



Reinvent NASA Model

10/30/02



Reinvent NASA Model Definition

The **Reinvent NASA Model** for Utilization Management of the International Space Station (ISS) is an approach to build upon the current organizational and management structure to focus all activities within one centralized organization and thus provide better response to the research community.



Reinvent NASA Model

Purpose

- The objectives and purpose of the Utilization Management are to:
 - Facilitate the pursuit of flight research
 - Optimize research opportunities within current capabilities of ISS and with future enhancements for greater capabilities
 - Increase the long-range productivity of research and development



Reinvent NASA Model

Description

The **Reinvent NASA Model** provides focus on STS/ISS Utilization Management through the creation of a new enterprise. This model provides greater advocacy and visibility to the Agency, S/T/C user community and public through offices having the responsibility for:

- STS/ISS Commercial Utilization, which provides a single office responsible for managing the commercial customers of Shuttle and Station
- STS/ISS Education and Outreach, which provides consolidation and focus as integrated archiving for STS/ISS research
- STS/ISS Payloads Office, which provides STS/ISS tactical manifesting and mission management functions
- Customer Focus and Smart Integration Teams that isolate the researcher from the process and focuses on the researcher as a customer



Reinvent NASA Option

End-state Functional Table

Function	Code Z Role	Remarks
0) Define, Develop and Implement Policy and Strategic Plans	Leads	For SSP/ ISS Utilization Management only
1) Management of Research Utilization		
a) Establish Research Plans	Supports	Led by Codes U, S, Y, R, M
b) Manage Research Programs	Supports	Led by Codes U, S, Y, R, M
c) Manage Integrated Research Utilization	Leads	For SSP/ ISS Utilization
2) Preparing and Allocating Budgets	Leads	For SSP/ ISS Utilization
a) Budget Formulation, Justification		
b) Budget Execution		
3) Selecting and Prioritizing Research	Leads	For Commercial Research only through CSCs
a) Managing selection process		
b) Selection		
c) Prioritizing selections		
4) Establishing Payload/ Experiment Requirements and Feasibility	Leads	For Program level multi-use hardware (EXPRI WORF, MELFI)
a) Research Requirements		
b) Engineering Concept Development & Hardware Assessments		
5) Developing Cost, Schedule, and Risk Assessments	Leads	For Program level multi-use hardware (EXPRI WORF, MELFI)
a) Perform Cost, Schedule, Risk Management Assessment		
b) Authority to Proceed		
6) Developing and Qualifying Flight Research Systems	Leads	For Program level multi-use hardware
a) DDT&E	Supports	For discipline specific and commercial hardwa
b) Subrack Integration		
c) Operations		
7) Maintaining and Sustaining Flight Research Systems	Leads	For all on-orbit laboratory facility racks (one yr after launch)
a) DDT&E		
b) Operations		
8) Developing Ground Systems	Leads	For integration and operations ground systems, and those associated with flight facility racks.



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End-state Functional Table

Function	Code Z Role	Remarks
9) Maintaining and Sustaining Ground Systems a) Identify changes/ upgrades to Research Flight Systems b) Maintain & Sustain Research Ground Systems	Leads	For integration and operations ground systems, and those associated with flight facility racks.
10. Constructing Ground Facilities	Support	Led by responsible Center
11. Maintaining Ground Facilities	Support	Led by responsible Center
12) Certifying Safety of Research Flight and Ground Systems	Leads	For integrated SSP/ ISS Utilization
13) Managing Missions and Allocating Services a) Advocacy, Manifesting and Resource Allocations b) ISS Research Mission Management	Leads	For integrated SSP/ ISS Utilization
14) Integrating User Mission – Analytical a) Payload Engineering Integration b) Payload Software Integration and Flight Production	Leads	For integrated SSP/ ISS Utilization Includes integrated Lab for payloads and rack to ISS analyses.
15. Integrating User Missions - Physical	Leads	For integrated SSP/ ISS Utilization
16) Integrating User Missions - Operational a) Payload Training b) Operations Integration	Leads	For integrated SSP/ ISS Utilization
17) Conducting Research & Analysis and Disseminating Results	Support	Through Customer Support/ Focus Integration Teams
18. Educating and Reaching Out to the Public (including industry) a) Management and Control b) Disseminate, Communicate & Report results to ISS customers	Leads	For integrated SSP/ ISS Utilization
19. Recommending ISS Pre-Planned Product Improvements	Leads	For integrated SSP/ ISS Utilization
20. Managing Archival of Research Samples, Data, and Results	Leads	For integrated SSP/ ISS Utilization



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Rationale

- Establishment of new centralized Code consistent with Guiding Principles and Vision of OBPR which have been co-authored with the other Codes S, Y, and M and focused on research.
 - Flight and increment assignments are based on Agency priorities.
 - Centralized assessment of all platforms which could be used for research optimizes research opportunities.
- Consolidation of activities within one centralized organization to provide better response to research community.
 - Distinct divisions to serve Commercial community vs. Science payloads division.
 - Centralization encourages S/C/T and IP utilization.
 - Customer Focal Point as single POC to researcher isolates research from process
 - Separation of science development from mission management with separate budgets empowers managers to perform to plan and is consistent with Freedom to Manage initiatives.



