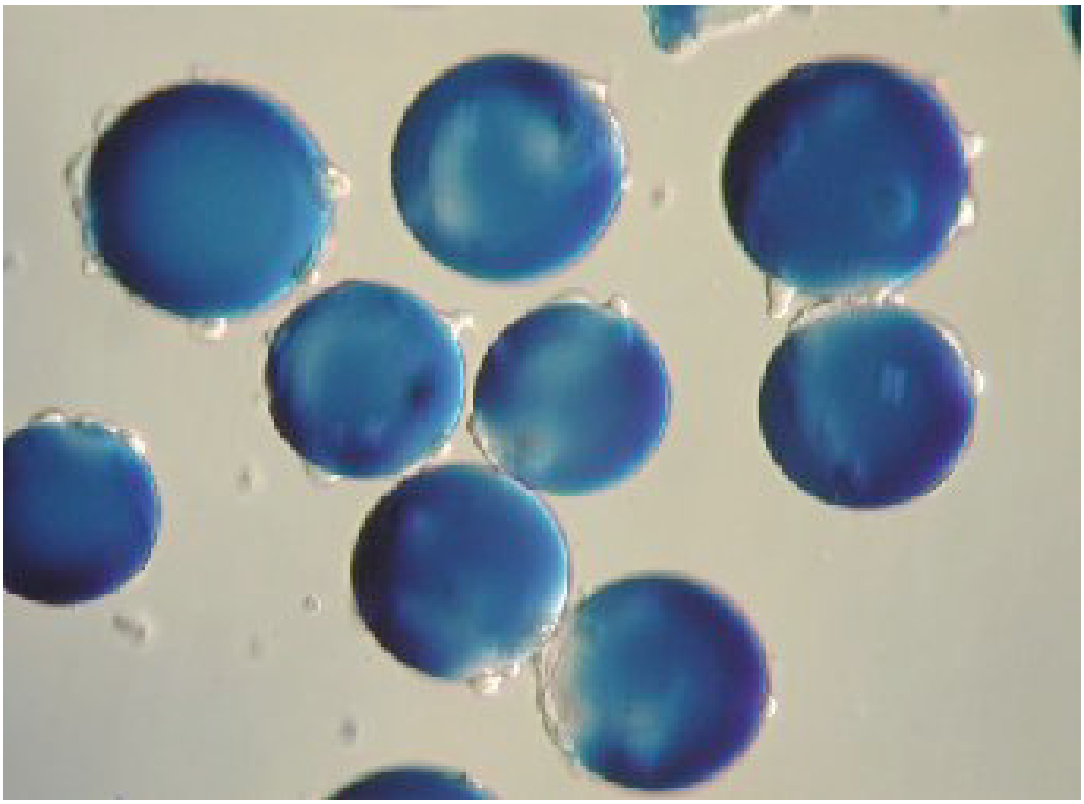
THEME: Research Partnerships and Flight Support



Liver cells like these were the subject of new research conducted by the fifth crew aboard the International Space Station. One of the specialized functions of the human liver is to break down drugs or toxins into less harmful and more water-soluble substances that are more easily excreted from the body. The StelSys experiment -- a joint study by NASA and Baltimore-based biotechnology research company StelSys, LLC – is testing this function of human liver cells in the microgravity environment aboard the International Space Station, comparing the results to the typical function of duplicate cells on Earth. The findings of this experiment will provide unprecedented information about the effects of microgravity on the proper function of human liver cells, offering new insight into maintaining the health of humans living and working in space.

RESEARCH PARTNERSHIPS AND FLIGHT SUPPORT

MAJOR EVENTS IN FY 2004

- 12 flight experiments from Space Product Development scheduled to be conducted on the Space Shuttle and Space Station.
- Multi-User Systems and Support will be involved in preparation of CIR and Express Research launches to Station in July 2004 and Europe's five research racks and two attached payloads planned for launch with the Columbus Module in October 2004, the first international partner laboratory module to be deployed on the Space Station.

