# MPS/AST Current & Future Activities

AAAC

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May 2, 2013

# Outline

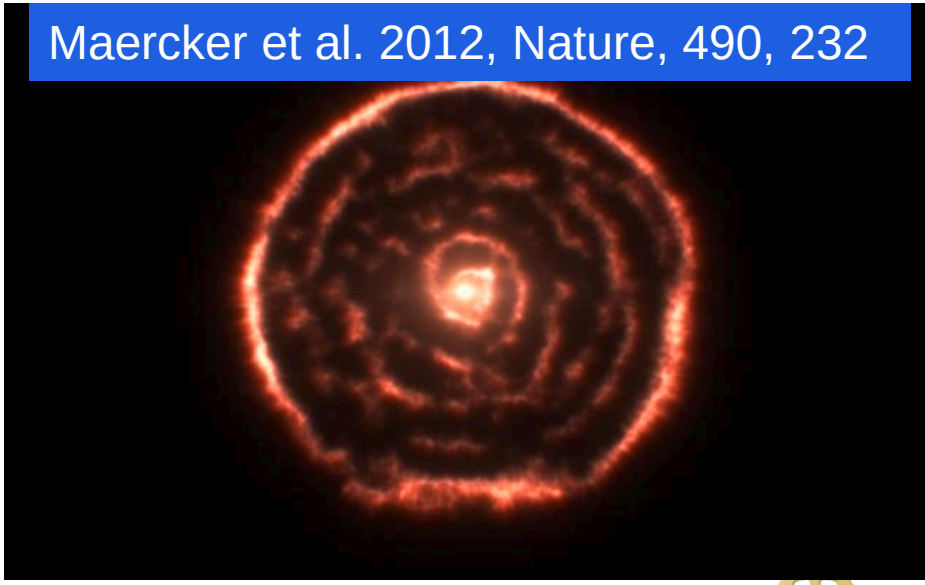
- Selected Science and Telescope Highlights
- Budgets: FY13 CR, FY14 Request
- Portfolio Review, Decadal Survey
- Response to 2013 AAAC Report
- What are our Issues?

# Selected Science and Telescope Highlights

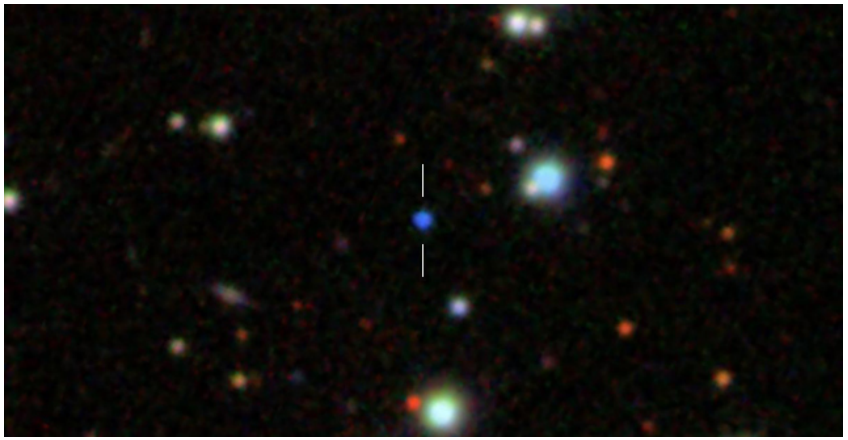
# ALMA Status

- 112 early-science projects selected from ~900 Cycle 0 proposals; 90% of observations completed
- 196 high-priority projects selected from 1133 Cycle 1 proposals
- All 66 antennas in Chile; 55 at high site
- Inauguration occurred on March 13, 2013


Gas spiral around R Sculptoris caused by interplay between AGB star thermal pulses and stellar companion



# Gravitational waves



The white-dwarf binary SDSS J0651+2844. Image credit: The Sloan Digital Sky survey. Hermes et al. 2012, ApJ, 757, L21.