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Rationale

Goals:

- Provide focused integration activity for ISS research rather than the distributed approach of today
 - Total program integration
 - International and domestic
 - Short duration and long duration (e.g, ISS and STS)
 - Various platforms/facilities (e.g., KC 135, Drop Tower, other assets)
 - Integrated voice for all researchers
- Provide very clear lines of authority
- Ensure flight and increment assignments are based on Agency priorities
- Integrate strategic and tactical planning for flight research
- Integrate flight manifesting and mission management to optimize use of resources and flight opportunities on multiple vehicles and platforms
- Standardize documentation and requirements templates
- Make transparent to the research community
- Simplify existing processes for efficiency



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Characteristics

- The characteristics of the Reinvent NASA model are similar to those presented by the Baseline Continuous Improvement Model.
 - Civil service leadership and management with contractor support
 - Ability to act directly with the International community
 - Integrated Flight Research Strategy across NASA and other Government Agencies
 - Includes Codes M, S, Y, R, U, N
 - Collaborates with DOD, DOE, NIH, FDA, NIST, etc.
 - Collaborates with International community
 - Customer Focal Point as a single point of contact to the researcher that isolates the researcher from the process and focuses on the researcher as a customer
 - Smart Integration Team that interfaces with the Customer Focal Point and external entities
 - Build products required by external entities (Safety, vehicle. etc)



Reinvent NASA Model

Characteristics

- New Enterprise – STS/ISS Utilization Management (Code Z) that focuses activity in an independent office responsible for Utilization Management of STS, ISS Flights
 - Elevates Research Utilization Office to ISS and STS Program equivalent stature
 - Provides greater advocacy and visibility to Agency (and public) of relevance of STS/ISS Utilization Management
 - Does not dilute Science Enterprise (OBPR) efforts from science focus
 - Provides service to OBPR, S, Y, M, R
 - Performs strategic utilization planning and designates funding of implementation independent of both the science and vehicle programs
 - Provides single POC for STS/ISS research community: Science, Commercial, Technology, IPs, other Agencies
 - Chairs SSUB and has authority over cross Enterprise ISS and STS research utilization decisions
 - Accommodates international barter agreements and allocation of resources easily



Reinvent NASA Option

Characteristics

- STS/ISS Research Council comprised of rotating IPAs from science community
 - Provide intellectual leadership
 - Provide resources to facilitate dissemination of research results and benefits of STS/ISS
 - Gain support of Scientific user groups external to NASA
 - Report to NAC and is a non-NASA advisory committee
- Chief Research Officer is a member of the Senior Management Council



Reinvent NASA Model

Characteristics

- Standardization of the science selection process across the NASA Codes
 - NASA Research Announcements (NRAs) are not part of end-to-end cycle time
 - These are ground studies or new research with no commitment to a flight opportunity
 - Announcement of Opportunities (AOs) follow a two step process focused on available resources and capabilities:
 - Step 1. Based on peer reviewed science and programmatic viability (Phase A)
 - Step 2. Full cost, technical, schedule proposal for Phase B/C/D award
 - Documented science requirements
 - One year Phase B followed with Mission Confirmation Review and Authority to Proceed to Phase C,D
 - Maturity of science assured



Reinvent NASA Model

Legal Structure

NASA was established through the National Aeronautics and Space Act of 1958 as a civilian Federal Agency. As such, Congress has declared that NASA's activities shall contribute to:

- Expansion of human knowledge of the Earth and phenomena in space
- Establishment of long-range studies of potential benefits gained from ...space activities for peaceful and scientific purposes
- Preservation of role of US as leader in space science and technology
- Cooperation by US with other nations in work done pursuant to this Act and peaceful application
- Most effective utilization of scientific and engineering resources

The International Space Station is one Program within NASA. Central authority for “utilization management” is in the Office of Biological and Physical Research and participating Centers are authorized to perform specific functions



Reinvent NASA Model

Legal Structure

- NASA elements as a Federal Agency include:
 - Administrator reports programmed activities and accomplishments to Congress in May each year.
 - Reports may include recommendations for additional legislation.
 - Research activities are subject to recommendations of NASA Advisory Council.
 - Activities are subject to security requirements, restrictions, and safeguards as deemed necessary by the Administration.
 - Personnel are subject to prosecution if found in violation of regulations of NASA in protection or security of any laboratory, station, base deemed as NASA/government property.