THEME: Research Partnerships and Flight Support

OVERVIEW

The Research Partnerships and Flight Supports theme is composed of several sections that directly contribute to the NASA mission: Space Product Development (SPD), Research Partnership Centers (formerly known as Commercial Space Centers), Multi-User Systems and Support (MUSS), and the Alpha Magnetic Spectrometer (AMS). The SPD component makes space research capabilities available to American business so businesses can explore the potentials of space-based research. SPD has historically accomplished this through the RPCs, located at academic institutions and funded by NASA, which seek industry partners to pursue specific areas of commercial research. As a part of this budget request, the SPD and RPC programs are being significantly realigned and reduced, with most being phased out over the next few years. Remaining realigned activities will ensure that all of NASA's investments will directly contribute to the agency mission. NASA will continue to facilitate the commercialization of space, and will focus on ensuring that commercial researchers have efficient access to space.

In addition to the RPCs, SPD has other cross-cutting functions such as: Mission Integration, which provides assistance to crew and payload requirements needed to prepare for flight; the Alpha Magnetic Spectrometer (AMS) is a major high-energy space particle physics experiment planned for the ISS.

The theme also provides flight support through the Multi-User Systems & Support (MUSS), which encompasses the multi-use hardware development projects, and the overall ISS payload integration, ground processing, and operations support.

Missions	Goals supported by this theme	Objectives supporting those goals Reference 2003 Strategic Plan
Understand and Protect Our Home Planet	3 Create a more secure world and improve the quality of life by investing in technologies and collaborating with other agencies, industry, and academia.	3.4 Support national priorities through partnerships across industry, academia, and government for market-driven research in space. 3.5 Use the unique low-gravity environment of space to resolve scientific issues impacting Earth-based technological and industrial applications
Inspire the Next Generation of Explorers	6. Inspire and motivate students to pursue careers in science, technology, engineering, and mathematics	6.3 Enhance science, technology, & mathematics instruction with unique teaching tools & experiences that are compelling to educators and students as only NASA can provide.
	7. Engage the public in shaping & sharing the experience of exploration and discovery.	7.2 Engage the public in NASA missions and discoveries and their benefits, through such avenues as public programs, community outreach, mass media, and the internet.

RELEVANCE

The SPD program provides researchers with the capabilities to pursue product lines with direct application to NASA's mission, improving life on Earth, and ensuring the safety of our planet.

MUSS provides end-to-end payload integration processing from initial manifesting; it provides engineering integration, training, mission integration, ground testing, on-orbit operations, and finally return of the experiment to the principle investigator for the ISS. MUSS develops and sustains multi-use hardware for payload/principle investigators.

AMS will study the origin of the universe, and in particular, search for mysterious forms of matter such as anti-matter, dark matter, and strange matter, if existing.

THEME: Research Partnerships and Flight Support

Education and Public Benefits
This theme opens NASA's capabilities to research that can lead to new businesses, products and services that are of value to the public and the national economy. Products have or may come on the market that support human health, agriculture, and new technologies in communication, power generation and many other areas. Examples of product lines are: Nutraceuticals, functional foods and biopharmaceuticals, fermentation research, flavors and fragrances, structure-based drug design improved insulin formulation, porous ceramic bone replacements, catalytic combustion, water mist fire suppression technology, and advanced casting techniques. Through partner universities, many college students are involved in this research. This "hands-on" experience provides students with expertise in emerging fields and a direct understanding of the benefits of the space environment for research and development.

IMPLEMENTATION

This theme is composed of the Space Product Development Division and the Mission Integration Division at NASA Headquarters Office of Biological and Physical Research, the SPD Office at MSFC, and the RPCs, and the JSC Payloads Office to achieve the aforementioned goals and objectives. POC is Mark Uhran, Acting Director of the Space Product Development Division and Director of the Mission Integration Division.

Tailoring
Full compliance with NPG 7120.5B will be achieved in FY 03 for the relevant portions.

