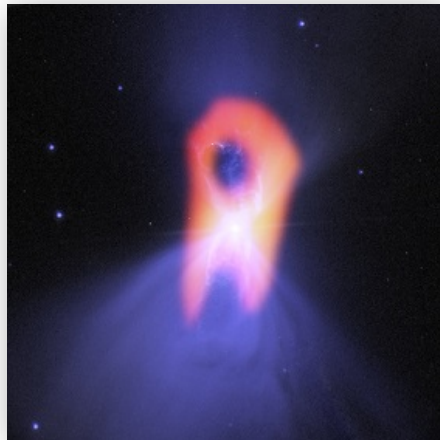
# ALMA High-Impact Science Results



Dust formation in  
supernova 1987A  
Indebetouw et al.  
2014

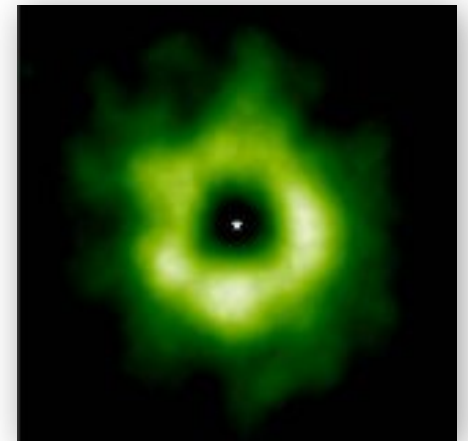


Galaxy superwind  
Bollato et al. 2013,  
and a Nature “Image  
of the Year”



The coldest place  
in the known  
universe ( $\sim 1\text{K}$ )  
Sahai et al. 2013

Imaging the “snow line”  
in an infant solar system  
Qi et al. 2013

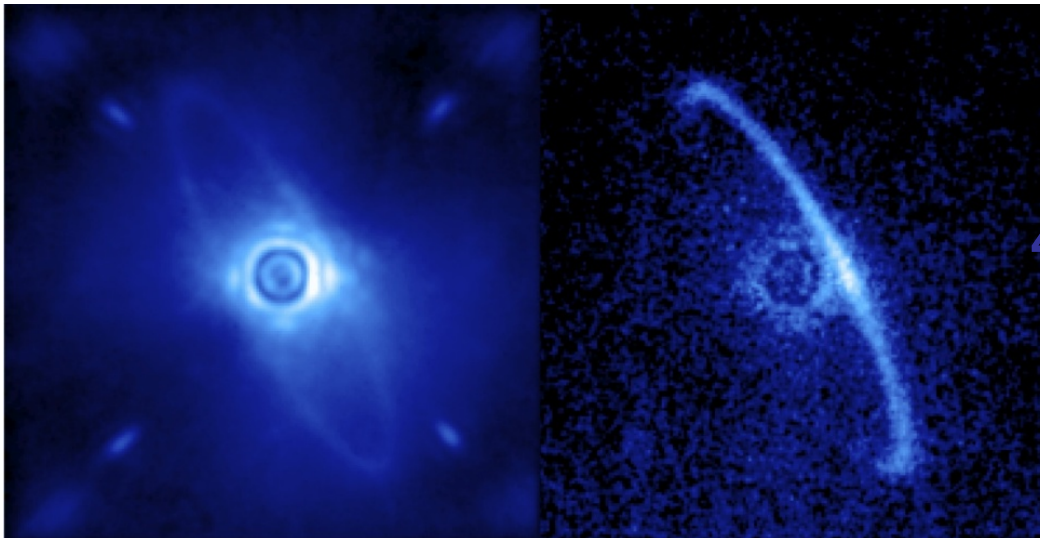






# GPI First Light

- GPI passed commissioning tests at Gemini-South
  - Able to detect and characterize giant planets at  $<10^{-6}$  brightness of parent star
  - Campaign to image ~600 exoplanets orbiting nearby stars begins later this year.