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Management Structure and Interfaces

- Three Division Level Offices would be created under Code Z
 1. STS/ISS Payloads Office
 - Perform the integrated Research Utilization Management function
 - Responsible for the STS/ISS tactical manifesting and mission management functions
 - Perform the analytical engineering and operations functions
 - Integrate Pre-Planned Product Improvement inputs to optimize ISS capabilities with research requirements
 2. STS/ISS Commercial Utilization
 - Provide a single office responsible for managing the commercial customers of Shuttle and Station
 - Provide faster turn around time for commercial community by having in dedicated Code Z
 3. STS/ISS Education and Outreach (assumes NASA doesn't establish an Outreach Office)
 - Consistently identified as “broke” by NGO User Workshop participants
 - Provide the focus needed by consolidating Outreach under Code Z
 - Provide STS/ISS integrated archiving responsibility



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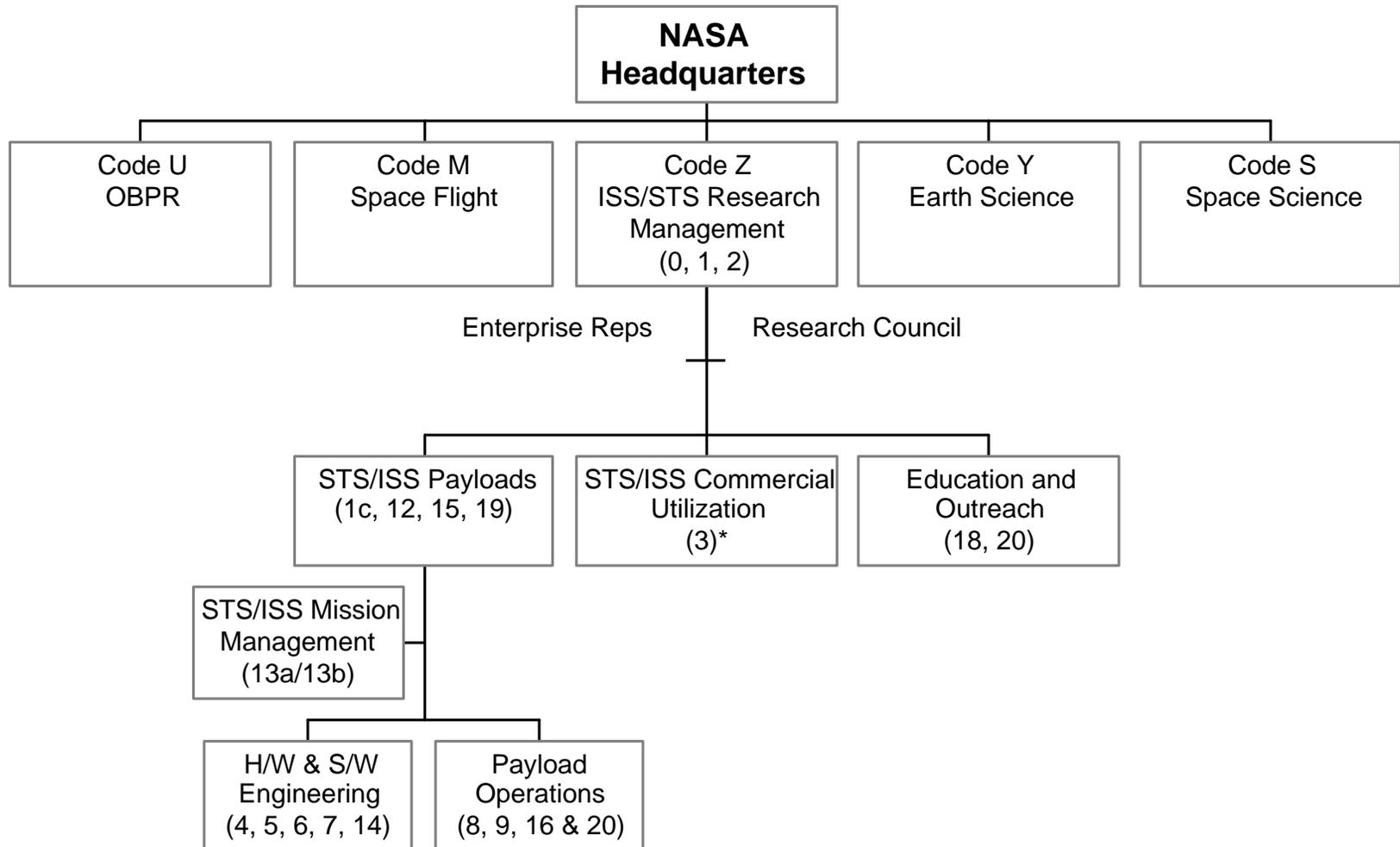
Management Structure and Interfaces