- WD binary in 13-minute orbit had orbital period decrease over 1 year that was consistent with GR prediction of gravitational wave emission
  - Observations by McDonald, Gemini-N, MMT determined that optical eclipses were delayed by 6 seconds about 1 yr after starting observations
  - Supported by two AST grants

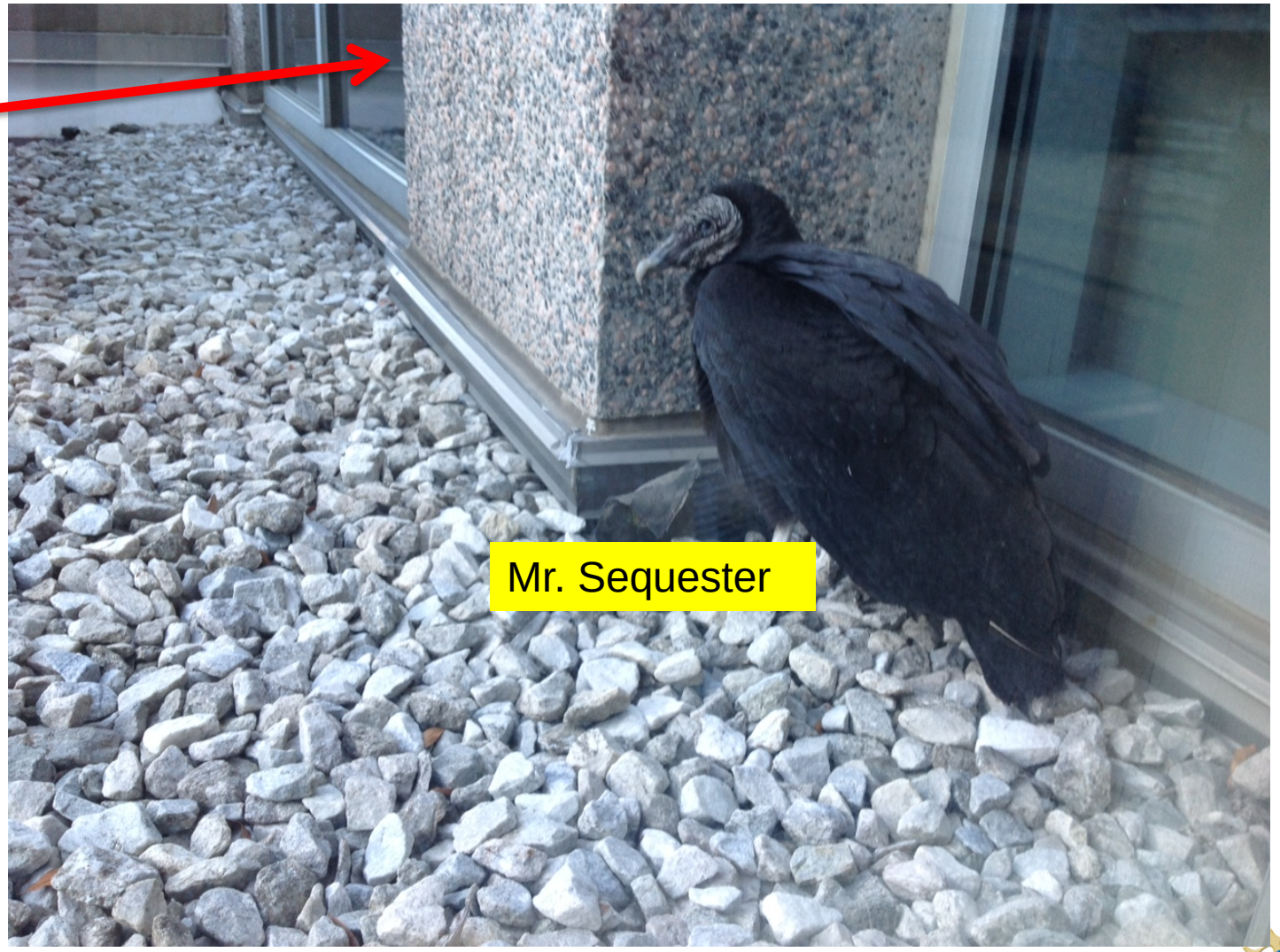
Antoniades et al, Science, April 26, 2013
Image Credit, ESO/L. Calçada