**First light with the Gemini Planet Imager: Dust ring 2x orbit of Neptune around HR 4796A (220 LY distance). Left image: total light; Right image: polarized light. Starlight is blocked.  
(2014 AURA/Gemini)**



# The Telescope Formerly Known as ATST

DKIST renaming ceremony, Dec. 15, 2013



- Telescope renamed the Daniel K. Inouye Solar Telescope (DKIST)
- Operational status scheduled for mid-2019

DKIST Coude pier, Haleakala



Coude rotator construction in Rockport, IL

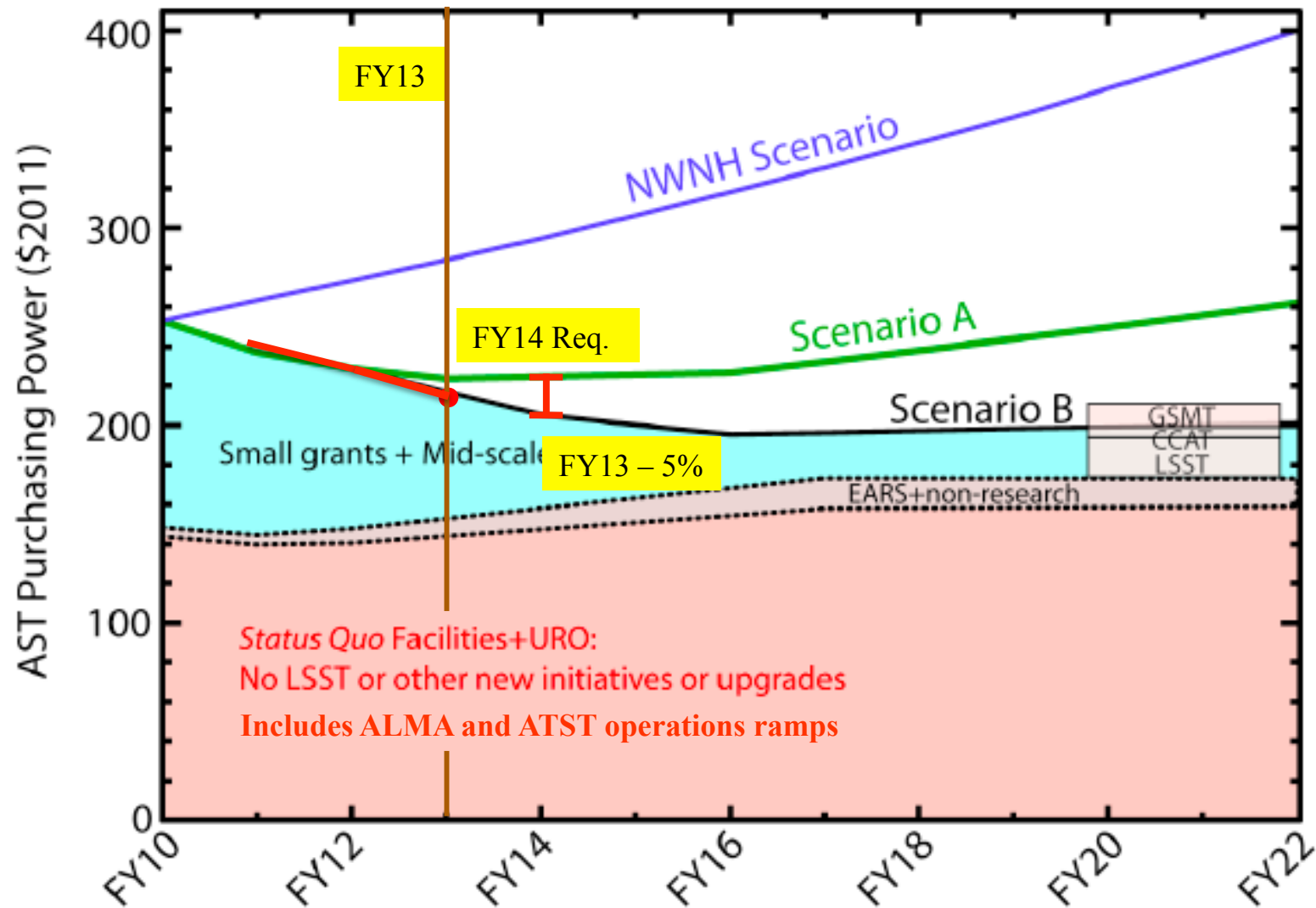




# Portfolio Review NSF 14-022

- This DCL outlines the next step for every telescope that was subject of a divestment-related recommendation in PR report
- Primary focus is on moving toward a formal consideration of alternatives for each telescope
  - For some telescopes, consideration of alternatives is deferred until some triggering event occurs
  - For other telescopes, consideration of alternatives is beginning in 2014
- Consideration of alternatives is a formal process that must comply with National Environmental Policy Act (NEPA), National Historic Preservation Act (NHPA), and Endangered Species Act (ESA)
  - Will include opportunities for public comment

# Portfolio Review Budget Scenarios







# Puerto Rico Earthquake, Jan. 13

- Magnitude 6.4, approximately 100 km from Arecibo (offshore)
- Damage to one of six cables (from one of three towers) supporting the Gregorian platform
- Arecibo telescope likely to be down until March





