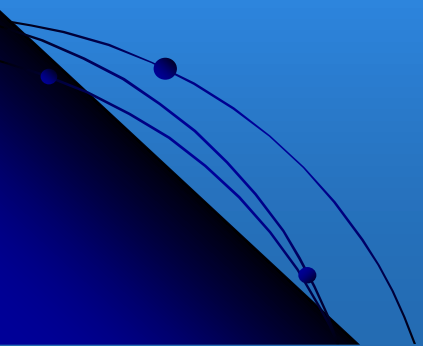


NSF PERSPECTIVE
PLANETARY SCIENCES
DECADAL SURVEY

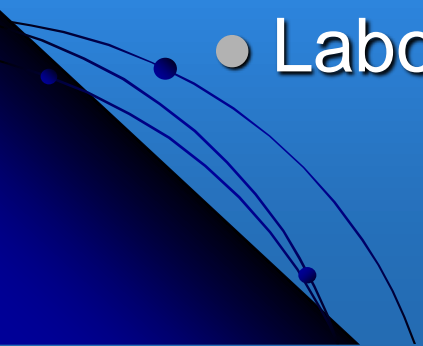
9 September 2009

Vernon Pankonin
Division of Astronomical Sciences

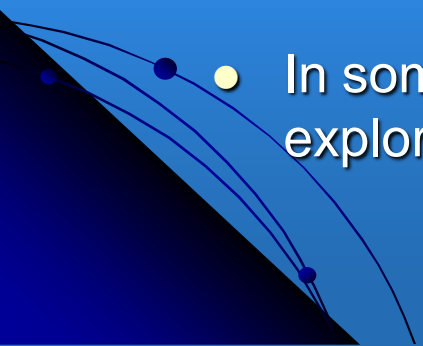


Scope

! Planetary Sciences !

- Solar System Phenomena, encompassing
 - Space exploration
 - Ground-based astronomy
 - Observational programs
 - Instrumentation
 - Facilities
 - Theory/modeling/simulations
 - Laboratory
- 

NSF supports all areas

- Space exploration – archived data
 - Ground-based astronomy – national & international observatories
 - Individual investigator awards
 - Observations
 - Instrumentation
 - Theory/modeling/simulations
 - Laboratory
 - In some sense, “rounding out” the NASA focus on space exploration of the solar system
- 

Planetary Sciences at NSF



Astronomical
Sciences

An oval containing a deep space photograph showing numerous galaxies and stars against a black background.



Planetary
Astronomy

An oval containing a collection of colorful planet models, including Jupiter, Saturn, Uranus, and Neptune, arranged in a fan shape.



PLANETARY SCIENCES

A large central oval containing a 3D model of a solar system with a central star and several planets in elliptical orbits.



Geo
Sciences

An oval containing a landscape photograph of a mountain range under a cloudy sky at sunset or sunrise.



ATM → AGS
EAR
OCE

A vertical oval containing the text 'ATM', 'EAR', and 'OCE' stacked vertically. A red arrow points from 'ATM' to 'AGS' on the right.



Polar
Programs

A light-colored oval with a textured background containing the text 'Polar Programs' in red.

Planetary Sciences at NSF

Office of Polar Programs

- U.S. Antarctic Meteorite Program
 - NSF, NASA, Smithsonian Institution
 - NSF/OPP -- ~\$100,000 per year
- Individual Investigator Awards
 - geomorphology in the Dry Valleys
 - terrestrial analogs to ancient Mars

Planetary Sciences at NSF

Directorate for Geosciences

- Atmospheric Sciences – ATM
 - 10/09 – Atmospheric and Geospace Sciences – AGS
 - planetary magnetospheres
 - planetary atmospheres
 - Solar, heliospheric & interplanetary environment (SHINE)
 - Solar-terrestrial
 - Earth Sciences -- EAR
 - meteorites
 - Ocean Sciences -- OCE
 - ocean ice
- 