- In addition to the analytical engineering and operations activities currently contained in functions 14 and 16, sustaining engineering and operations of ISS facility racks could transition to Code Z
 - Code Z becomes responsible for sustaining and maintaining ISS as an on-orbit laboratory including the facilities (EXPRESS, HHR, FCF, etc)
 - EXPRESS, EXPRESS derivatives and multi-use racks and pallets (i.e., 8 EXPRESS, WORF, 2 HRF, 2 HHR, MELFI, CRYO, 3 EXPRESS Pallet) transition immediately
 - Other discipline specific facility racks transition one year after launch
 - Allows time for HW developers to operate, sustain, flush out problems before transition
 - Maintains development of all inserts which interface to science specimens with the PD
 - Consistent integration approach is provided for all Facilities
 - Use of facilities is optimized across research disciplines
 - Efficiencies in engineering personnel, integrated logistics and sparing are gained



Reinvent NASA Option

Management Structure and Interfaces

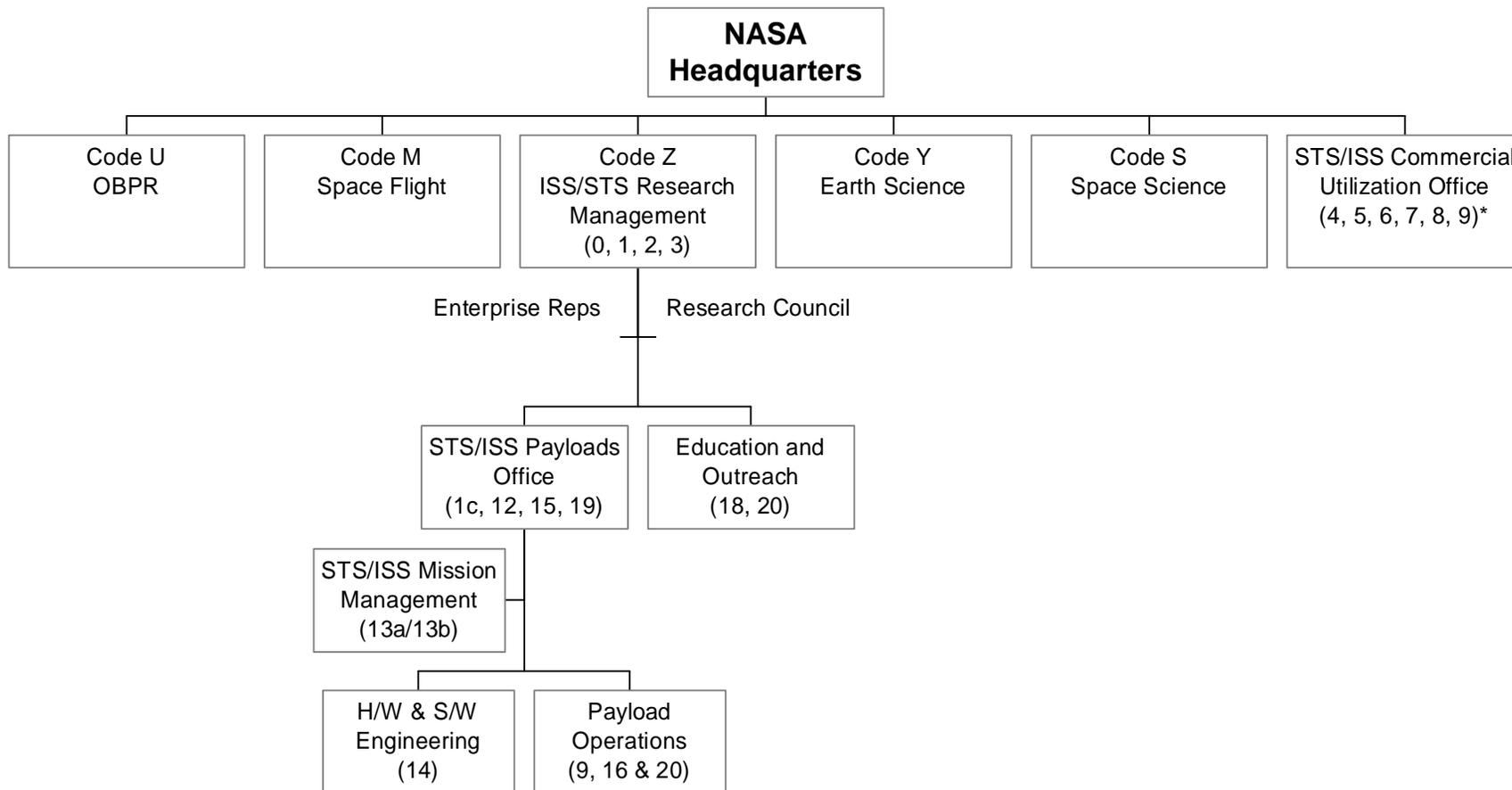


* For Commercial Payloads only



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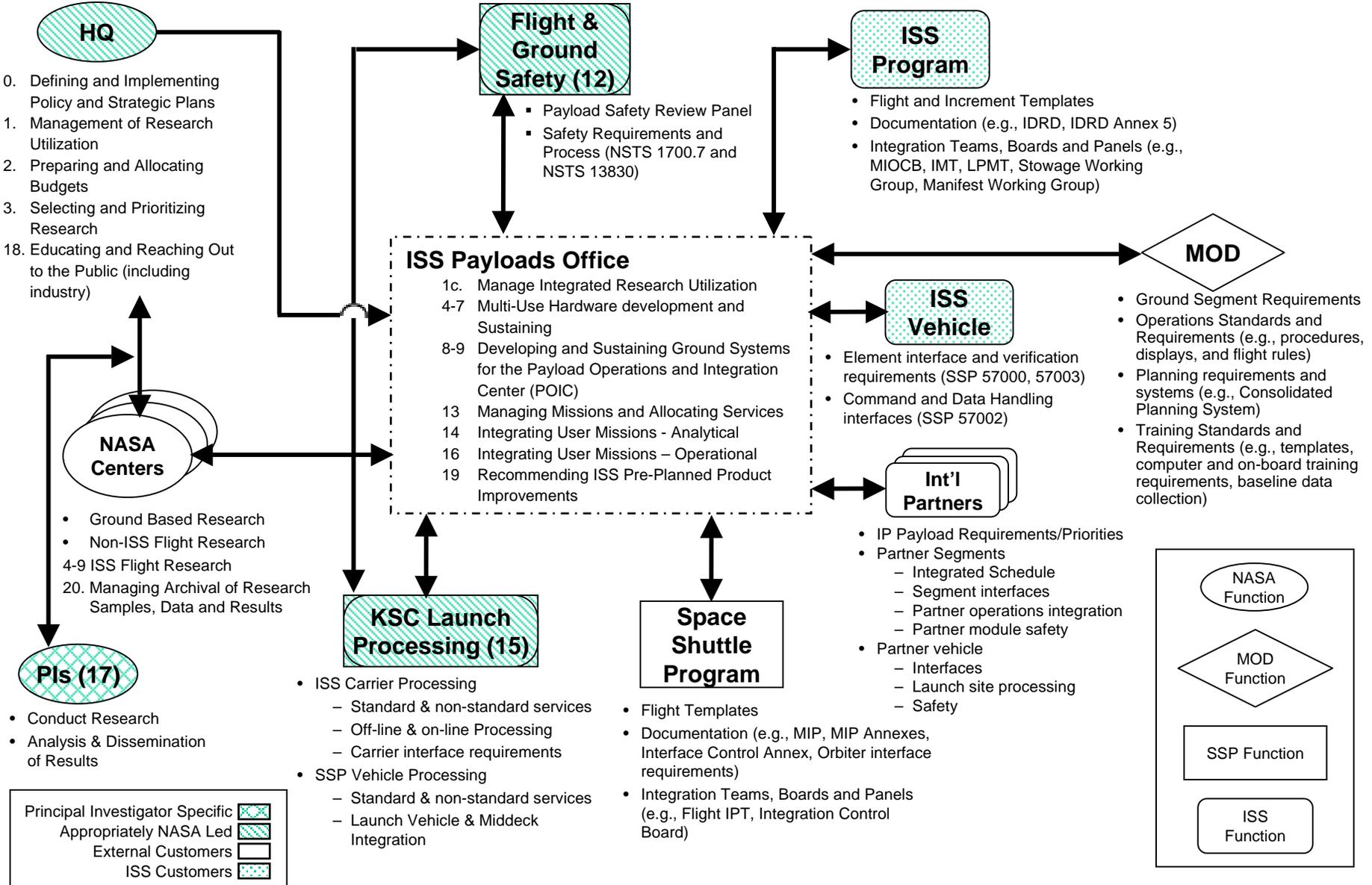
Management Structure and Interfaces