STATUS

In FY 2002, SPD transitioned four Research Partnership Centers (RPCs, a.k.a. CSC) from another NASA Enterprise. Some of the major accomplishments included the flight of six commercial research experiments to the ISS, addition of more than 15 new industrial partners, and the marketing of two commercial products. Currently, the SPD and RPC programs are being rescoped to ensure that all of NASA's investments will directly contribute to the overall mission.

THEME: Research Partnerships and Flight Support

PERFORMANCE MEASURES

Annual Performance Goals	
OUTCOME	3.4.1 Advance NASA's vision and mission by leveraging industry investment in space-based commercial activity through active partnerships with industry and academia.
	Performance Goals:
4RPFS1	Complete realignment plans of SPD, initiate phaseout, and demonstrate contributions to agency mission.
4RPFS2	Enable industry research in space that allows them to bring 1 commercial product under investigation to market by FY04.
OUTCOME	3.5.1 Use the unique low-gravity environment to resolve scientific issues that impact Earth-based technological and industrial applications
	Performance Goal:
4RPFS3	Integrate and prepare the Combustion Integrated Rack research facility for launch in the FY 2004 time frame.
OUTCOME	6.3.1 Improve quality of STEM instruction.
	Performance Goal:
4RPFS4	Develop collaborations with Professional Education Associations directed to enhance educator proficiency in use of space research content and classroom, education hardware focused on standards-based curriculum.
4RPFS5	Develop and train facilitators for dissemination of 3 comprehensive Educator Professional Development Seminars focused on biological and physical sciences research that coordinates with standard's based science, math, and technology concepts.
OUTCOME	7.2.4 Broaden OBPR research information to diverse audiences.
	Performance Goals:
4RPFS6	Increase distribution of the *Space Research* newsletter by 5,000 over FY 03 circulation in order to further educate the general public, industry and acedemia on space-baeed research.
4RPFS7	Establish and sustain a series of media presentations of OBPR research, through collaboration with PAO, to convey important space-based research results to the general public, industry and acedemia.
4RPFS8	OBPR will expand its involvement in reaching minority & under-represented sectors of the public, through participation in conferences and community events that reflect cultural awareness and outreach. There will be at least one new venue associated with a minority and/or under-represented community over outreach efforts taking place in FY 03.

INDEPENDENT REVIEWS

Types of Review	Performer	Last Review	Next Review	Purpose
RP Independent Review	Booz Allen Hamilton	9/02-2/04	2005/2007	Retrospective evaluation of on-going tasks. HQs directed tri-annual independent review of the status and progress of the RPs.
Space Station Indept. Asses.	NASA	Oct 1, 2001	Annual	Assess ISS Program and the MUSS activities.
POCAAS	RPC (a.k.a. CSC)	Jan 23, 2002	None Planned	Assess the payload ops and associated flight/ground architecture.

THEME: Research Partnerships and Flight Support

BUDGET

Budget Authority ($millions)		FY02	FY03	Change	FY04	Comments
Research Partnerships & Flight Support		**196.9**	**169.5**	**+91.4**	**260.9**	
Operations		180.1	154.7	+76.3	231.0	
	Space Product Development	15.5	15.8	+3.0	18.8	Change due to full cost accounting and
	Multi-User System & Support	164.6	138.9	+73.3	212.2	realignment of programs.
Research		16.8	14.8	+15.1	29.9	
	Research Partnership Center	16.6	14.6	-1.6	13.0	In FY02 the RPC line includes 4 new centers
	Mission Integration	0.2	0.2	+16.7	16.9	Includes consolidated taxes (starts FY 03) and FY 04 includes AMS

Note: For all formats, the FY 02 column reflects the FY 2002 Congressional Operating Plan letter dated 9/30/02. The FY 03 column reflects the FY 2003 Presidents Budget Submit (PBS) as Amended. The Change column includes both programmatic and full cost adjustments. FY 2004 column is in full cost.

Indicates budget numbers in Full Cost.

Indicates changes since the FY 2003 Presidents Budget Submit.
FY 2002 and FY 2003 are not in full cost.