- J0348+0432, a pulsar-WD binary in 2.5-hr orbit (pulsar is 2-solar-mass neutron star)
  - Discovered with GBT, measured with GBT and Arecibo
  - 8 μsec/yr decrease in orbital period

# Budgets: FY13, FY14 Request

# FY13 Budget and AST

Jim's office, April 25, 2013



# FY13 Budget

- Full-year continuing resolution passed in late March
  - Need to apply 1.877% rescission, plus the 5% sequestration
- NSF Directorate/Division Budgets
  - At this writing (May 1), NSF Divisions have not yet been given budget numbers to propose a plan for FY 2013
    - Numbers are expected hourly
    - Final Congressionally approved AST budget may be known in June
    - Individual investigator research awards, and decisions on 4th quarter funding for facilities, are unlikely before mid-June
  - Senate Appropriations Committee included specific numbers and instructions for MPS/AST, but interpretation in the sequestration scenario is not yet finalized

# Highlights of FY 2014 Budget Request

- Resolution of the President's Budget Request depends on the outcome of national issues regarding economy and sequestration
- Major Research Equipment and Facilities Construction (MREFC)
  - Large Synoptic Survey Telescope (LSST) construction start in FY 2014 was requested
  - Advanced Technology Solar Telescope (ATST) is undergoing a re-baseline assessment because of the 30-month delay in site access
- AST Division Request
  - AST request of $243.6M is 3.9% increase over FY 2012
  - Facility funding is relatively flat or decreasing, except for ALMA ramp
  - Beginning of ATST Operations ramp was deferred until FY 2015
  - $7M in request for Mid-Scale Innovations Program

