

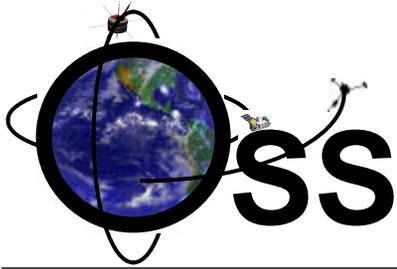
Research and Analysis (R&A) Programs

**Presentation to
Solar System Exploration Subcommittee**

By

**Dr. Guenter Riegler
Executive Director for Science
Office of Space Science**

July 18, 2001



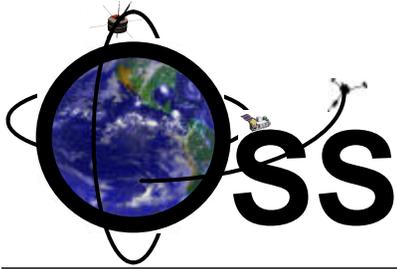
Update on “Planetary Systems Science” Grants Processing

A combination of staff changes and work priority changes at NASA HQ/Office of Space Science (OSS) during January/February 2001 resulted in

- † **excessive delays in notifying proposers of selection decisions for proposals they had submitted in mid-2000**
- † **Excessive delays in issuing awards to successful proposers**

With help from the American Astronomical Society’s Division of Planetary Sciences, we received more than 10 expressions of interest for planetary scientists to help OSS

- † **John Hillman has joined OSS as visiting scientist under the Intergovernmental Personnel Act (IPA) program**
- † **He has taken over all aspects of the Planetary Astronomy and Planetary Atmospheres R&A programs, including proposal reviews and awards handling**
- † **With his help we do not anticipate a repeat of the delays of ~6 months ago.**

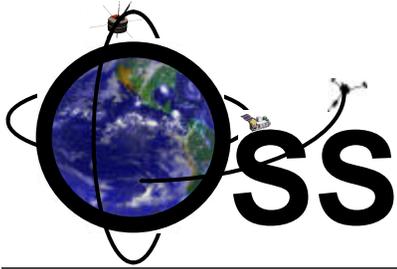


Assessment of NASA's Space Science R&A Programs

This first of a triennial series of assessments of the entire Space Science R&A program has been completed.

This presentation contains

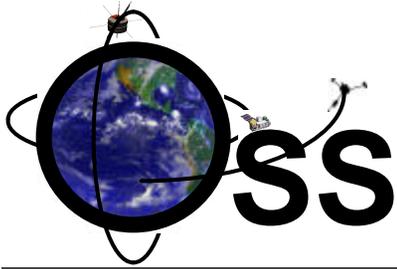
- † **An introduction to the R&A programs and to the review process**
- † **Highlights from the final report of the “R&A Senior Review” panel**
- † **NASA/OSS decisions following the recommendations from the Senior Review panel**



Foreword, cont'd

In 1997, the formal advisory committee for NASA's Office of Space Science (OSS), the "Space Science Advisory Committee", formed a Task Group to address structural aspects of the OSS R&A programs.

- † **Among its recommendations (July 1998; <http://spacescience.nasa.gov/adv/minutes.htm>) was a call for an independent outside assessment of the performance of the R&A programs.**
- † **In 1998, the National Research Council's Space Studies Board published a set of recommendations for "Supporting Research and Data Analysis (R&DA) in NASA's Science Programs" (<http://www.nas.edu/ssb/rapmenu.htm>).**
- † **This report, which addressed NASA's Space, Earth and Life and Microgravity Sciences, recommended that NASA should ". . . regularly evaluate the impact of R&DA on progress toward the goals of the strategic plans . . .", and ". . . regularly evaluate the balance among various subelements of the R&DA program. . ."**
- † **All of these recommendations point to the need for an assessment of both the merits of the Space Science R&A programs and their relevance to the goals of the OSS Strategic Plan (<http://spacescience.nasa.gov/strategy/2000/index.html>).**



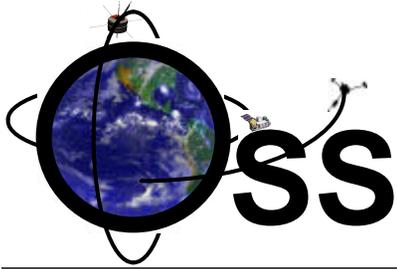
Overview of the Space Science R&A Program

