



Red Team II

on

ISS Utilization Management

August 15, 2002



Red Team II Charter

- Review model outcomes and associated Agency civil service and contractor workforce, core competency and facility implications.
- Informally review Red Team II findings with the Blue Team and provide guidance as appropriate.
- Document and present findings and recommendations to the OBPR Associate Administrator.



Red Team II Membership

GSFC/ Jerry Simpson, Chair

HQ/ Carolyn Davis, Robert Stephens, Harold Nelson

HQ/ Mike Milsted, Ray Sparnon

ARC / Scott Hubbard PhD

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Acknowledgements

- We commend the Blue Team on their long, hard work, work that is critically important to the success of ISS and the Agency.



Thanks for the Great Support !

Barbara Kreykenbohm

Gail Herzenberg



Report Structure

- Work Force Observations and Recommendations
- Competency Observations and Recommendations
- Facilities Observations and Recommendations
- General Issues Observations and Recommendations
- Overarching Issues Observations
- Summary



Work Force Observations

- Potential disparity in salaries between NASA employees on IPA and NGO employees
 - Ex.: Will NASA need to pay supplement to IPAs? If so, cost increase.
Note: FFRDC not allowed to pay supplement to NASA IPA.
- Resources and time needed for change management are currently underestimated.
- Analysis of impact needed on skills mix and the resultant synergy, especially in matrix organizations.



Work Force Observations (cont.)

- All the conditions to make the IPA route viable are not certain.
 - Detailed IPAs count as FTEs
 - Unrealistic to expect all IPAs to return
 - Will NASA have positions if they do return?
- Analysis needed of civil service work force data by Centers to assess impact on women, minorities, bargaining units, core competencies, etc.



Work Force Observations (cont.)

- FFRDC option underestimates challenge of forming an NGO with a core staff of geographically dispersed NASA-badged employees. It will be difficult to form a cohesive culture.
- Transition strategy of going from support to lead role is not sufficiently defined.
- Existing institutes should not be included in contract strategy summary.
- Concern that models would impact NASA's ability to attract and recruit young talent to civil service work force. Impacts human capital strategy.



Work Force Recommendations

- Where a model relies on a legislative change/action, need an assessment of likelihood of success from Codes L, G, F. Need to develop a back up plan, if necessary. (Blue Team)
 - Ex.: Conflict of interest statutory barriers, “portability of benefits,” soft landing tools
- “Inherently Governmental” – Review against the most recent guidance on Code H. (Blue Team)
- Impact of resources and time needed for change management should be analyzed for all options. (Blue Team)
- Contractor impacts resulting from NGO implementation and its effects on Congressional districts should be identified and evaluated. ‡
- Review function 18 to ensure no conflict with Agency initiatives on education as a core mission. ‡



Competency Observations

- The product to date does not have sufficient definition and detail to perform a complete competency implications assessment
 - Methodology for center self-assessments of competency priorities appears open to interpretation by centers
 - Center self-assessments did not express magnitude of function associated with center competencies (if only 2 FTE impacted, is it a true center impact of a subset?)
- Civil Service retention via IPAs is questionable as practice for retaining competencies



Competency Observations (cont.)

- Approach to Competency Review:
 - Assessed in relation to Agency need for function and skills (may leave/move out of Agency which impacts Agency competency).
 - Assessed competency implications of Agency unique skills in comparison to 21 functions as assigned to models
 - Red Team II interpreted the data available that assessed Center impacts, then used team members' experience to assess Agency-wide implications.
 - Rated competency impact as High, Medium, or Low
 - Competency and other implications were noted for six of 21 functions (Functions 1,4,5,6,8,16).
- Definition of High, Medium, and Low:
 - High = Losing 100% of that competency from the Agency. The competency may be needed in the near future.
 - Medium = There is an impact on one or more centers, but it can be mitigated by the Agency using another approach.
 - Low = No appreciable impact.