THEME: Research Partnerships and Flight Support

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THEME:	Research Partnerships and Flight Support
OPERATIONS:	Space Product Development

PURPOSE

Objectives	Reference 2003 Strategic Plan	Performance Measures
3.4; 6.3; 7.2		4RPFS1/2/4/5/6/7/8

The Space Product Development (SPD) Program will seek to advance NASA's mission and develop opportunities for commerce in space through research partnerships. SPD couples NASA capabilities and private sector technology development to the advantage of both. Facilitating the use of space for commercial products and services can help enable sustainable space exploration by NASA. In FY 2004 the SPD program will begin rescoping the program to ensuring that all of NASA's investments will directly contribute to the agency vision and mission.

OVERVIEW

The research performed in Space Product Development must be of benefit to NASA's visions and mission. The program is executed through Research Partnership Centers (former known as Commercial Space Centers) working with industry partners that they recruit and for which they act as a liaison with NASA. The current rescoping and refocusing of the program will reduce the number of RPCs and will ensure that all research contributes to the NASA mission, is industry supported, product oriented, and can be eventually brought to market.

PROGRAM MANAGEMENT

The SPD program responsibility delegated to Mary Kicza, the OBPR Associate Administrator, to the HQs Division Director and then to Marshall Space Flight Center under the authority of the Space Product Development Office. The CAS (The Commercial Advisory Subcommittee) assists in an advisory capacity. All SPD projects are projects of the RPCs and therefore subject to the project reqirements of theRPCs. For details, see the SPD Program Plan. NPG 7210.5B does not have application to this program.

TECHNICAL COMMITMENT

The definition of the baseline is contained in the SPD BOE package dated 12/2002

Technical Specifications			FY04 President's Budget			Change from Baseline
S/DRUMS	PDR - 10/98	CDR - 9/99	H/W Ready-02	Launch 4/03/Flight - ULF-1		--
ZCG-HTF	PDR - 03/01	CDR-11/01	H/W - 12/02	Launch - 5/03	Flight: 12A.1	--
CBTM	PDR - 02/03	CDR-09/03	H/W Ready-04	Launch/Flight		--
CGBA	PDR-Completed	CDR-Compl.	H/W Ready-02	Launch-4/02	Flight - 8A	--
PGBA	PDR-Completed	CDR-Compl.	H/W Ready-03	Launch-8/02	Flight 9A	--
CPCG-H	PDR-Completed	CDR-Compl.	H/W Ready-04	Launch-4/02; 1/03	Flight 8A and ULF-1	--
CPCG-V	PDR-9/97	CDR-8/99	H/W Ready-03	Launch 1/03	Flight-ULF-1	--
DOME	PDR-8/01	CDR-12/01	H/W-TBD-03	Launch- 8/03/Flight - 13A		--
MEPS	PDR-Completed	CDR-Compl.	H/W Ready-02	Launch-5/02	Flight-UF2	--

Schedule	FY04 President's Budget	Change from Baseline
Nov 02-07	Annual renewal of Research Partnership Center Cooperative Agreements.	--
2002-2004, 2005-2007	Independent review of Research Partnership Centers, 3 year cycle.	--
April 02-07	6-month review of RPC milestone accomplishments.	--

THEME:	Research Partnerships and Flight Support
OPERATIONS:	Space Product Development

ACQUISITION STRATEGY & PERFORMING ORGANIZATIONS

The SPD/ISSRC program is in place through five-year Cooperative Agreements with competitively-procured university-based Commercial Space Centers. These agreements are renewable each year after receipt of the annual report and other indicators that the agreed-to milestones/deliverables have been met.

Current Acquisitions	Actual*	Selection Method	Actual*	Performer	Actual*
Cooperative Agreements	99%	Full & Open Competition	100%	Industry	3%
Cost Reimbursable	0%	Sole Source	0%	Government	0%
Fixed Price	0%		100%	NASA Intramural	10%
Grants	0%			University	87%
Other	1%	Sci Peer Review	0%	Non Profit	0%
	100%	* % based on FY 02 direct proc.			100%

Future Acquisitions - Major	Selection	Goals
Renewal of Cooperative Agreements	Fall '02	Annual renewal of grant is based on grantee meeting milestones and deliverables agreed to in current year grant.

