

# Division of Astronomical Sciences (AST)

## Mission

The mission of the Division of Astronomical Sciences is to support forefront research in ground-based astronomy; to help ensure the scientific excellence of the U.S. astronomical community; to provide access to world-class research facilities through merit review; to support the development of new instrumentation and next-generation facilities; and to encourage broad understanding of and diverse participation in the astronomical sciences.

The Division supports research in all areas of astronomy and astrophysics and related multidisciplinary studies. Modes of support include single-investigator and collaborative awards, as well as funding for acquisition and development of astronomical instrumentation, technology development for future ground-based facilities, and educational projects that leverage the Division's research investments to build research and workforce capacity and to increase scientific literacy.

## Astronomical Facilities

The Division invested 54% of its FY 2007 appropriation in the management and operation of ground-based astronomical facilities. Through the national observatories and international partnerships, the Division provides support for a system of multi-aperture, research-class telescopes as well as frontier facilities that enable transformational capabilities in both radio and optical/infrared astronomy. Technological advances in a number of key areas of telescope construction and design—including sophisticated adaptive optics technology to compensate for the blurring effects of the Earth's atmosphere at optical/infrared wavelengths and high-resolution aperture synthesis techniques of radio astronomy—allow these instruments to operate at the forefront of ground-based capabilities.

## Contact Information

### Division Director

Dr. G. Wayne Van Citters

### Executive Officer

Dr. Eileen Friel

National Science Foundation  
Division of Astronomical Sciences

4201 Wilson Boulevard

Room 1045

Arlington, VA 22230

Telephone: (703) 292-8820

Fax: (703) 292-9034

Web site: <http://www.nsf.gov/div/index.jsp?div=AST>



Credit: Gemini Observatory ALTAIR Adaptive Optics Image.

A high-resolution image taken with the Gemini Observatory shows Jupiter's two giant red spots brushing past one another in the planet's southern hemisphere. The image was obtained in near-infrared light using adaptive optics that corrects, in real-time, for most of the distortions caused by turbulence in Earth's atmosphere. The result is a view from the ground that rivals images from space.

## Programs in Astronomical Sciences

### Individual Investigator Programs

- Astronomy and Astrophysics Research Grants (AAG)
- Faculty Early Career Development Program (CAREER)
- NSF Astronomy and Astrophysics Postdoctoral Fellowships (AAPF)
- Partnerships in Astronomy and Astrophysics Research and Education (PAARE)
- Research Experiences for Undergraduates (REU)
- Research at Undergraduate Institutions (RUI)

### Astronomical Instrumentation Programs

- Advanced Technologies and Instrumentation (ATI)
- Major Research Instrumentation (MRI)
- Program for Research and Education with Small Telescopes (PREST)
- University Radio Observatories (UROs)

### Large Facilities

- Atacama Large Millimeter Array (ALMA)
- Gemini Observatory
- National Astronomy and Ionosphere Center (NAIC)
- National Optical Astronomy Observatory (NOAO)
- National Radio Astronomy Observatory (NRAO)
- National Solar Observatory (NSO)

*A Guide to Programs / Browse Funding Opportunities* is available at [http://www.nsf.gov/funding/browse\\_all\\_funding.jsp](http://www.nsf.gov/funding/browse_all_funding.jsp).

## Electromagnetic Spectrum Management (ESM)

AST represents the interests of NSF and the scientific community in protecting access to portions of the electromagnetic spectrum that are needed for research purposes. The sensitivity of radio and optical telescopes can be compromised by electromagnetic interference from sources such as airborne and satellite radio transmissions and light pollution. ESM personnel protect these and other scientific resources by participating in the establishment of regulations, operating procedures and technical standards related to government, private sector and international uses of the spectrum.

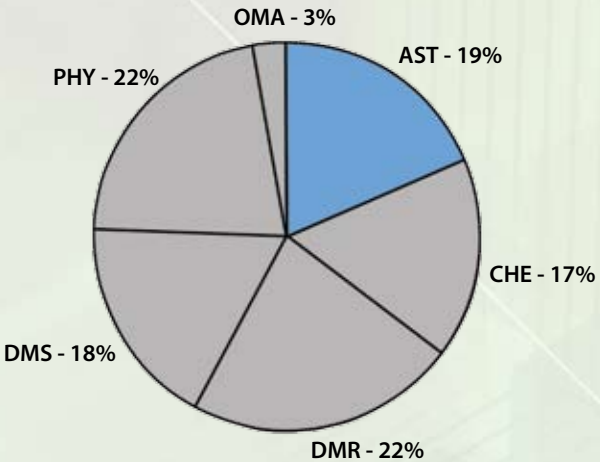


The Atacama Large Millimeter Array (ALMA) is an international collaboration to develop a world-class radio telescope composed of 66 antennas that will work together to study the universe from a high and dry site in the Chilean Andes. Once construction is completed, ALMA will function as the most capable imaging radio telescope ever built.