Competency Observations

- Identified competency implications:
 - Impacts program/project management competency
 - Impacts oversight/smart buyer skill set
 - Excludes synergy in similar flight hardware development
 - Impact to engineering design and development competency
 - Impacts oversight/smart buyer skill set
 - Excludes synergy in similar flight hardware development
 - Lose opportunities for human capital skill development
- Other Implications:
 - Lose synergy between flight and other research management
 - Will drive increase in total cost due to duplication of expertise
 - Under FFRDC, NGO cannot perform functions 4 and 5 adequately because of development inexperience



Competency Implications

Core Competency Model Implications					
Function	Option				
	<u>ISSCI</u>	<u>Re-Invent</u>	<u>Institute</u>	<u>FFRDC</u>	<u>G-Corp</u>
0 Defining Policy/Strategic Plan	--	--	--	--	--
1 Research Management	Low	Low	Medium	Medium	Medium
<i>A. Lose synergy between flight and other research mgmt</i>					
<i>B. Impacts Program/Project Mgmt Core competency</i>					
<i>C. Will drive increase in total cost due to duplication of expertise</i>					
2 Budget	Low	Low	Low	Low	Low
3 Research Selection	Low	Low	Low	Low	Low
4 Payload Requirements and Feasibility	Low	Low	Medium	Medium	High
<i>A. Lose synergy between flight and other research mgmt</i>					
<i>C. Will drive increase in total cost due to duplication of expertise</i>					
<i>D. NGO cannot perform adequately because of development inexperience (FFRDC only)</i>					
5 Dev cost, schedule, and risk assessment	Low	Low	Medium	Medium	High
<i>A. Lose synergy between flight and other research mgmt</i>					
<i>C. Will drive increase in total cost due to duplication of expertise</i>					
<i>D. NGO cannot perform adequately because of development inexperience (FFRDC only)</i>					
6 Dev and Qualify Flight Systems	Low	Low	Medium	Low	High
<i>C. Will drive increase in total cost due to duplication of expertise</i>					
<i>E. Impacts oversight/smart buyer skill set</i>					
<i>F. Excludes synergy in similar flight h/w development</i>					
<i>G. Lose opportunities for human capital skill development</i>					
7 Maint/Sust Flt systems	Low	Low	Low	Low	Low



Competency Implications

8	Develop Ground Systems	Low	Low	Medium	Medium	High
	<i>A. Lose synergy between flight and other research mgmt</i>					
	<i>C. Will drive increase in total cost due to duplication of expertise</i>					
	<i>E. Impacts oversight/smart buyer skill set</i>					
	<i>G. Lose opportunities for human capital skill development</i>					
9	Maint/Sust grnd systems	Low	Low	Low	Low	Low
10	Constructing grnd facilities	Low	Low	Low	Low	Low
11	Maint of ground facilities	Low	Low	Low	Low	Low
12	Certify Safety	--	--	--	--	--
13	Managing Missions	Low	Low	Low	Low	Low
14	Integrating - Analytical	Low	Low	Low	Low	Low
15	Integrating - Physical	Low	Low	Low	Low	Low
16	Integrating - Operations	Low	Low	Low	Medium	Medium
	<i>G. Lose opportunities for human capital skill development</i>					
17	Conducting Research	--	--	--	--	--
18	Education/Outreach	Low	Low	Low	Low	Low
19	Recommend P3I	Low	Low	Low	Low	Low
20	Managing Archive	Low	Low	Low	Low	Low



Competency Recommendations

- Assess Center and Agency competency implications -- requires additional validation and evaluation of competency data.
 - Define a methodology (for each Center to use)
 - Assess the data in context of individual models
 - Review findings by Center to assure Center unique impacts are addressed.
 - Issue findings with respect to Agency impacts
- With data from above steps, determine secondary impact of facility conversions to Agency core competencies on a center by center basis (Centers).



Facilities Observations

- Continuous improvement (CI) option probably does not reflect anticipated reductions resulting from current CI initiatives.
- GovCorp and ISSRI are likely to have highest impact to facilities inventory due to relatively narrow mission (as compared to the Agency mission) and desire to reduce cost.
- A clear linkage of facilities to the objectives (see Blue Team report pg. 10) should be established.
- If a non-NASA option is taken and the entity elects not to use current NASA facilities, the cost of “closing down” facilities needs to be factored in decision (making a decision to mothball, abandon, or demolish - all cost money).



Facilities Recommendations

- Validate facility data
 - Meet with Code JX to define relevant use metric and a standardized format for a consistent response (Blue Team)
 - Educate each center's facilities managers to assure consistent interpretation of use metric (Code JX)
 - Validate data including constructing a matrix mapping facility usage into 21 functions to help understand facility usage by function (quantitative) (Centers)
 - Use Code JX or other center to cross check center preliminary response (Centers)
 - Space Station program offices review/confirm center facility utilization data (Blue Team or delegate)
- Confirm facility usage for each option by function and determine relative annual cost estimate by fiscal year (Blue Team)
- With data from above steps, determine the impact of facility conversions to the centers' facility capabilities (Centers).