AGREEMENTS

Internal: None.

External: Space Act Agreements with private companies/individuals. Cooperative Agreements are in existence with each RPC and host university.

Changes since FY03 Pres. Budget: None.

INDEPENDENT REVIEWS

Types of Review	Performer	Last Review	Next Review	Purpose
RPC Independent Review	Booze Allen Hamilton	9/02-2/04	2005/2007	Retrospective evaluation of ongoing tasks. HQ directed tri-annual independent review of the states and progress of the RPCs.

BUDGET / LIFE CYCLE COST

Budget Authority ($ in millions)	FY02	FY03	FY04	Comments
FY 2004 President's Budget	15.5	15.8	18.8	
Space Product Development	15.5	15.8	18.8	
Changes since FY 03 President's Budget	0.0	0.0	-0.4	***Reason for Change:***
		-0.4	-0.6	Realignment and rescope of program.
			+1.5	Full cost accounting.

Indicates budget numbers in Full Cost.

Indicates changes since the FY 2003 Presidents Budget Submit.

FY 2002, FY 2003, Prior and BTC are not in full cost.

THEME: Research Partnerships and Flight Support

OPERATIONS: Multi-User System & Support (MUSS)

PURPOSE

Objectives	Reference 2003 Strategic Plan	Performance Measures
3.5		4RPFS3

MUSS supports this objective by providing end-to-end payload integration processing from initial manifesting, to engineering integration, to training, to mission integration, to ground testing, to on-orbit operations, and return of the experiment to the principle investigator for the International Space Station (ISS). MUSS develops and sustains multi-use hardware for payload/principle investigators.

OVERVIEW

The Multi-User Systems and Support (MUSS) encompasses the multi-use hardware development projects, and the overall ISS payload integration and operations support. Multi-use hardware development projects include the EXPRESS (EXpedite the PRocessing of Experiments on Space Station) Racks and EXPRESS Transportation Racks, and the Window Observational Facility (WORF). Logistics and sustaining engineering is supported for these racks as well as the Human Research Facility and the Habitat Holding Racks. Development oversight is provided for the EXPRESS Pallet as well. New active and passive biotransportation freezer units are presently undergoing a procurement phase. Utilization support services for ISS payload integration and operations are provided to both U.S. and International Partners. This includes services for payload planning and engineering support, crew and user team training, sub-rack and sub-pallet level payload integration, ground processing, and on-orbit payload operations for all research related hardware and software on-board the ISS. The utilization effort also includes the development and operations of the ground facilities, including the Payloads Operations Information Center (POIC) and the Payloads Office Information Facility (POIF).

PROGRAM MANAGEMENT

Enterprise official is Mary Kicza, Associate Administrator with Mark Uhran as the Mission Integration Division Director. MUSS program management is implemented by the Jonhson Space Center Payloads Office (JSC/OZ) by Lesa Roe. Full compliance with NPG 7120.5B will be achieved in FY 03 for the relevant portions.

TECHNICAL COMMITMENT

The definition of the baseline is OBPR's Basis of Estimate (BOE) dated Feb 2002

Technical Specifications	FY04 President's Budget	Change from Baseline
ARTIC Freezer Unit	Units 1, 2	--
Payload Rack Checkout Unit (PRCU)	Units 1, 2, 4, 5, 6	--
Passive Rack Isolation System (PaRIS)	Units 1, 2	--
EXPRESS	Racks 1, 2, 3, 4, 5, 7, 8	--
Window Observational Research Facility (WORF)		--
BioTransportion Hardware	Units 1 - 10	--