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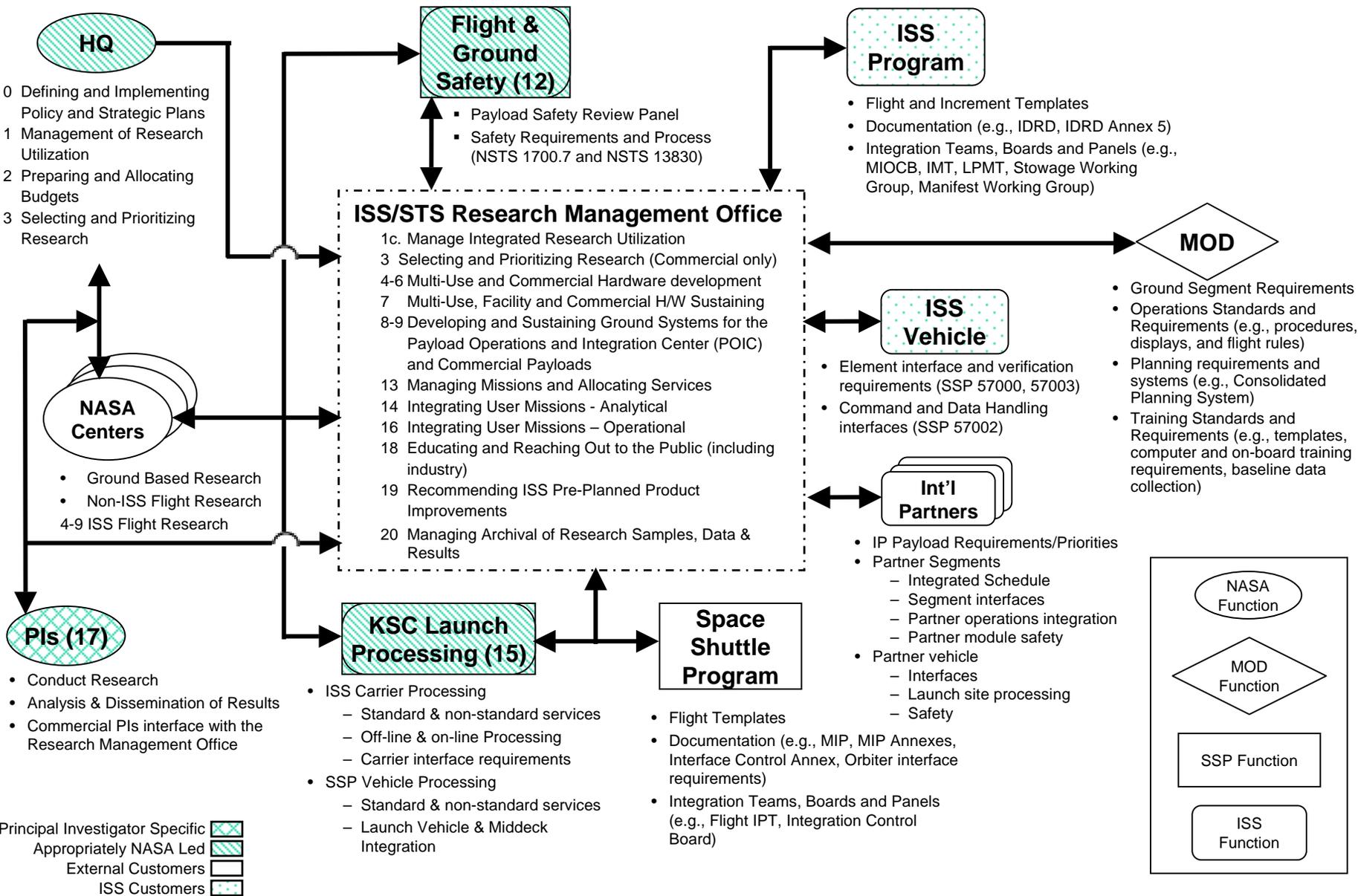