General Observations

- Options-Specific Observations:
 - Institute Option – assumed “STScI” model as starting point.
 - Outcome: ISSRI manages guest investigators and will eventually duplicate NASA Payload Development capability up to “50%.”
 - Questions:
 1. Is this hardware capability consistent with “STScI” science management model?
 2. Does “50%” represent excessive duplication (cost)?
 3. Why isn’t guest investigator management sufficient? Justify further.



General Observations (cont.)

- Outcome: Engage scientific community.
 - Questions:
 1. How would this institute engage commercial research?
 2. How will the ISSRI manage a broad set of disciplines, e.g., micro gravity materials, fundamental physics, space biology, biomedical research and payload types, e.g., commercial, US science, international?
 3. Does the institute option create an artificial barrier between PIs and GIs?



General Observations (cont.)

– Government Corporation Option –

- Outcome: Assumed to operate as “a business.”
 - Questions:
 1. Is this consistent with scientific research, as opposed to commercial research?
 2. Is there a marketing and business plan which supports this option?
 3. Transition appears quite complex with heavy dependence on IPAs. Is this a realistic approach?
- Presentation appears overly optimistic with respect to organizational behavior. Example: Lack of funding control raises questions of NASA strategic direction (function 0).



General Observations (cont.)

– FFRDC Option –

- Outcome: No ISS researchers in FFRDC.
 - Questions: 1. How can this attract top caliber talent?
 2. How can research be managed?
 - Implication is that FFRDC is primarily an operations entity which appears inconsistent with research management.

– NASA Reinvention Option –

- Question: Do the benefits of creating a new AA-level enterprise outweigh the downside?



Overarching Issues Observations

- Process Observations:
 - Options are described in terms of functions rather than outcomes.
 - How was scope of a given option determined?
 - Why functions in or out?
 - Blue Team was inconsistent in approach/assumptions and definitions
 - Functions 4, 5, and 6 are related - proposals for FFRDC and Institute are inconsistent with this kind of linkage
 - Provide rationale for not transferring same functions to different NGO models.
 - Is the driver the model or the organizational objectives (Blue Team report p. 10)?
 - Red Team II evaluated data as provided
 - Still will need to validate and review final products



Overarching Issues Observations (cont.)

- Any option which seeks to use NASA capabilities across multiple centers in new arrangements must address complex management interfaces.
- Models did not provide considerations related to loss of synergy (i.e., research ops separated from vehicle ops).
- Why is it that function 0 was left as only NASA?
 - How is strategic planning made better?
 - Could some of the functions of 0 be moved into the NGO, e.g., integrated research plan?



Overarching Issues Recommendations

- Assuming that all Red Team I recommendations are completed, evaluate options vs. desired outcomes (e.g., those on page 10, Blue Team report + other Agency objectives).



Summary

- More analysis is required, but not necessary for all to be done by Blue Team
- Based on significant amount of remaining work to be done and the exhausting nature of the work done to date, Red Team II believes the schedule for completion needs to be reassessed.
- Blue Team has assembled a wealth of data crucial to evaluation, characterized options, and with some additional management guidance, improvement in ISS research utilization is achievable.



Back Up Materials



Core Competency Findings – Back-up

- Competency implications include:
 - Program/Project management core competency (Functions 1, 4,5,6)
 - Excludes synergy in similar flight hardware development
 - Eliminates ability to manage Program end to end by eliminating flight hardware Program/Project management development
 - Engineering Design and Development core competency (Functions 4,5,6 & 8)
 - Human rated Payload Development would be depleted at all Centers which would
 - Impact oversight/smart buyer skill set (Functions 6, 8 – IISRU, GCOR, FFRDC)
 - Exclude synergy in similar flight hardware development (Functions 4,5,6,8 – IISRU, GCOR, FFRDC(excluding Funct. 6)
 - Lose opportunities for human capital skill development through hands on design/development (Function 6,8 – IISRU, GCOR, FFRDC (Function 8 only)



Step 8: Document Advantages and Disadvantages of Each Option

Blue Team Charge for Step 8:

- Develop and document option advantages and disadvantages for each option and in comparison to the other options.
- Develop and document option workforce, competencies, facilities, and contracts outcomes and in comparison to the other options.
- Specific Red Team I requests to Blue Team to complete:
 - Complete the evaluation matrix
 - Where do we want to be vs. where we are today?
 - How well does each fulfill the targets, metrics, and improvements?
 - Evaluation requires comparison to existing management structures and lessons learned from organizations such as Hubble, national laboratories, etc., as a forecasting tool



Step 8: Document Advantages and Disadvantages of Each Option (cont.)