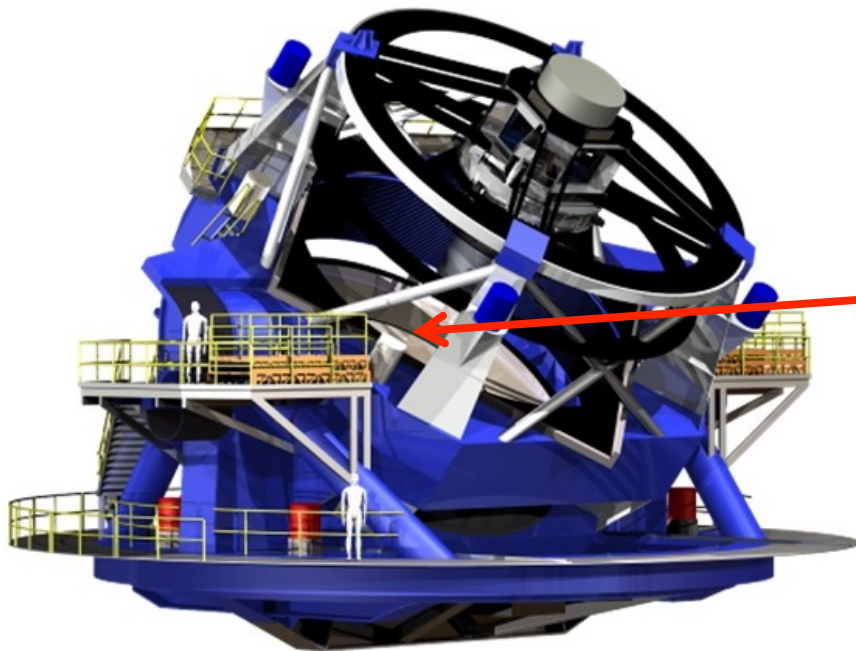


# Decadal Survey (NWNH) Status

- LSST is in FY 2014 President's request, Final Design Review held in December
- MSIP is in FY 2014 President's request, solicitation was released, pre-proposals evaluated, proposal invitations issued
- NSF and community participating in TMT Board, Science Advisory Committee, via planning award
- Only Cerenkov Telescope Array (CTA) opportunity - MSIP
- Only CCAT opportunity - MSIP
- “Small” recommendations: TCAN (Theoretical and Computational Astrophysics Network) started with NASA, no funds available for other recommended increases

# LSST Recent Progress

- Primary-Tertiary Mirror on track to complete final polishing, summer 2014
- Secondary mirror contract in place: ITT/Exelis (design, option to build)
- Telescope Mount Assembly bids reviewed; vendor recommended; negotiation starting
- Summit Facility Construction bids due in early March





# LSST Review Schedule

August 2010	#1 large, ground-based project in NAS decadal survey
Aug/Sept 2011	NSF Preliminary Design Review
Nov 2011	DOE CD-1 camera review
Jan-March 2012	NSF MREFC Panel
May/June 2012	Cost Update and Joint Interface Reviews
July 2012	NSB advances LSST to Final Readiness stage
April 2013	MREFC start requested in President's FY 2014 Budget
December 2013	NSF Final Design Review ←We are here
March 2014	NSF MREFC Panel
May 2014	NSB hears action item for award approval
May 2014	DOE CD-3a review (long-lead procurements for camera)
July 2014	Potential MREFC award begins
2015	DOE CD-2 review (baseline cost for camera project)



# Mid-Scale Innovations Program (MSIP)

- MSIP was #2 priority large program recommended by *New Worlds, New Horizons* decadal survey
- Solicitation NSF 13-567 allowed range of \$4M to \$40M
  - Estimated Number of Awards: 2 to 4
- 38 pre-proposals (8-page project description) received at deadline of September 16, 2013, in four categories
  - Mid-Scale Science Projects
  - Mid-Scale Facilities
  - Development Investments
  - Open Access Capabilities (\$4 million minimum waived)
- 12 groups invited to submit full proposals
  - Full-proposal due date is March 12, 2014



# NSF Appropriation, FY 2014

In \$M	FY12 Plan	FY13 Req	FY13 Plan	FY14 Req	FY14 App.
NSF	7033	7373	6884	7626	7172
R&RA	5689	5983	5545	6212	5810
MREFC	197	196	196	210	200
MPS	1309	1345	1249	1386	???
AST	235	245	233	244	???