Division of Astronomical Sciences (AST)
Astronomy & Astrophysics Research Grants (AAG)

AST

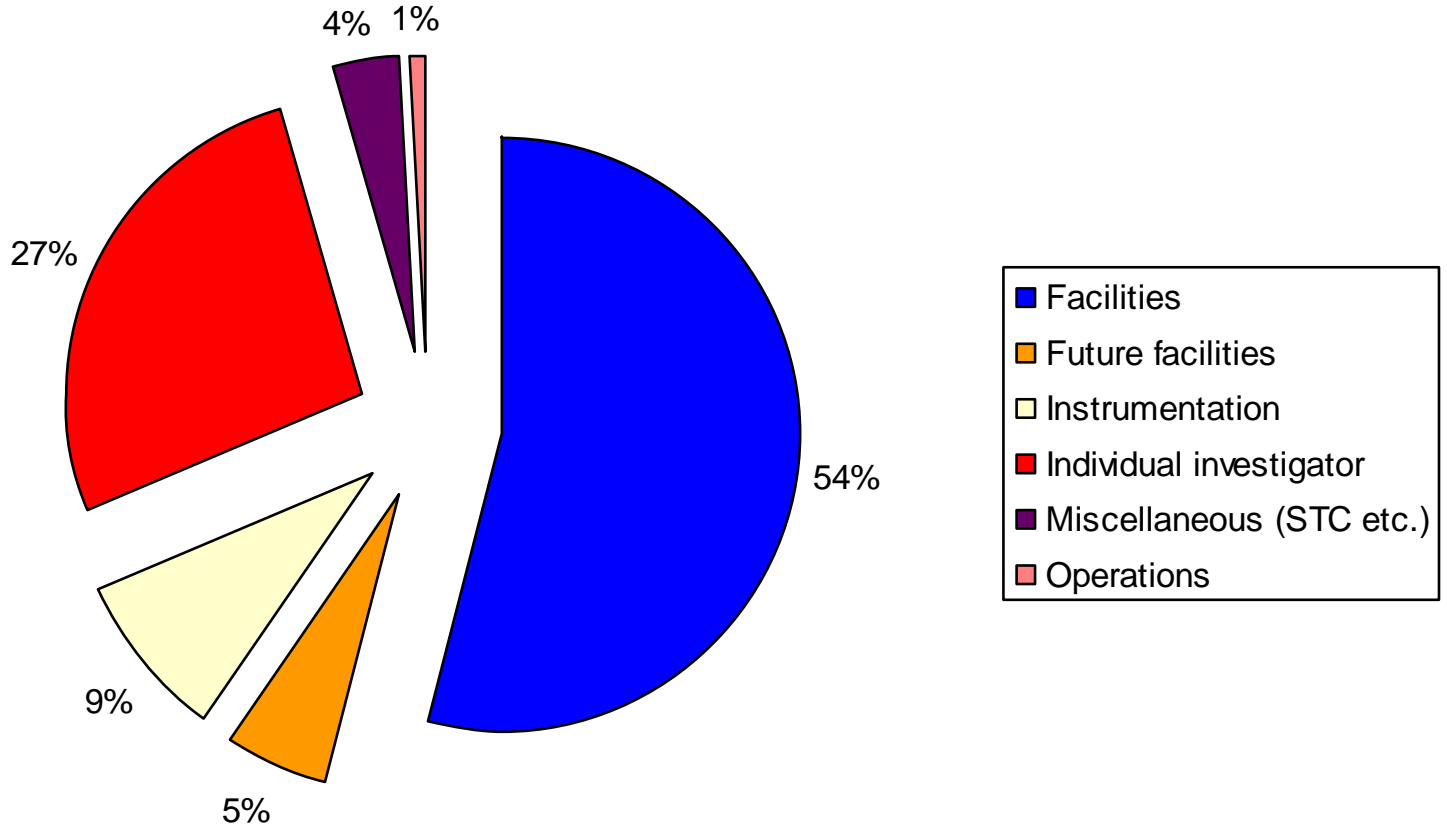
- **focus is on scientific merit / broader impact of a proposed project**
- **search for potentially transformative research**
- **no predetermined topic or technique or facility for preferential treatment**

