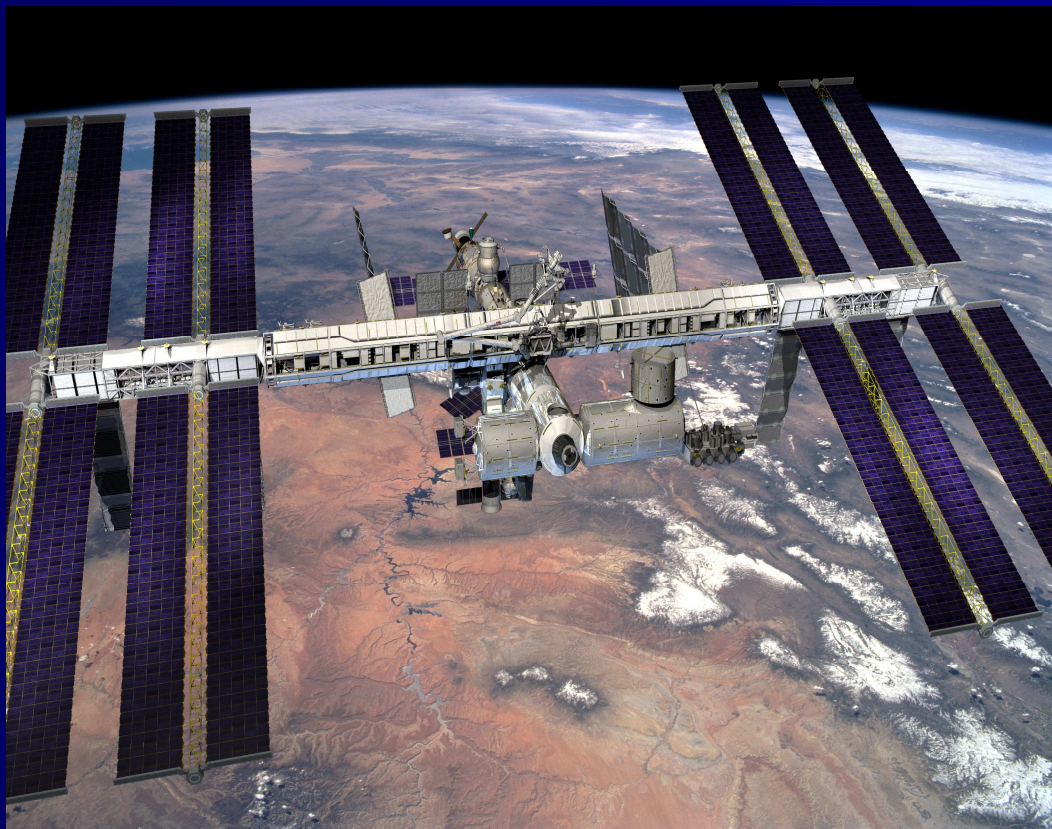
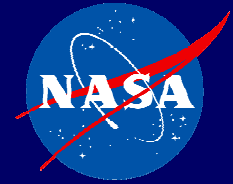




# International Space Station National Laboratory Applications Development

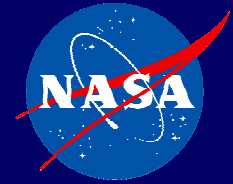


**45th Annual AIAA  
Aerospace Sciences Meeting**

**Special Session:  
*ISS a New National Laboratory***

**11 January, 2007  
Reno, NV**

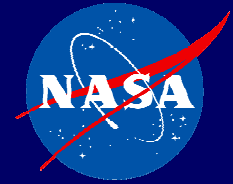
**Mark Uhran  
Assistant Associate Administrator  
for International Space Station  
Office of Space Operations  
NASA Headquarters  
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# Contents

- **National Policy Background**
  - **ISS Mission**
- **ISS Event Horizon**
- **Objective and Constraints**
- **Strategy and Actions**
- **Conclusion**

# National Policy Background



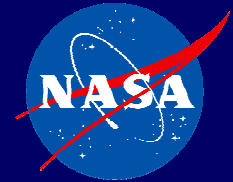
## NASA Authorization Act of 2005, Sec.507 NATIONAL LABORATORY DESIGNATION (Public Law 109-155)

**(a) Designation-** To further the policy described in section 501(a) [maintain capability for human access to space on a continuous basis], the US segment of **the ISS** is hereby designated a national laboratory.