# FY 2014 NSF Budget Request: LSST

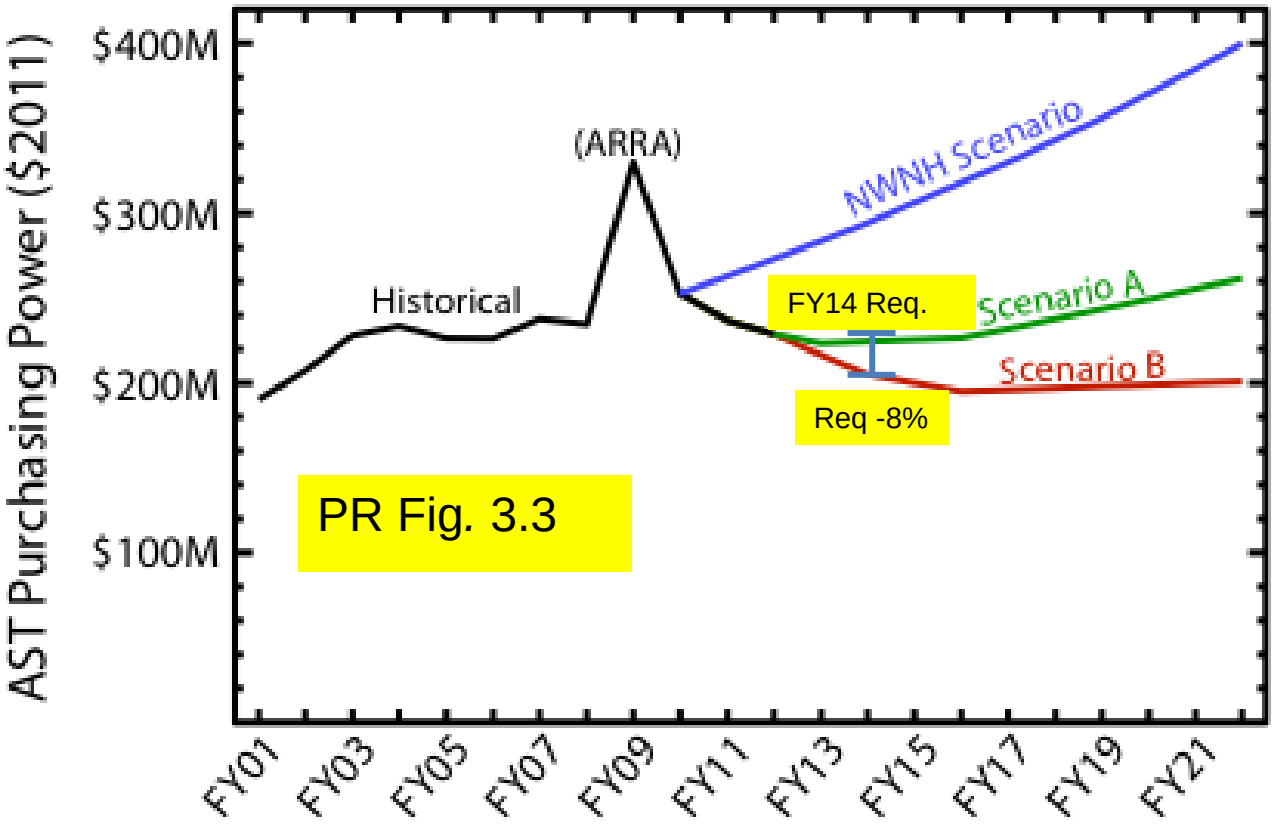
**MREFC Account Funding, by Project**

(Dollars in Millions)

| | FY 2012[1] Actual | FY 2012 Enacted/ Annualized FY 2013 CR[2] | FY 2014 Request | FY 2015 Estimate | FY 2016 Estimate | FY 2017 Estimate | FY 2018 Estimate | FY 2019 Estimate |
|---|---|---|---|---|---|---|---|---|
| AdvLIGO | $20.96 | $20.96 | $14.92 | - | - | - | - | - |
| ALMA | 2.50 | 3.00 | - | - | - | - | - | - |
| ATST | 10.00 | 10.00 | 42.00 | 20.00 | 20.00 | 9.93 | - | - |
| IceCube | 1.52 | - | - | - | - | - | - | - |
| LSST | - | - | 27.50 | 89.76 | 89.18 | 55.26 | 55.56 | 48.03 |
| NEON | 60.30 | 60.30 | 98.20 | 91.00 | 80.64 | - | - | - |
| OOI | 102.80 | 102.80 | 27.50 | - | - | - | - | - |
| **MREFC Total** | **$198.08** | **$197.06** | **$210.12** | **$200.76** | **$189.82** | **$65.19** | **$55.56** | **$48.03** |

- Note that this is a REQUEST, not an appropriation
  - Assumes start on July 1, 2014
  - AST also requests $7.5M Design & Development funds
- Total 8-yr project cost of $465.93M to NSF cited (FY14-21)
  - Not-To-Exceed cost awaits Final Design Review