Planetary Astronomy Theme

Individual investigator awards for theoretical, observational, and laboratory studies of the Solar System ---

- Structure & Composition of Planetary Interiors, Surfaces, and Atmospheres
 - Planetary Satellites
 - Comets and Asteroids
 - Trans-Neptunian / Kuiper Belt Objects
 - Inter-Planetary Medium
 - Solar System Origins and Evolution
-
- typical award: \$95,000 to \$125,000 per year for 3 years (08 mean \$108k)
 - can be more (or less!); can be for 5 years (very rarely longer)
 - FY06: 55 projects, 11 awards, \$2.9m
 - FY07: 62/13/\$3.6m; FY08: 54/11/\$4.0m; FY09: 52/19/\$3.5m+\$3.9m

AST FY2008



National Observatory Facilities

- Gemini Observatory
 - International partnership, twin N-S
- National Optical Astronomy Observatory
 - Kitt Peak National Observatory/Cerro Tololo Interamerican Obs.
 - O/IR system; TSIP; US Gemini; LSST; TMT
- National Radio Astronomy Observatory
 - Expanded Very Large Array; Green Bank Telescope; VLBA
 - Atacama Large Millimeter-submillimeter Array
- University Radio Observatories
 - Operations, equipment at existing facilities; maybe new facilities
- National Solar Observatory
 - McMath-Pierce; SOLIS; Sacramento Peak; ATST
- National Astronomy and Ionosphere Center
 - Arecibo Observatory

National Observatory Facilities

National Astronomy & Ionosphere Center, Arecibo, Puerto Rico

- ◆ Astronomy:
 - ◆ 305m Radio/Radar Telescope
 - ◆ 1 MW S-band Planetary Radar (would not exist w/o NASA)
- ◆ Atmospheric Science:
 - ◆ 430 MHz incoherent scatter radar on Antenna
 - ◆ Numerous LIDARs, OIR Imagers
- ◆ Education / Outreach:
 - ◆ Arecibo Observatory Visitor and Education Facility



National Observatory Facilities

National Astronomy & Ionosphere Center, Arecibo, Puerto Rico

- ◆ **Senior Review:**
 - ◆ **Reduce AST support**
 - ◆ **Cost reviews of all facilities by outside contractor**
- ◆ **Current manager – Cornell University**
- ◆ **Management to be competed.**
- ◆ **New cooperative agreement solicitation “imminent”**
 - ◆ **See Dear Colleague letter at NSF/AST web site**
 - ◆ **Agreed between AST and ATM [AGS]**
 - ◆ **Base budget that keeps the facility open and viable**
 - ◆ **Does not support current level of effort**
 - ◆ **Requires reduced scope or additional non-NSF funding**



From the Statement of Task

B. National Science Foundation

Recommendations

- For NSF, the survey and report shall encompass all ground-based observational techniques, as well as analysis of data collected and relevant laboratory and theoretical investigations (including modeling and simulation). Thus, the study will assess the NSF-supported infrastructure of the field, including research and analysis support, the educational system, instrumentation and technology development, data distribution, analysis, and archiving, theory programs, and so on. The Committee shall also recommend any changes to this infrastructure that it deems necessary to advance the science and to capture the value of facilities in place.

CONCLUSIONS

- Decadal survey of **Planetary Sciences**
 - Space exploration (incl. archival)
 - Ground-based astronomy
 - Theory/modeling/simulations
 - Laboratory
 - Coordinate with Astronomy & Astrophysics Decadal Survey, ASTRO2010
 - Balance, and possibly tension, between existing and new capabilities
 - Current and future balance between areas
 - Questions?
- 