Schedule	FY04 President's Budget	Change from Baseline
Artic Freezer Unit 1 FHA	Jan-02	--
Artic Freezer Unit 2 FHA	Mar-02	--
PRCUs (Units 1, 2, 4, 5, 7)	Delivered (Feb 02)	--
PaRIS Unit 1 for HHR 1	Sep-02	--
PaRIS Unit 2 for HHR 2	Mar-03	--
EXPRESS Racks	Delivered (1 - 8 Aug 02)	--
WORF	Delivered (Mar 02)	--
Biotransportion Hardware	Under Review	New Requirement
PaRIS Unit 3 for CIR	Dec-02	New Requirement

THEME: Research Partnerships and Flight Support

OPERATIONS: Multi-User System & Support (MUSS)

ACQUISITION STRATEGY & PERFORMING ORGANIZATIONS

Data Current as of 1/18/2003

The prime contractor for the Payload Operations & Integration Center (POIC) is Lockheed Martin. Present work includes sustaining engineering and maintenance of the facility. This contract runs through the end of FY03 and subsequently recompeted. The prime contractor for the ISS Payload Integration Contract is Boeing. This contract runs through FY 04 with an option for FY05. In FY02, direct procurement represented 100% of budget authority. Changes since FY03 Pres. Budget: None.

Current Acquisitions	Actual*	Selection Method	Actual*	Performer	Actual*
Cooperative Agreements	0%	Full & Open Competition	50%	Industry	45%
Cost Reimbursable	100%	Sole Source	50%	Government	0%
Fixed Price	0%		100%	On-site Contractors	55%
Grants	0%			University	0%
Other	0%	Sci Peer Review	0%	Non Profit	0%
	100%	* % based on FY 02 direct proc.			100%

Future Acquisitions - Major (FY03)	Selection	Goals
Biotransportation Hardware	12/02	Develop cryogenic transportation capabilities for the ISS.

AGREEMENTS

Internal: None

External: None

Changes since FY03 Pres. Budget: None.

INDEPENDENT REVIEWS

Data Current as of 1/18/2003

Types of Review	Performer	Last Review	Next Review	Purpose
POCAAS	RPC	23-Jan-02	None Planned	Assess payload ops and associated flight/ground architecture.

BUDGET/LIFE CYCLE COST

Budget Authority ($ in millions)	FY02	FY03	FY04	Comments
FY 2004 President's Budget	164.6	138.9	212.2	
Multi-User System and Support	164.6	138.9	212.2	
Changes since FY 03 President's Budget	0.0	0.0	+68.1	***Reason for Change:***
Full Cost/REMAP		0.0	+68.1	Delta due to full cost and ReMaP.

Indicates budget numbers in Full Cost.

Indicates changes since the FY 2003 Presidents Budget Submit.

FY 2002 and FY 2003 are not in full cost.

THEME: Research Partnerships and Flight Support

RESEARCH: Research Partnership Centers

PURPOSE

Objectives	Performance Measures
3.4; 6.3; 7.2	4RPFS1/2/4/5/6/7/8

The Research Partnership Centers (RPC) will develop opportunities for commerce in space. RPC's couple NASA capabilities and private sector technology development to the advantage of both. The RPC program is being rescoped and realigned to ensuring that all of NASA's investments will directly contribute to the agency vision and mission.

OVERVIEW

The research performed in the Research Partnership Centers must contribute directly to the NASA mission and be industry driven and thus requires industry participation, cash and in-kind financial support. The program is executed through the Research Partnership Centers working with industry partners that they recruit and for which they act as a liaison with NASA. The current rescoping and refocusing of the program will reduce the number of RPCs and will ensure that all research contributes to the NASA mission, is industry supported, product oriented, and can be eventually brought to market.

PROGRAM MANAGEMENT

The RPCs program responsibility delegated to Mary Kicza, the OBPR Associate Administrator, to the HQs Division Director then to Marshall Space Flight Center under the authority of the Space Product Development Office. The CAS (The Commercial Advisory Subcommittee) assists in an advisory capacity. All SPD projects are projects of the RPCs and therefore subject to the project requirements of the RPCs. For details, see the SPD Program Plan. The AMS is managed from HQs, the Mission Integration Division-Mark Sistilli is Program Manager. Full compliance with NPG 7120.5B will be achieved in FY 03 for the relevant portions.