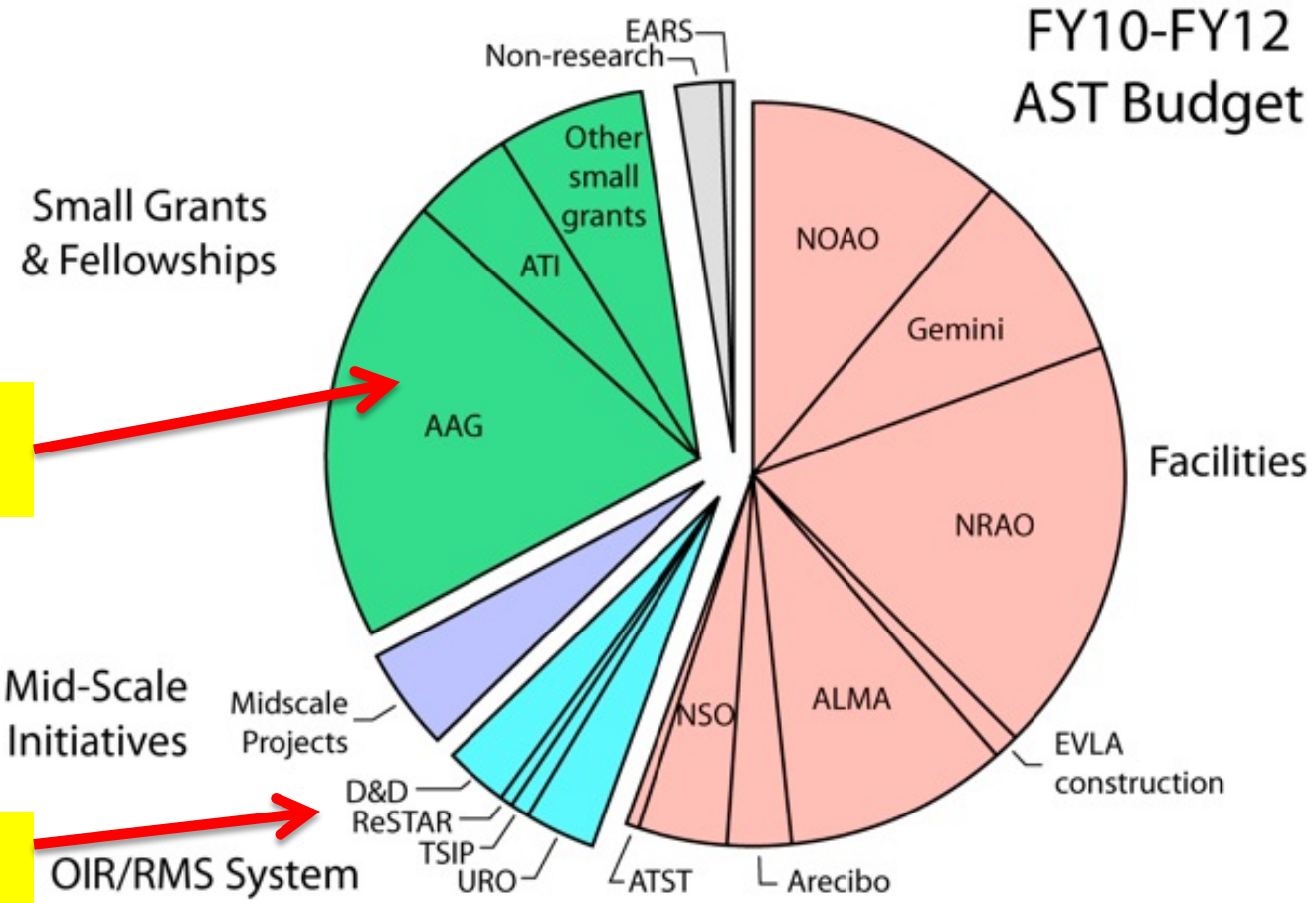
# What Will Budgets Really Be?




Recent AST budget requests and appropriations (M$):

| Year | FY11 | FY12 | FY13 | FY14 |
|---|---|---|---|---|
| Request | $251.8 | $249.1 | $244.6 | $243.6 |
| Approp. | $236.8 | $234.6 | $230? | ??? |
| NWNH | H$262 | H$279 | H$298 | H$318 |