The research and analysis (R&A) portion of NASA's space science program consists of ~40 discipline programs for

- † **instrumentation,**
- † **suborbital flights,**
- † **theory,**
- † **simulation,**
- † **data analysis and**
- † **laboratory research**

addressing

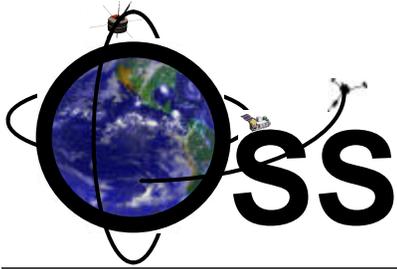
- † **Sun-Earth Connection,**
- † **Solar System Exploration,**
- † **Astronomical Search for Origins, and**
- † **Structure and Evolution of the Universe.**



Introduction, cont'd

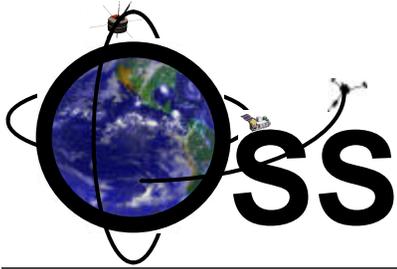
Since mid-1999 it has been my responsibility to manage this R&A Senior Review process by working with the Discipline Scientists in the Research Division, others in OSS, the formal advisory committees, the outside working groups and science writing teams which supported the Discipline Scientists, and finally the R&A Senior Review panel.

As part of the preparations for this independent outside assessment, the ~40 research sub-disciplines were grouped into 11 research “clusters”. The contents and budget plan for these R&A clusters for Fiscal Year 2002 are:



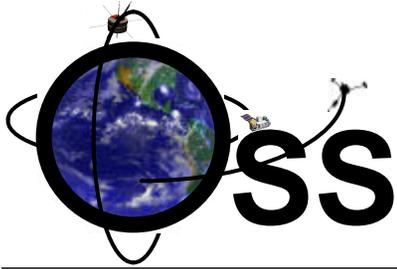
Space Science Clusters - Part 1

1A and 1B: Cross-Theme Theory and Data Analysis Programs (Evans and Zanetti; Golombek)		
	Space Physics Theory	\$ 4 M
	ATP-Astrophysics Theory Program	\$ 7 M
2: Solar and Heliospheric Sciences (Wagner, Guhathakurta, Jones and Ling)		\$ 11 M
	Heliospheric Physics SR&T	
	Solar Physics SR&T and suborbital programs	
	Solar Rocket	
3: Geospace (Ionosphere, Thermosphere, Mesosphere, Magnetosphere (Mellott and		\$ 12 M
	Magnetospheric Physics	
	ITM	
	Plasma Rocket – suborbital program	
4: Origin and Evolution of Solar System Bodies (Boyce and Grant)		\$ 38 M
	Cosmochemistry (from Astrogeochemistry perspective)	
	PG&G - Planetary Geology&Geophysics	
	Origins of Solar Systems (incl. Cosmochemistry, Observations and Theory	
	MDAP - Mars Data Analysis Program	
Planetary Systems Science (Bergstrahl, Beebe and Morgan)		\$ 19 M
	Planetary Astronomy	
	Planetary Atmospheres	



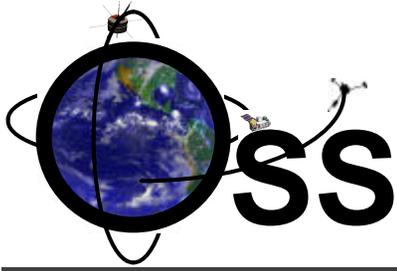
Space Science Clusters - Part 2

<u>5: Planetary Systems Science (Bergstrahl, Beebe and Morgan)</u>		<u>\$ 30 M</u>
	Planetary Astronomy	
	Planetary Atmospheres	
	Planetary Suborbital Prog - part of Planet. Atm Prog.	
	Keck and Observatory Support	
	JDAP - Jupiter Data Analysis Program	
<u>6A and 6B: Astrobiology and Planetary Instrumentation (Meyer and Betts)</u>		<u>\$ 17 M</u>
	Exobiology	
	PIDDP; PIUP	
<u>7: Space Astrophysics/ASO (Hasan, Crane, and Stringfellow)</u>		<u>\$ 16 M</u>
	IR/Radio Astronomy incl. Instrumentation, lab and suborbital	
	UV, Visible and Gravitational Astrophysics incl. Instrumentation, lab and suborbital	
<u>8: High Energy Astrophysics (Kaluziensky, Kniffen, and Jones)</u>		<u>\$ 16 M</u>
	High Energy R&A incl. Instrumentation, lab and suborbital	
	Cosmic Balloon	
	Low Cost Balloon	
	Cosmic Ray Physics Experimental SR&T	
<u>9: Information Systems</u>		<u>\$ 10 M</u>
	Applied Information Systems Research	