### **(b) Management-**

- 1) **PARTNERSHIPS--** The Administrator shall seek to increase the utilization of the ISS by other Federal entities and the private sector through partnerships, cost-sharing agreements, and any other arrangements...
- 2) **CONTRACTING--** The Administrator may enter into a contract with a non-governmental entity to operate the ISS national laboratory, subject to all applicable Federal laws and regulations.

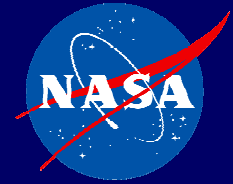
# National Policy Background continued....



(c) **Plan**-- the Administrator shall transmit to [applicable Congressional oversight committees] a plan describing how the national laboratory will be operated.

At a minimum the plan shall describe--

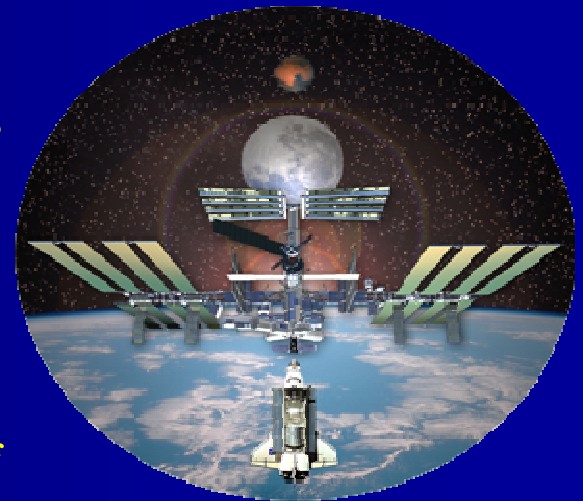
- (1) any changes in the research plan transmitted under section 506(3) and any other changes resulting from the designation;
- (2) any ground-based NASA operations or buildings that will be considered part of the national laboratory;
- (3) the management structure for the laboratory, including the rationale for contracting or not with a nongovernmental entity to operate the ISS national laboratory;
- (4) the workforce that will be considered employees of the national laboratory;
- (5) how NASA will seek the participation of other parties described in subsection (b)(1); and
- (6) a schedule for implementing any changes in ISS operations, utilization, or management described in the plan.