# AST Near-Term Budget Actions

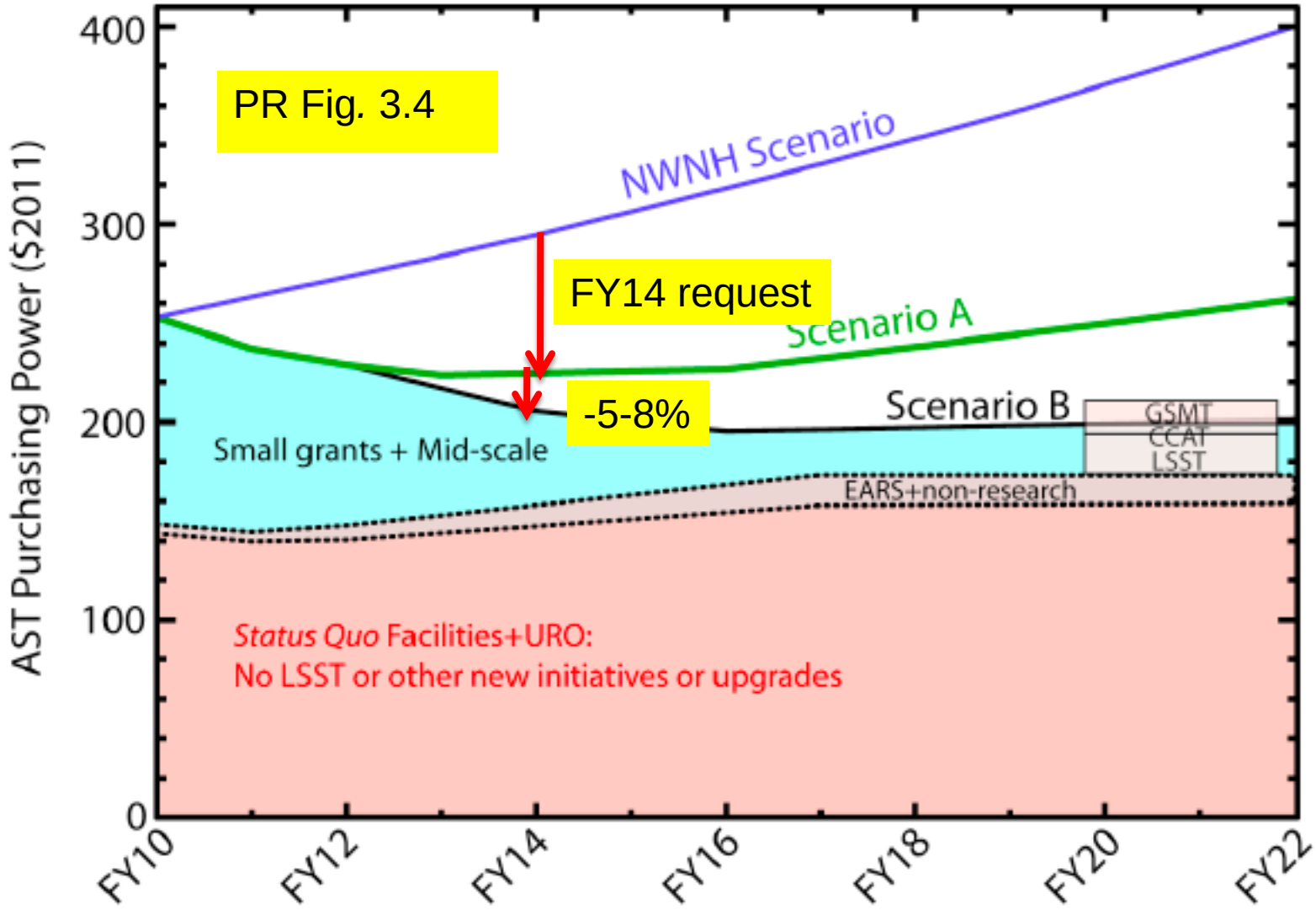



This segment is now getting hit hard

Have been hammering this segment of the program for last 2-3 yr

# Portfolio Review, Decadal Survey

# Impact of Maintaining Status Quo



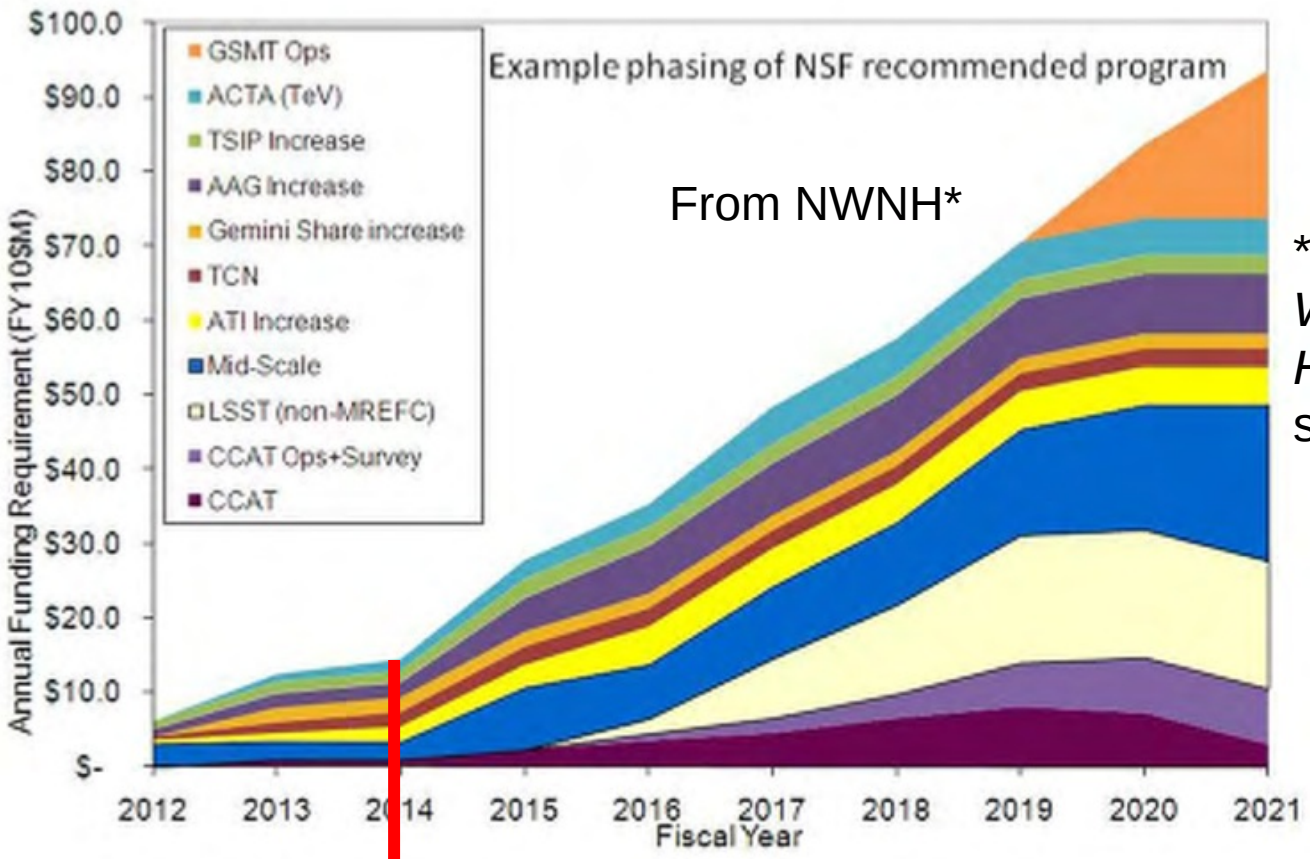
# AST Actions in Response to PR Report

- Response document issued in late August, noting that decisions need to be made near end of 2013
  - No divestment decisions made yet
  - Decisions are not up to AST alone!
- Exploring various partnership models for major facilities that were recommended for divestment
  - Mid-Scale Dark Energy Spectroscopic Instrument (MS-DESI)
  - Meeting with managing organizations and potential partners regarding facilities given lower priority by PR Committee.
  - Met with tenants on Kitt Peak.
- Proceeding on competitions for management of NOAO, NRAO, and Gemini, all to be decided in 2015
  - Solicitations out this summer will describe scope of work.
  - Announced that Green Bank Telescope and Very Long Baseline Array will be partitioned from NRAO competition.