Credit: ALMA/European Organization for Astronomical Research in the Southern Hemisphere/National Astronomical Observatory of Japan/NRAO.

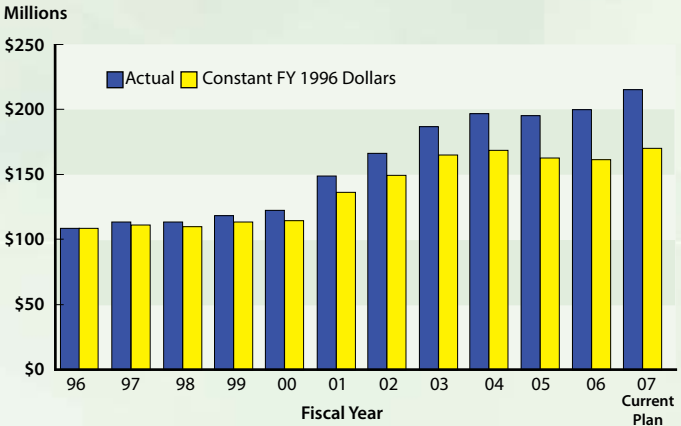
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## MPS Funding FY 2007 Current Plan



Pie chart showing divisional portions of MPS total budget for FY 2007. AST will spend \$215 million in FY 2007, which is 19% of the total MPS budget. *Totals may not add due to rounding.*

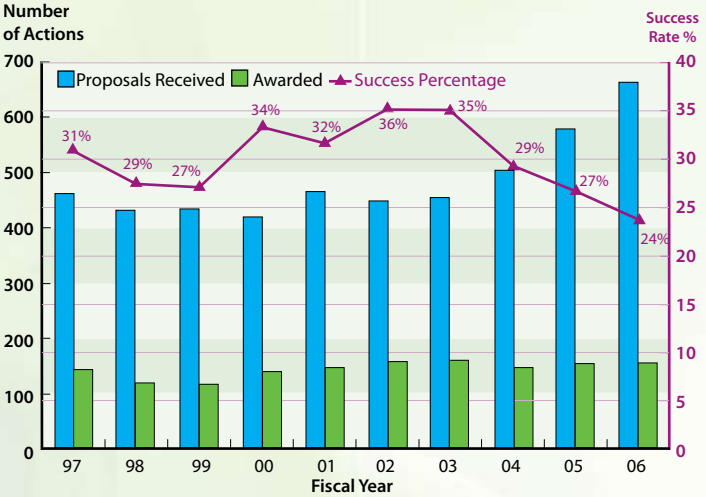
## Budget in Actual and Constant FY 1996 Dollars



AST annual budgets in actual and constant FY 1996 dollars. Constant dollars show the purchasing power of the AST budget. Over this 12-year period, the constant dollar budget for AST has increased 56%.

Data provided from FY 1998 to 2008 NSF Budget Requests to Congress, <http://www.nsf.gov/about/budget/>. Constant 1996 Dollar Deflator from Section 10 of the Gross Domestic Product and Implicit Outlay Deflators, Historical Tables of the U.S. Budget, FY 2005, <http://www.whitehouse.gov/omb/budget/fy2008/pdf/hist.pdf>.

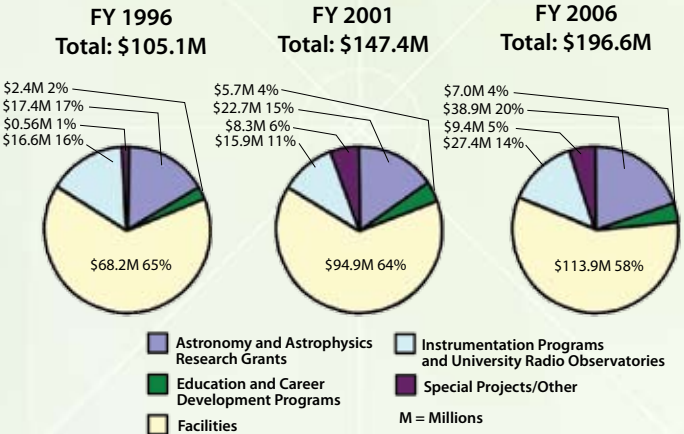
## Success Rates and Number of Actions



Graph shows number of proposals submitted versus awarded for Research Grants as defined by NSF and resultant success rates. Success rate is defined as the number of new or renewal proposals awarded funding divided by the total number of proposals received. The number of proposals received by AST in 2006 was 44% higher than in 1997.

Note: the distribution of success rates reflects the average for the Astronomical Sciences Division and may not represent success rates in individual programs.

## Modes of Support



Pie charts showing AST investments for FY 1996, 2001 and 2006.