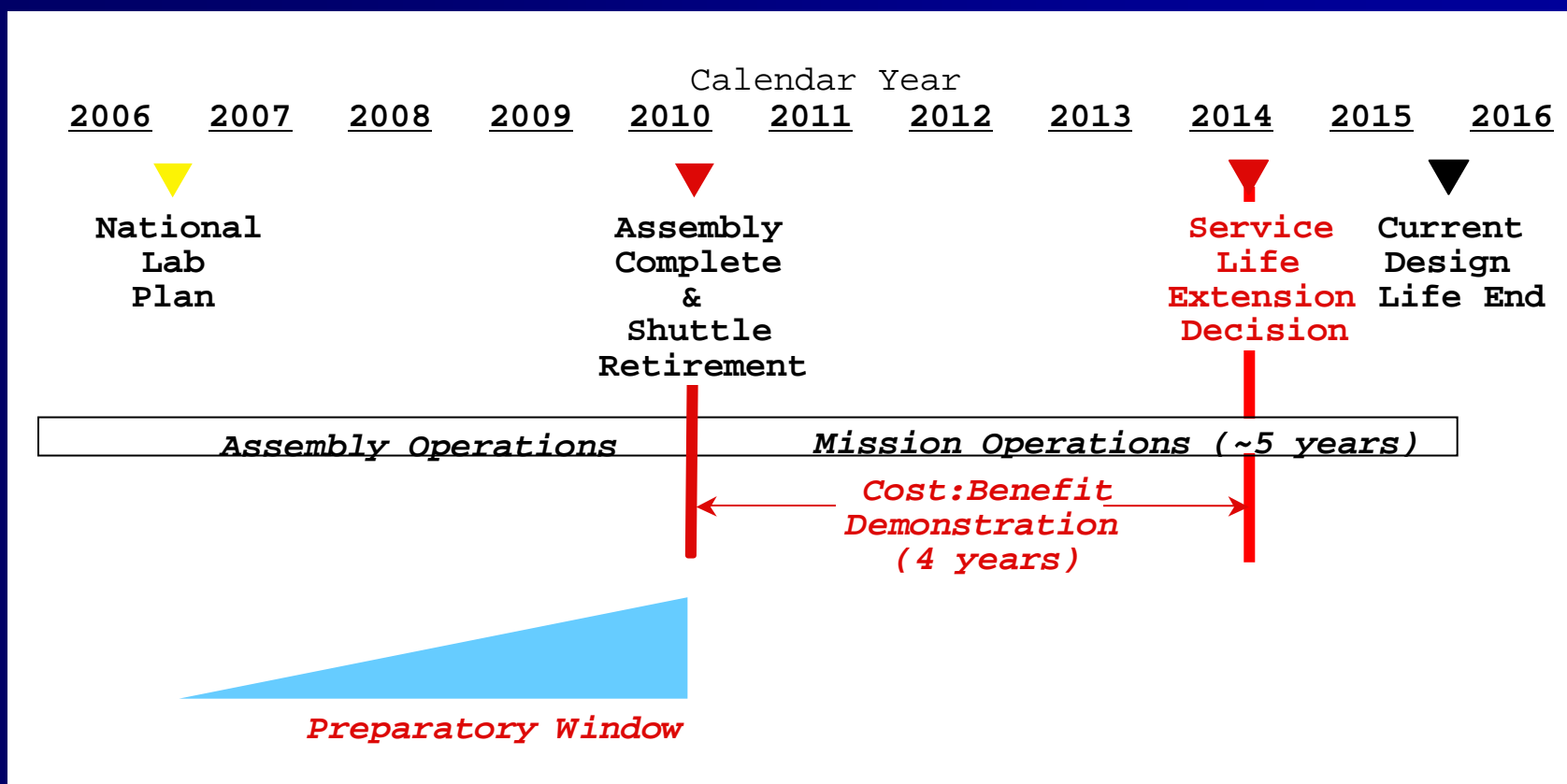
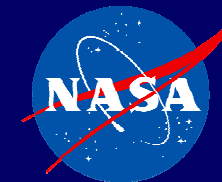
## ISS Mission

### ➤ ISS mission is now directly aligned with National Vision for Space Exploration:

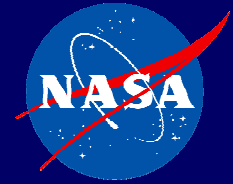
- ✓ Research, development, test and evaluation of *biomedical protocols for human health and performance* on long-duration space missions;
- ✓ Research, development, test and evaluation of *systems readiness* for long-duration space missions, and;
- ✓ Development, demonstration and validation of *operational practices and procedures* for long duration space missions.