Foreword, cont'd

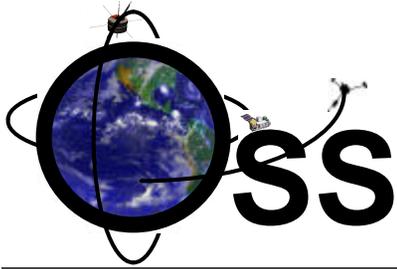
This assessment report contains the conclusions of the R&A Senior Review committee from its meeting in Washington, DC on June 12-14, 2001.



R&A Senior Review Panel Report

Assessment of NASA's Space Science Research and Analysis Programs

Donald Burnett, Andrea Dupree (Co-Chair), Michael Hauser, Roberta Humphries, Wesley Huntress (Co-Chair), Martin Lee, Janet Luhmann, Chris McKee, Douglas Richstone, Eileen Ryan, Dieter Söll, and Richard Vondrak

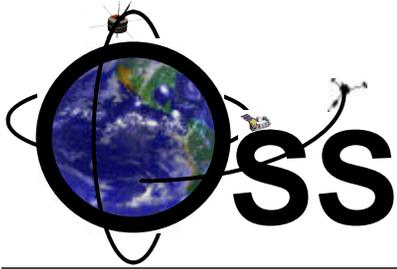


Introduction

The R&A Senior Review committee received a report from each of the 11 R&A program clusters in May 2001.

The charge to the Committee consisted of 4 questions:

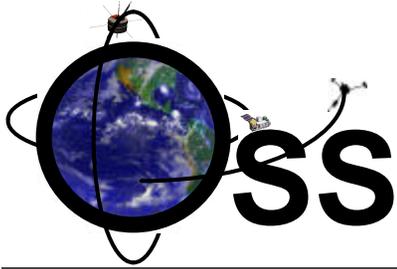
- † **Merit and Relevance:** What is the science quality and productivity of each science cluster, and to what degree does each cluster support or enable the strategic goals and objectives of the Space Science Enterprise?
- † **Budget Distribution:** Judging by the priorities in the SSE strategic plan, is the current funding distribution across the nine science clusters the optimum, or would the Panel recommend changes?
- † **R&A Program Structure:** Is the current science cluster structure optimal for attaining the long-term strategic goals of the Office of Space Science?
- † **New Initiatives or Augmentations:** What are the highest-priority new initiatives or augmentations in space science R&A?



Overall Recommendations

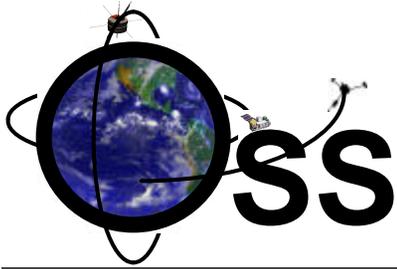
Merit and Relevance

- † **The Committee is impressed with the uniformly high quality of the R & A proposals reports.**
- † **The Committee finds that the OSS R & A program is essential to realizing the full potential of flight missions and to defining the imperatives for new flight programs. The R & A program provides the universal context for the flight program.**



Augmentations to the R&A Program

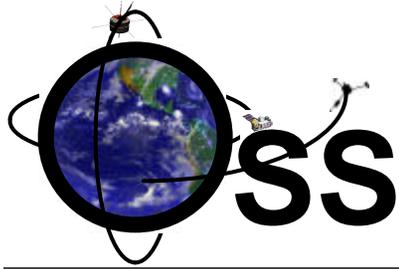
- † **The individual R&A cluster programs are oversubscribed by substantial factors; investigator turnover is good but individual grants have decreased in size or the total focus of each program has narrowed. During the last decade, the OSS program content has increased but the R&A program has been flat funded.**
- † **The R&A program should be augmented to provide the proper level of science support for utilizing the results of missions and preparing for future missions. An additional or special augmentation should be targeted towards science areas where mission activity has increased.**



Structure of R&A Program

The Committee notes that the current reorganization of OSS provides an opportunity to streamline the organization of the R & A clusters and to make them consistent across the science divisions.