Baseline ISS Utilization Management Organization Interfaces





NASA Re-invent Interfaces

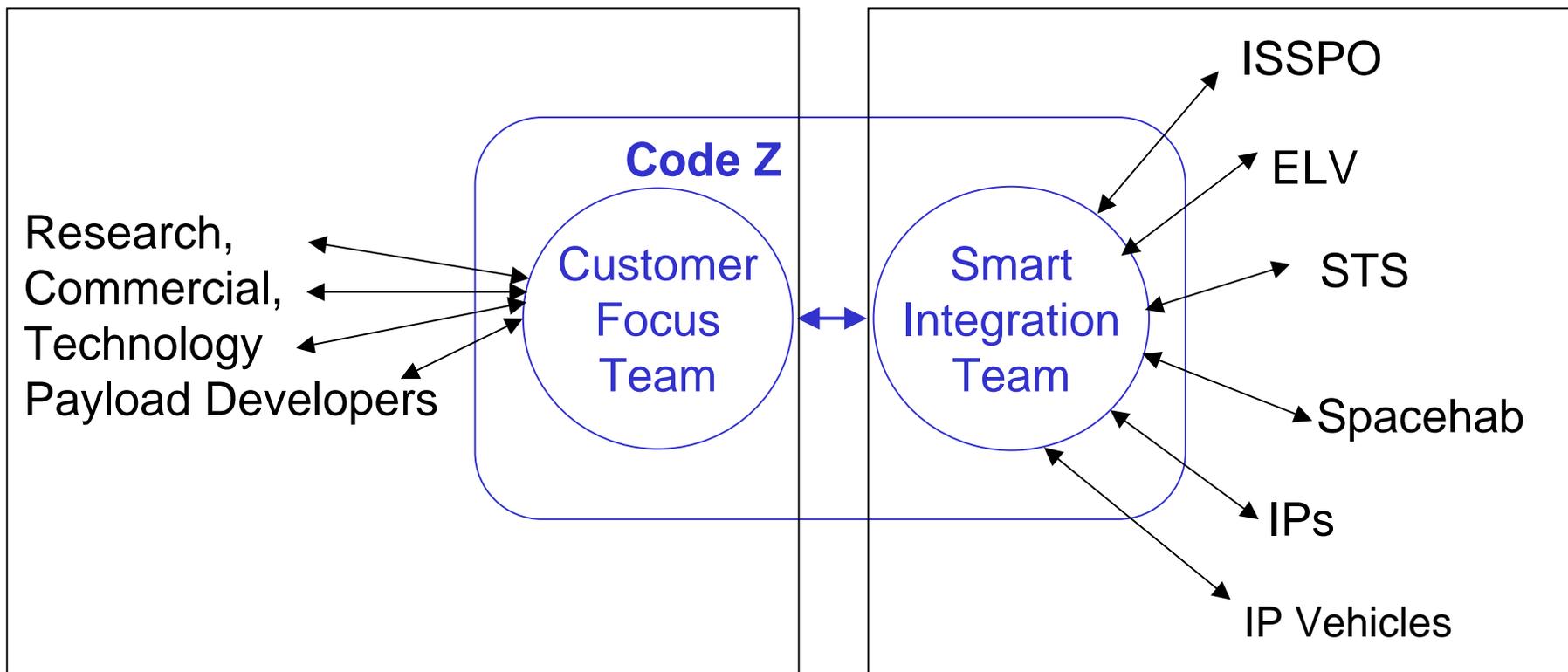




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Management Structure and Interfaces

Customer Focus





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Timeframe and Schedule

Schedule/timeframe is at discretion of NASA Administrator

- Has potential to be transitioned quicker than other Options
- Can be fully implemented in one year with minimum impact and overlap



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Budget and Finance

- Budgets will need to be balanced between organizations subject to delineation of responsibilities. Initial small overhead of 5-10 people for 2 years which declines to \$0 in FY05.
- Delta Funding will be needed to establish Research Council, Customer Focus Team, and Smart Integration Team

Fiscal Year	<u>FY03</u>	<u>FY04</u>	<u>FY05</u>	<u>FY06</u>	<u>FY07</u>
\$M	1.5	1.5	0	0	0



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Personnel and Staffing

- The workforce under the Reinvent NASA Model includes both civil servants and support contractors and represents Code Z Enterprise.
- Personnel numbers increase in the first 2 years to staff the new Enterprise, then declines to zero following consolidation of activities.

Workforce is estimated as follows:

	FY03	FY04	FY05	FY06	FY07
Civil Servants	5	5	0	0	0
Contractors	5	5	0	0	0
Total	10	10	0	0	0



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Advantages/Disadvantages/Risks/Mitigation Plans

Legal Structure

Advantages	Disadvantages	Risk	Risk Mitigation
No additional legal authority is required for a NASA Division since authority comes from NASA's mission as defined in the Space Act	Government statutes and regulations must be followed along with Congressional direction.	Congressional demand that an NGO be established along with presidential severe downsizing of civil service staff	Structure Reinvention to remedy those issues indicated by user community as "broke" and communicate changes to user community with hopes of their feedback to Congress.
Well-defined set of policies and directives currently exist	Cannot lobby	That value of Reinvent NASA is never recognized	Continue customer feedback and surveys with FOLLOW-UP on improvements or why nots
Can perform Inherently Governmental functions			
Can hold property and loan property to other organizations			
Permits reimbursement via Space Act Agreements			
Ability to make agreements with other governments			

Characteristics

Advantages	Disadvantages	Risk	Risk Mitigation
Direct International coordination and ability to invest authority in IP's, e.g., final verification approval			
Government leadership emphasizes US role as leader in space science and technology			



Re-invent NASA Model

Advantages/Disadvantages/Risks/Mitigation Plans

Characteristics

(continued) Advantages	Disadvantages	Risk	Risk Mitigation
Activities subject to NAC	NASA does not always follow NAC recommendations	Alienation of science community	Strengthen interfaces with science community via the Research Council and bring accomplished and recognized scientists into leadership roles within NASA
Integrated flight research strategy across NASA and other government agencies, e.g., DOD, DOE, NIH, FDA		Potential to deviate from NASA's mission	Retains the expertise to understand the needs of various outside elements while maintaining focus on accomplishing NASA's mission
Provide Customer Focal Point as single POC to researcher and isolates research from process	Not assuring that customers needs are clearly understood	Total misinterpretation of customer and/ or researcher needs	Close coordination with the Developers, while allowing the Developers for the researcher to also use their expertise and knowledge in interpretation of research element needs
Provide Smart Integration Team to support the development of integration products and assist the PDs through the process			
Create new Enterprise (Code Z) to elevate Research Utilization Office to ISS and STS Program equivalent structure	Builds yet another Enterprise at HQ	Research Codes U, S, Y & M may view as in conflict	Provide a Chief Scientist and strong Research Council to bridge with the Research Codes
Code Z chairs the SSUB and has authority over cross enterprise ISS and STS research and thus will ensure representation of ALL programs	Research codes have no direct jurisdiction over research flow on each and every increment	Research codes may feel Agency Research priorities are being jeopardized	Provide a Chief Scientist and strong Research Council to bridge with the Research Codes