# FY 2014 AST Plan

- No AST budget available until FY 2014 Plan is submitted to Congress and approved, c. end of March
- MREFC
  - Requested \$42.0 million for DKIST and \$27.50 million for LSST
  - Congress cut MREFC line by \$10.12 million, funding ongoing projects at request level, remainder for LSST
    - Permission given to request fund transfers
- Senate report language incorporated by reference
  - Fund domestic NRAO at FY 2012 level
  - Require 60-day notice, including cost, to divest any operating facilities



# FY14 Individual Investigator Programs

- AAG (general research grants)
  - Number of proposals approximately equal to FY 2013
  - Expect earlier award decisions than last year because of earlier appropriation
  - No current plan to change due dates or mechanisms
- CAREER: six awards in process
- AAPF: Made 10 initial offers
- REU sites: Six new awards completed
- ATI: Proposals in hand, under evaluation



# FY 2013 AST Budget: \$232.52 M

Program	\$M	Program	\$M
NRAO	41.00	AAG	42.44
ALMA Ops	32.92	URO*	10.76
NOAO	25.50	ATI	8.66
Gemini	18.15	Mid-Scale	7.58
NSO	8.00	EARS	6.00
Arecibo	5.00	CAREER	4.60
DKIST mitigation	2.00	AAPF	2.23
LSST D&D	7.50	REU	2.00
GSMT/TMT	0.25	Misc, expenses	7.93

\*URO includes \$4.46M of FY14 forward funding

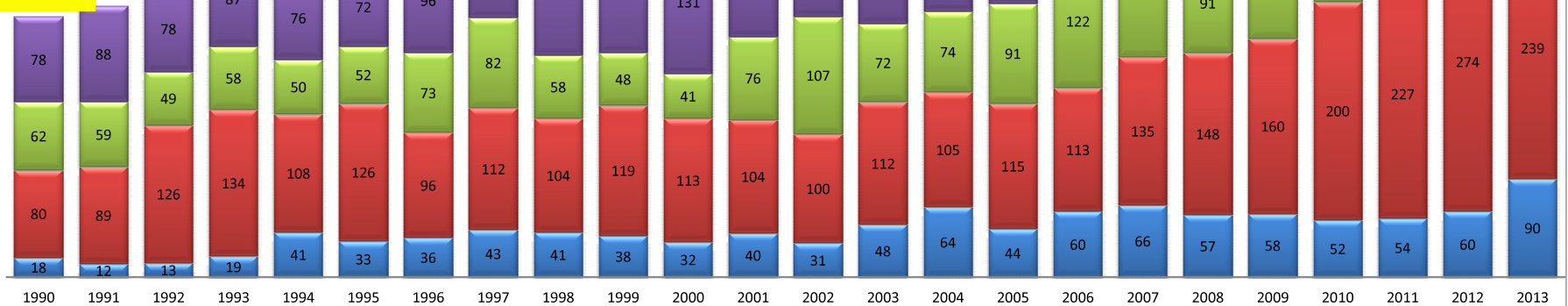


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## Proposals Reviewed in AAG