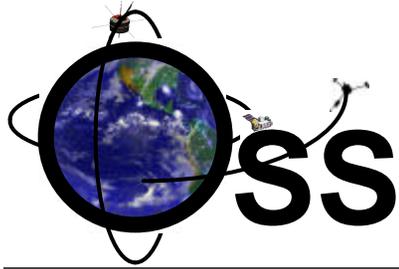
- † **The Committee recommends that the clusters be restructured such that the program content is uniform amongst them.**
 - † The current “clustering” is very non-uniform, some including DA and some not, and some including instrument development and some not, and some including theory and some not.
- † **The Committee endorses the concept in the recent Astronomy & Astrophysics Decadal report of including directly-related theory with data analysis in mission line MO & DA.**
 - † Consideration should be given to including directly related laboratory work, field work, and ground-based observations.



Structure of (Future Triennial R&A) Reviews

We recommend that all R&A elements should be included (e.g. Astrobiology and LWS R & A programs) in the next review cycle.

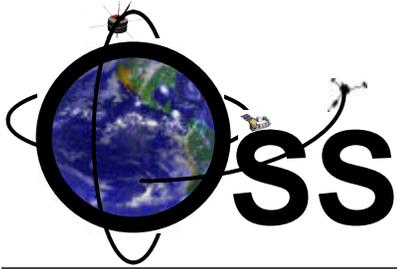
Future R&A reviews require a better description of the DA programs.



Recommendations for SS Augmentations and New Initiatives

Recommendations on Changes in the Budget Distribution

- † One of the questions to the Committee was “Judging by the priorities in the SSE strategic plan, is the current funding distribution across the nine science clusters the optimum, or would the Panel Committee recommend changes?”
- † In order to respond to this question, the Committee developed the following categories:
 - † Category I: Most deserving of additional resources in a general R & A program augmentation.
 - † Category II: Deserving of continuing support and some increase in a general R & A program augmentation.
 - † Category III: Requires improvement in performance. Candidate for reduction in support.
 - † Category IV: Candidate for a major decrease in support or termination.



Changes in Budget Distribution, cont'd

Using these categories, the Committee reached the following recommendations for changes in the budget distribution between the 11 research clusters:

† **Category I:**

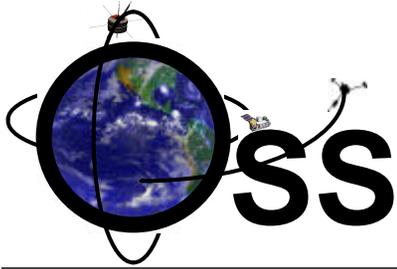
- † Theory Program for Sun-Earth Connection
- † Theory Program for Astrophysics
- † Solar and Heliospheric Sciences
- † Origin and Evolution of Solar System Bodies
- † Planetary Systems Science
- † Space Astrophysics Research and Analysis, and
- † High Energy Astrophysics.

† **Category II:**

- † Geospace Sciences
- † Exobiology, and
- † Planetary Instrument Design and Development.

† **Category III: Information Systems.**

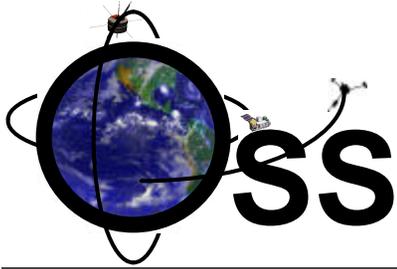
† **Category IV: None.**



Recommendation for Special Augmentation: High Priority Initiatives

Three clusters are recommended for special augmentation:

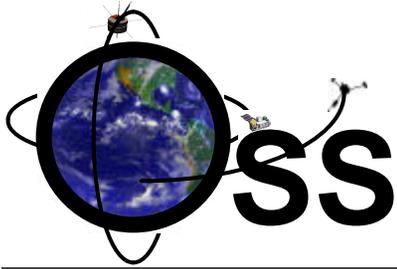
- † **Cluster 1b (theory Program for Astrophysics) would benefit from an increase of 50 per cent (\$3M/year) to increase theoretical efforts to both motivate and help to define new missions. This augmentation is consistent with the recommendation of the Astronomy & Astrophysics Decadal Survey.**
- † **Cluster 3 (Geospace Sciences) proposed to establish an Instrument Definition and Development program to facilitate instrument development to the “proposal ready” level. We recommend an SEC-wide augmentation of \$2.25M/yr for this important new initiative for instruments in the Sun-Earth Connection Strategic mission flight program.**
- † **Cluster 4 (Origin and Evolution of Solar system Bodies) strongly merits an augmentation ramping up to \$5M/year after 3 years to expand the search for extra-solar planets using ground-based techniques. This amounts to a doubling of the cluster 4 budget in this area. It is particularly important to establish teams to provide the continuity of observation necessary to detect extra-solar planets with orbital periods of many years, to upgrade instrumentation, to capitalize on the investment that NASA has made in the Keck telescopes and the SIM interferometer, and to prepare properly for TPF.**



NASA HQ Decisions on Space Science R&A Programs

The panel for the R&A Senior Review 2001 has completed its report, which is now available for open distribution.

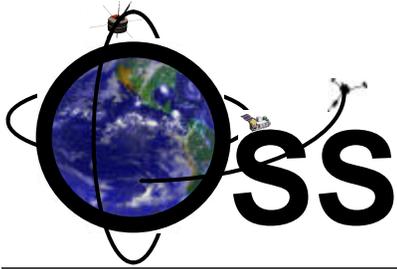
- † **This report contains a very thorough assessment of the science performance and relevance to the Space Science Enterprise Strategic Plan.**
- † **The panel also made very thoughtful recommendations on the structure of the Space Science R&A programs, on the structure of future reviews of R&A programs, and on highest-priority needs for augmentations or new initiatives.**



Response to Specific Recommendations

NASA HQ/OSS reviewed the Senior Review panel's assessments and recommendations, and formulated a plan for actions in response to the recommendations:

- † **The Applied Information Systems Research Program (AISRP) will be asked to develop a plan of action to respond to the three specific issues (assure productivity; assure results dissemination; develop usage tracking system) listed in the R&A review panel's report.**
 - † The goal should be to show quantitative progress in all three areas by the time of the next R&A review in 2004.
 - † The budget of the Applied Information Systems Research Program (AISRP) will be reduced by \$1.5M during fiscal year 2002, and by \$3.0M/year during FY03 and FY04.
 - † The budget plan for subsequent years will be determined after the next R&A Senior Review in mid-2004.



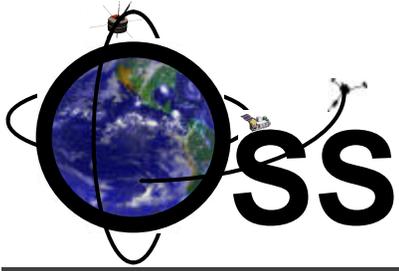
Special R&A Augmentations/New Initiatives:

Three proposed new initiatives received high-priority recommendations:

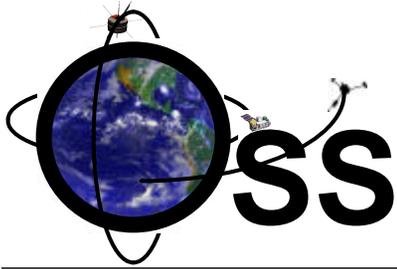
- † **an enhancement of the Astrophysics Theory Program for larger "group" grants,**
- † **an instrument definition and development program for Geospace sciences, and**
- † **an expansion of the ground-based search for extra-solar planets (part of the "Origins and Evolution of Solar System Bodies" program) .**

Each of these three augmentations will receive a budget augmentation beginning in FY02:

- † **Each of these three R&A clusters will receive budget increases of \$0.5M in FY02, \$1.0M in FY03, and \$2.4M in FY04.**
- † **The budgets for the three programs for FY05 and beyond will be defined after the R&A Senior Review in 2004.**
- † **However, as non-committed placeholders we will tentatively show increases of \$2.4M in FY05 and \$4.0M in FY06.**
- † **All of these increases are above the previous budget plans, which include annual inflation increases.**



Backup Material



Research and Analysis (R&A) and Data Analysis (DA) Trends