# Bottom Line

- Until facility divestments occur, or budgets rebound significantly, it is not possible to (1) maintain the current grants programs, (2) start a competed mid-scale line and (3) support ALMA and ATST operations profiles. (Future LSST ramp exacerbates, but does not cause, the problem.)

# Decadal Survey Sample Program




From NWNH*

*NWNH = *New Worlds, New Horizons* decadal survey

**FY 2014 budget request**

# Response to 2013 AAAC Report

# AAC Recommendations/Response-I

- OMB/OSTP coordinate funding on interagency projects
  - NSF and DOE briefed OMB/OSTP on LSST this week
- Prioritization should involve peer review process with community input
  - Agree, Portfolio Review was an example, will continue if future activities of a similar nature are needed
- NSF/DOE should continue LSST as highest priority large ground-based facility
  - NSF construction in FY14 budget request, hampered by CR in FY13 that delays DOE camera start
- NSF should identify path for Mid-scale Innovations Program
  - $7M included in FY14 budget request. Not enough to fund projects much above $20M, unless a larger wedge can be created.

# AAAC Recommendations/Response-II

- Flexible Open Skies Policy
  - Under discussion, will be complicated to implement
- Adopt principles of reciprocal participation and mutually agreed sharing of costs and responsibilities
  - Dark Energy Survey, LSST, Mid-Scale Dark Energy Spectroscopic Instrument, Virtual Astronomical Observatory, Theoretical and Computational Astrophysics Network are interagency (two-agency) examples. Becomes much more complicated when three agencies and interlocking international/private partnerships are involved.
- Balance small/medium/large and across disciplines
  - Difficult in current environment until divestments can occur
- Request CAA OIR system study
  - Under discussion, has been delayed by budget uncertainty and difficulty to define a coherent, achievable charge
- CAA Mid-decadal study
  - Yes, after OIR system study

# What are our Issues?

- Budget levels
- Budget uncertainties
- Staff workload
- Response to Portfolio Review; divestment options
- LSST Final Design Review and start
- ATST re-baselining
- Ability to gather sufficient funds to start mid-scale
- What happens when individual investigator funding rates drop to single digits?

# Background Slides Follow

# NWNH Actions—Large Programs

- LSST proposed for MREFC start in FY 2014
- Mid-Scale Innovations Program (MSIP), $4M-$120M
  - Difficult to find a budget wedge in current climate; $7M in FY14 budget request
  - Portfolio review committee recommended combining with other similar-size programs, such as University Radio Observatories and Telescope Systems Instrumentation Program
  - Maximum project size will be well below $120M
- GSMT partnership planning solicitation issued
  - Condition: No construction funding before 2020
  - Award of $250K/yr made to TMT
- ACTA: No wedge visible, could propose to MSIP

# NWNH Plans—Medium

- CCAT Design and Development proposal funded
  - No construction wedge available in 2014/2015
  - Could compete for funds in MSIP, if AST is able to fund that line, but reaching the $37M recommendation of NWNH will be extremely challenging

# “Small”/Other Recommendations

- Increases in general (AAG) and instrumentation (ATI) grants programs not possible without substantial facility divestment and improved budget outlook
- TSIP: see response to MSIP
- Gemini: $2M increase in FY 2012 mandated by Congress; extra funds in future years are unlikely
- Theoretical & Computational Astrophysics Network: NSF/NASA solicitation, $1.5M/yr from NSF for 3 yr
- Gemini/NOAO consolidation: unlikely due to difficulty of combining national and international observatories
- DSIAC: metamorphosed into Committee on Astronomy and Astrophysics