- Model evaluations need to address the following types of performance based questions:
 - Adaptability to ISS configuration changes;
 - Ability to accommodate work in progress (flight investigations, significant development, etc);
 - Time Phasing implications of implementation of management model
- Estimate ROM FTE, cost implications
- Produce a narrative of strengths and weaknesses for each model and in comparison to the other options.



Option Assumptions - Workforce

- Based on direct workforce as reflected in the OBPR ISSRC POP-02 budget submission
- Workforce data reflects Code U Enterprise only
- No workforce efficiencies assumed beyond those included in POP-02
- Workforce for existing functions is transferred on a one for one basis with no assumptions of efficiencies gained
- Results are relative and are for comparison across Options only
- Infrastructure (management, overhead, G&A, etc.) for new organizations require 20% of total organization workforce



Option Assumptions - Budget

- Based on the OBPR ISSRC POP-02 budget submission
- Budget data reflects Code U Enterprise only
- Numbers not adjusted for full cost accounting
- Results are relative and are for comparison across Options only
- For estimating purposes, assumed \$150K per FTE
 - Used for additional/new workforce
 - Used for civil service work transitioned to new organization



Option Assumptions – Contracts

- Identified contracts that may be affected by the transfer of work and assumed that novations, terminations, competitions, modifications and/or bridging may be required
- Costs associated with any contract actions have not been identified



Option Assumptions - Facilities

- Unique facility costs were not identified



Option Review

Each Option will describe:

- Definition
- End-State Description
- End-State Functional Table
- Characteristics
- Legal Structure
- Transition Strategy
 - Diagram
 - Description
- Option Specific Strategies
- Implications on Existing ISS Utilization Infrastructure
 - Civil Servant and Contractor Workforce
 - Contracts
 - Facilities
 - Competencies



Step 1: Agency's Strategic Vision for ISS Utilization

Level I: Goals/Vision/Requirements:

Required: The Agency's strategic vision for ISS Utilization

- **Must take into consideration uncertainties/drivers such as:**
 - **Agency Enterprises**
 - **Agency Scenarios**
 - **ISS Configuration and Evolution (e.g., number of racks, crew size, attachment points)**
 - **REMAP**
 - **etc.**
 - **International Partner (IP) Relations**
 - **Goals of ISS in context of**
 - **Science**
 - **Technology**
 - **Commercial**
 - **Agency Advisory/Stakeholders Structure**
 - **Agency Priority Decision Tree/Authority**
- **Action: Distinguish/Evaluate Similarities/Differences of 3 (science, technology, commercial)**
- **Outcome: Performance Targets for evaluating Utilization Management Model**



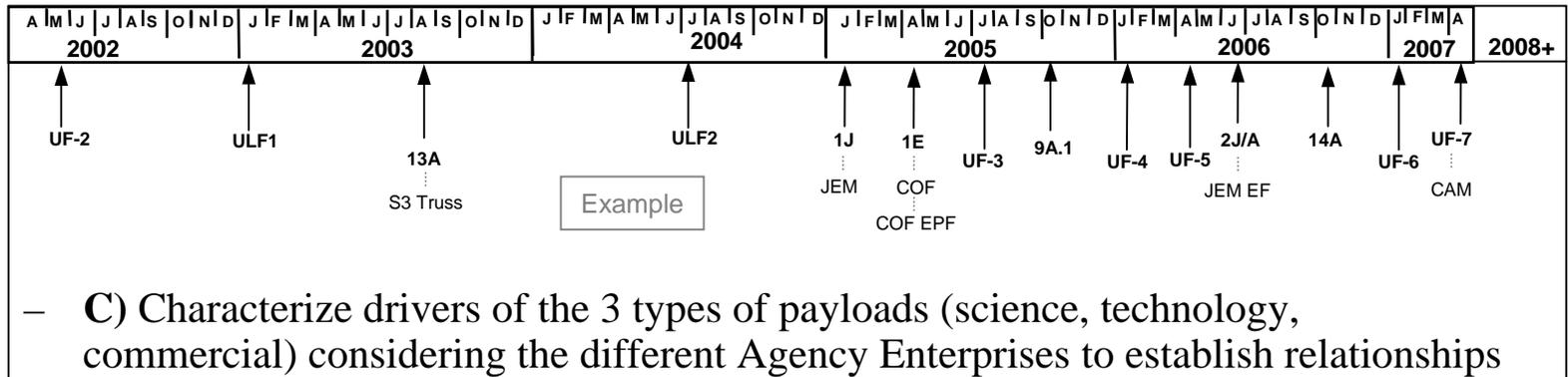
Step 2: Establish Utilization Processes and Resources/Constraints (Present state)