■ PLA ■ SAA  
■ GAL ■ EXC

238



1990

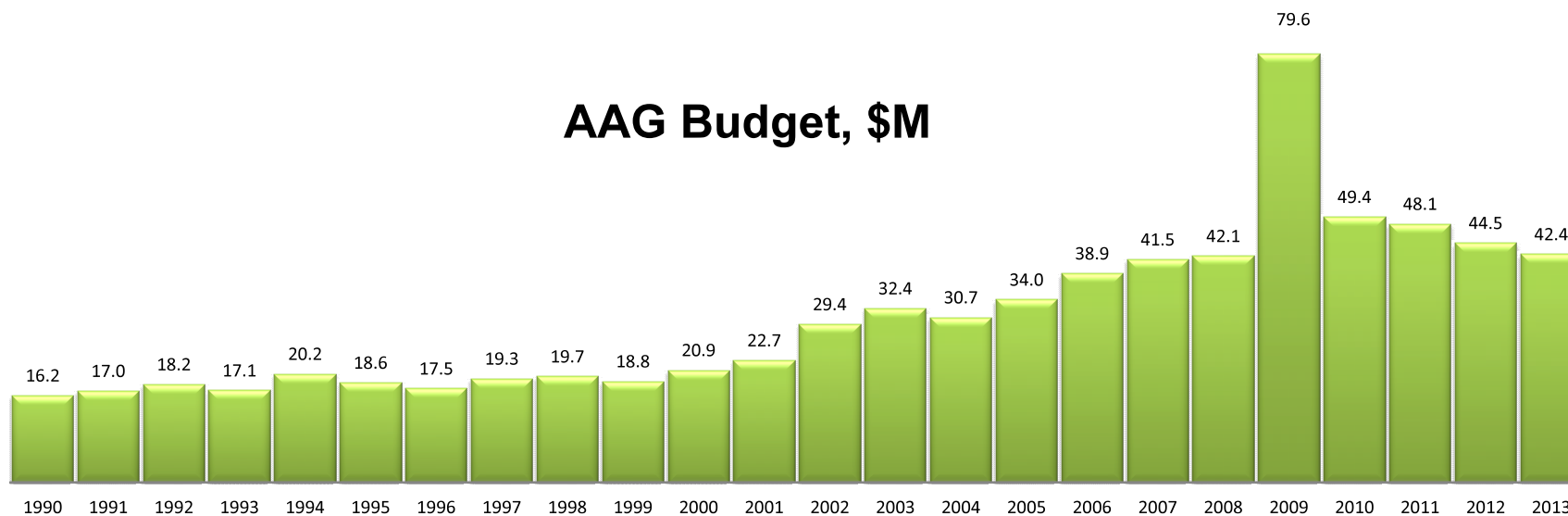
2013

02/03/2014

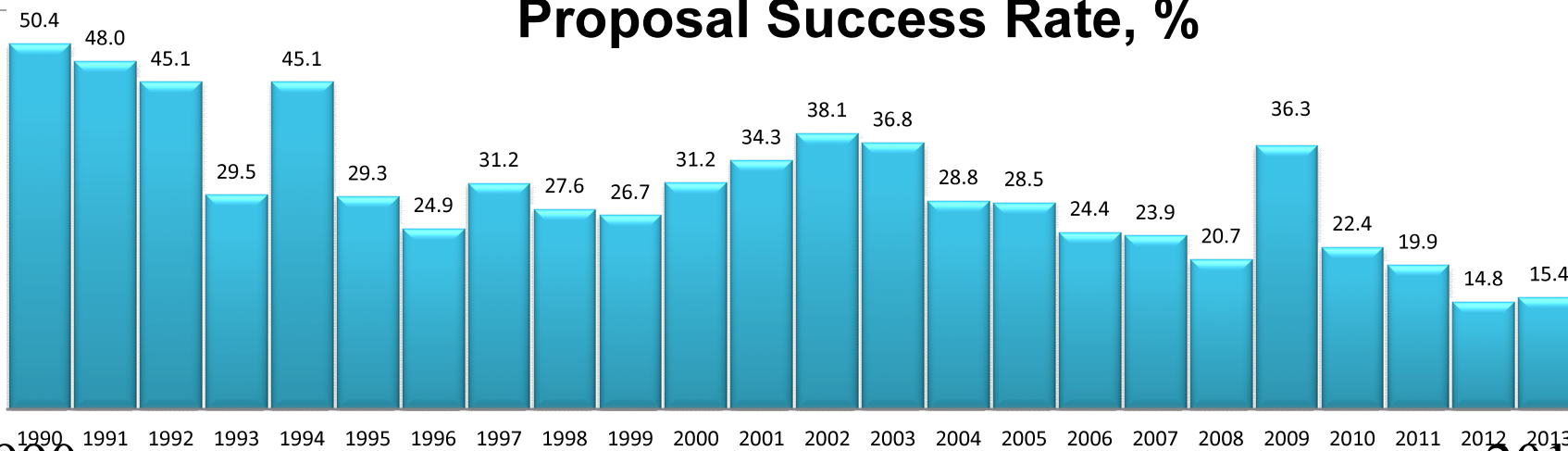
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## AAG Budget, \$M



## Proposal Success Rate, %



1990

2013





# AAG Proposal Requests—FY12

Item	Budget Percentage
Senior Personnel	17%
Grad Students	13%
Postdocs	8%
Undergrads	2%
Fringe Benefits	9%
Travel	6%
Other Direct Costs (incl. tuition)	6%
Indirect Costs	31%
Misc (professionals, publications, equipment, etc.)	8%



# Other Interagency Issues

- Dark Energy Survey in progress
- Dark Energy Spectroscopic Instrument (DESI)
  - Possible future path for Mayall Telescope on Kitt Peak
  - Depends on P5 report and DOE HEP funding outlook
- Virtual Astronomical Observatory
  - NASA will fund continuing infrastructure, NSF will fund new applications through its grants program
- Exoplanets/TESS
  - Preliminary discussions with NASA regarding ground telescope availability for radial velocity measurements
- Principles for Access to Projects, Data, and Facilities
  - Discussed by CAA at their AAS Town Hall meeting
  - NSF awaits some recommendation from AAAC



# Backups Follow