Re-invent NASA Model

Advantages/Disadvantages/Risks/Mitigation Plans

Characteristics

(continued) Advantages	Disadvantages	Risk	Risk Mitigation
Provides Program Chief Scientist who can focus research pursuits and make research thrust visible to the science community while cognitive of Mission management constraints	Code U not directly involved in flight manifest decisions for research to be flown	Out of touch with Code U vision	Establish IWG's with Enterprise representatives for each increment similar to that of SpaceHab and historic SpaceLab and close Liaison of Chief Scientist to Code U--having office at HQ
Ability to implement cost reduction in hardware verification activities through CI	No "unified" effort across development Centers to ensure standardization of processes and acceptance of risks	Lack of "buy-in" at various centers	Mandated top down from HQ, e.g., Gregory
Managed by civil service with contractor support	Perception that engineering is total focus of ISS since NASA viewed as engineering organization	Continue to be perceived as an engineering organization	Program scientists advertise as a science organization through increased outreach efforts
Ability to combine contracts	Removes competition	may not result in best value	Be selective on contract consolidation to ensure best value
Provide STS/ ISS Research Council comprised of rotating IPAs from science community which also advocates to external community, provides guidance in strategic research goals, reports to NAC			
Corporate knowledge and experience has been established	May be viewed as not responsive to new processes which may be simpler and with fewer interfaces	No gain in productivity	Establish good communication throughout program



Re-invent NASA Model

Advantages/Disadvantages/Risks/Mitigation Plans

Characteristics

(continued) Advantages	Disadvantages	Risk	Risk Mitigation
Ability to implement continuous improvement process at all levels from Mission Management to PD			
Establish Commercial Utilization as one division which allows faster response and turnaround for commercial community			
Establish Education and Outreach Division within this code to better advertise what is available on ISS and make available better data retrieval of existing materials		Potential for duplication of effort or requested to pull back division	Establish Division with well defined goals and responsibilities in compliance with Education Office
Establish STS/ ISS Payloads Office to perform integrated Research Utilization Management, tactical manifesting, analytical engineering and operations, mission management and preplanned product improvement	Potential for creating an office with an engineering focus with no checks and balances	Perceived as a non-science entity (just engineering)	Create strong Science Group with rotating IPAs and Research Council; also have Chief Scientist in Residence at site
Representatives from other Enterprises detailed to Code Z to support transition of manifesting and mission management in one Enterprise	Dilution of other codes or double work	Alienation of other Codes	Direction for establishment of Code Z would have to be from above and in agreement with other Codes



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Advantages/Disadvantages/Risks/Mitigation Plans

Budget and Finance

Advantages	Disadvantages	Risk	Risk Mitigation
Requires minimal funding for implementation			

Procurement

Advantages	Disadvantages	Risk	Risk Mitigation
Procedures for buying and selling goods and services are established and well known	Federal procurement and disposal regulations require procedures that are time consuming and paperwork intensive		

Workforce

Advantages	Disadvantages	Risk	Risk Mitigation
Current personnel have learned from 10 years of dealing with ISS issues and bring experience	Numbers of civil servants involved reduce available manpower to new pursuits which NASA should be addressing vs. remaining an Operations organization	Aging workforce (25%) going into retirement and loss of corporate memory and experience base	Open hiring and implement mentoring program with personnel matrixed to ISS, but also venturing into other programs as more contractor support assumes responsibility



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Advantages/Disadvantages/Risks/Mitigation Plans

Facilities

Advantages	Disadvantages	Risk	Risk Mitigation
Retain current facilities utilization where ground support systems have been well established	All facilities involved could potentially be released for other programs. Many of the facilities may be aging requiring refurbishment investments in 5 years or less since they are already elements dating to early '60's.	Aging facilities at development centers which may eventually result in extensive overhead costs	Agency recognize the issue throughout all centers

Management Structure and Interfaces

Advantages	Disadvantages	Risk	Risk Mitigation
Retains basic structure that is well understood by User's as we now enter Increment 5. Retains people with historical expertise to establish Code Z.			
HQ OBPR (source of Science Policy) retains membership in many ISS Boards			
Removes potential for mgmt conflict of interest & mgmt of research budgets vs. multi-use infrastructure	Lack of control by science organization whom ISS is supposed to be serving	Lack of visibility into real science needs	Establish good liaison persons, e.g., Chief Scientist, Science Working Group



Re-invent NASA Model

Advantages/Disadvantages/Risks/Mitigation Plans

Timeframe and Schedule

Advantages	Disadvantages	Risk	Risk Mitigation
No additional financial burden as result of need to implement transition phase seen in other models			

Performance Evaluation

Advantages	Disadvantages	Risk	Risk Mitigation
Strict well established definition exists for evaluating contracts	Often viewed as limiting due to government regulations		