- **Required:**
 - **Agency Policies/Procedures**
 - **Utilization Selection Processes (e.g. peer reviewed science)**
 - **International Partner Agreements**
 - **Intellectual Property (e.g. commercial)**
 - **30/30/30/10 Resource Allocation Policy**
 - **Programmatic Resources/Constraints, e.g.,**
 - **Vehicle (STS, ISS, resupply, etc.) capabilities**
 - **ISS configuration**
 - **Budget**
 - **Infrastructure**
 - **Interdependencies with other NASA programs and institutional assets (people, facilities, etc.)**
 - **Schedules**
 - **Crew use**
 - **Research Priorities**
- **Action: Establish Utilization Processes/Drivers**
 - **Transaction Flow Diagrams (steps/procedures) [At one step lower level of detail than shown in “Top Level Flow ISS Utilization”]**
 - **End-to-end cycle time for classes of payloads**



Step 3: Utilization Scenarios

- Outcome:
 - **A)** Benchmark payload complexities that represent present and future requirement flows, e.g.:
 - Racks - STS -- ISS -- Operations
 - Middeck Lockers - STS -- ISS -- Ground
 - Attached Payloads - STS -- ISS -- Operations
 - Human experiments on IP modules using commercial equipment
 - **B)** Establish scenarios of manifest and platform availability for payloads over time, e.g.:



- **C)** Characterize drivers of the 3 types of payloads (science, technology, commercial) considering the different Agency Enterprises to establish relationships to Management Model Support (e.g. Commercial Payload Rapid turnaround)



Step 4: Utilization Management Requirements

- Action: Develop utilization management requirements derived from Steps 1, 2, & 3
- Outcome: Rows of Advantages/Disadvantages matrix (at a level containing 10's of entries, not 100's)
 - Performance Targets
 - Metrics
- Sources:
 - Products of Steps 1, 2, & 3
 - Transaction Diagrams
 - Work Breakdown Structure (WBS)



Step 5: Model Evaluation Criteria

- Performance targets (from Step 4.)
- Metrics (from Step 4.)
- Add to criteria: Areas of improvement based on present performance. Integrate/consolidate existing customer surveys for areas of improvement (at a level consistent with block 2). Use data sources such as: PPMR; POCAAS; SSUAS Advisory Group; PI and payload developer interviews
 - A. What is working very well?
 - B. What is working but can be improved?
 - C. What is broken?
 - What are the possible fixes?
- Evaluate the “present” state as the first column of the models in the matrix
- Develop relative weighting of criteria



Step 6: Model Down-select

- Extend candidate models to include combinations of organizations
 - Consider different partitioning options between NASA and NGO functions
 - Instead of basing models on assigning functions alone, construct models with sufficient consideration of the effects on process flows to avoid adding complexity, excessive handoff points, and lack of accountability.
 - Are Multiple NGOs required (research vs commercial)?
(zero, one, multiple)
- Considerations for NASA
 - Inherently governmental: legal, procurement, FAIR
 - Core Competencies
 - Appropriately governmental (safety, e.g.)
 - Management functions
 - Policy
 - Budget
 - Schedule and phasing of implementation
- Start with a broad range of models and down-select to a few.



Step 7: Candidate Models

- Document candidate options
- Develop candidate options packages
- Develop options comparison matrix
- Describe the down-select criteria and process.
- Provide an advantages/disadvantages matrix for each option and in comparison to all other options.



Red Team II Evaluation Approach

- Process Used
- Four Subteams
 - Work Force Outcome Analysis
 - Core Competencies Outcome Analysis
 - Facilities Outcome Analysis
 - General Outcomes Analysis
- Overarching Issues Analysis



Products

- The Step 8 matrixes were not completed.
- We recommend the team focus on only those products required to complete the evaluation matrix.
 - Other products that have been developed should be useful in the procurement development process.
- The products should only be at the level of detail needed.
 - For example, the WBS, inherently governmental and interface matrix are at a much greater level of detail than necessary.



Report Structure

- Work force --Josie Burnett, Mike Milsted, Susan Cloud, Carolyn Davis
 - Facilities --Mike Suffredini, Ray Sparnon, Pete Allan, Harold Nelson
 - Competencies --Charles Stegemoeller, Rita Willcoxon, Tom Stinson
 - General outcomes --Rudolph Saldana, Scott Hubbard, Robert Stephens, Roger Breckenridge, Kim Whitson
- Overarching Issues -- Entire Team