TECHNICAL COMMITMENT

(Listed below are some of the current Research Partnership Centers, and examples of their projects.)

The definition of the baseline is described in the BOE package as of the FY03 PBS.

Technical Specifications	FY04 President's Budget	Change from Baseline	
Bioserve Space Technologies Center	Commercial Generic Bioprocessing Apparatus	TBD	(Biotech)
Cntr for Advanced Microgravity Materials Processing	Zeolites/Nucleation & Control Methods	TBD	(materials)
Cntr for Commercial Applications of Comb. in Space	Space Drums, Water Mist	TBD	(materials)
Cntr f/Biophysical Sciences & Engineering	Influenza Med., Organ Rejection, Auto-Immune	TBD	(Biotech)
Cntr for Space Power	Miniaturization technology, etc.	TBD	(Infrastructure)
Commercial Space Center for Engineering	Engineering Center	TBD	(Infrastructure)
Consortium for Materials Development in Space	NonLinear Optics	TBD	(Biotech/Mat.)

In FY 2004 the RPC program will be realigned and reduced to ensure that all of NASA's investments are directly contributing to the agency vision and mission.

Schedule	FY04 President's Budget	Change from Baseline
6-month reviews	Apr, Oct — 1 YR PERIOD	TBD
Annual Renewals	Nov — 1 YR PERIOD	TBD
Independent Reviews	2003, 2006, 2009 — 3YR PERIOD	TBD

Independent Review — Independent Review — Independent Review

THEME: Research Partnerships and Flight Support

RESEARCH: Research Partnership Centers

ACQUISITION STRATEGY & PERFORMING ORGANIZATIONS

Data Current as of 1/18/2003

The SPD program is accomplished through the competitively selected, university based Research Partnership Centers. These Centers are brought on-board through five-year Cooperative Agreements which are renewable yearly, after mutually agreed-to milestones and deliverables have been met.

Current Acquisitions	Actual*	Selection Method	Actual*	Performer	Actual*
Cooperative Agreements	87%	Full & Open Competition	90%	Industry	3%
Cost Reimbursable	0%	Inhouse	10%	Government	0%
Fixed Price	0%		100%	NASA Intramural	10%
Grants	0%			University	87%
Other	13%	Sci Peer Review	0%	Non Profit	0%
	100%	* % based on FY 02 direct proc.			100%

Future Acquisitions - Major	Selection	Goals
Renewal of Cooperative Agreements	Fall '03	Annual renewal of each grant is based on grantee meeting milestones and deliverables agreed to in the current year grant.

AGREEMENTS

Internal: None

External: Space Act Agreements are in existence with private companies. Cooperative Agreements are in existence with each RPC and host university.

INDEPENDENT REVIEWS

Data Current as of 1/18/2003

Types of Review	Performer	Last Review	Next Review	Purpose
RPC Independent Review	Booz Allen H.	9/02-2/04	2005/2007	Retrospective evaluation of ongoing tasks. Hqs directed tri-annual independent review of the status and progress of the RPCs.

BUDGET/LIFE CYCLE COST

Budget Authority ($ in millions)	FY02	FY03	FY04	Comments
FY 2004 President's Budget	16.8	14.8	29.9	
Research Partnership Centers (RPC)	16.6	14.6	13.0	
Mission Integration	0.2	0.2	0.2	
Alpha Magnetic Spectrometer	0.0	0.0	2.5	
Program support funds consolidation	0.0	0.0	14.2	
Changes since FY 03 President's Budget	+0.4	-0.2	+14.3	***Reason for Change:***
			+2.5	AMS is added starting in FY04.
			+14.2	Program support consolidation in FY04.
RPC Adjustments	+0.4	-0.2	-2.4	Program realocation in '02 and RPC reduction in 03-04.
FY03 President's Budget (RPC)	16.2	14.8	15.4	Late 01 Op Plan.

Indicates budget numbers in Full Cost.

Indicates changes since the FY 2003 Presidents Budget Submit.

FY 2002 and FY 2003 are not in full cost.