# ISS Event Horizon



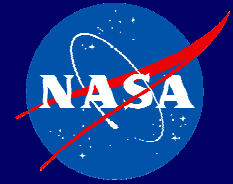
# Objective



- **Develop non-NASA users for ISS accommodations and resources capacity currently available during the post-assembly period.**
  - **Establish partnerships with government, academic and industrial participants.**
  - **Produce diversified portfolio of productive applications projects contributing to US economic growth.**

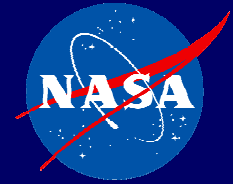


# Constraints



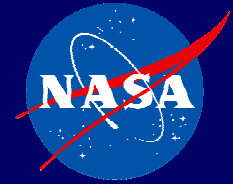
- **NASA exploration mission uses of the ISS must command top priority for ISS payload resources and accommodations.**
- **Funds necessary for OGA uses of ISS National Laboratory must be appropriated outside of FY 2007 and subsequent NASA appropriations.**
  - No impact to NASA's primary mission.
  - *NASA will continue to cover cost of ISS maintenance and operations.*

# Strategy



- **Pursue ISS Applications Development through NASA HQ Office of Space Operations.**
  - Memoranda of Understanding (MOUs) with other government agencies...
  - Space Act Agreements (SAAs) with private firms...
  - Coordinated with ISS Program and Office of General Counsel.
  
- **In parallel, determine pros/cons and most effective approach to creating an authority that could take responsibility for further non-NASA program development in next decade.**
  - Study of potential legal frameworks by Office of General Counsel.
  - “Form follows function” approach at this early stage.

# NASA Actions to Date: Education



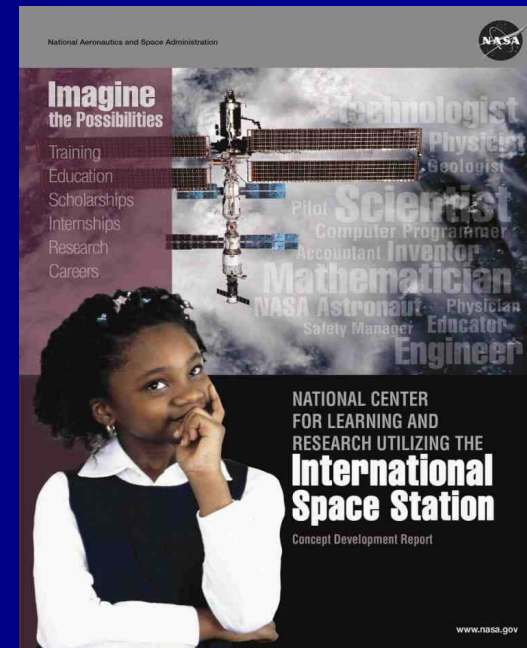
➤ Launched NASA Office of Education outreach project to US Department of Education and STEM education-relevant agencies (NIH, NSF, DOD...)

➤ Linkages to PACE & ACI

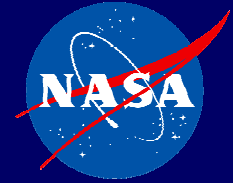


Protecting  
America's  
Competitive  
Edge

➤ Initial reactions affirmative.

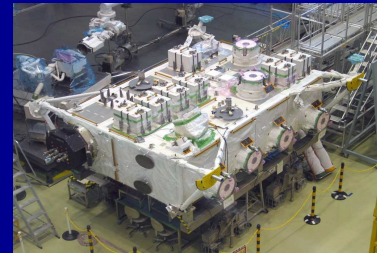


# NASA Actions to Date: Technology Demonstrations

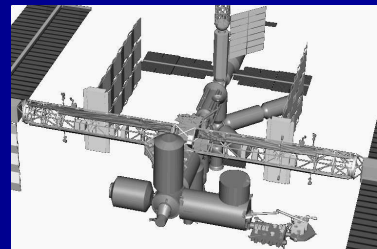


✓ = technologies planned or in development discussions

- ✓  IVA/EVA environmental control/life support  
(*regenerative ECLS, commercial O2 supply service, LED lighting*)
- ✓  electrical power generation, transmission, storage  
(*Li+ batteries, fresnel concentrating lenses*)
- thermal control
- ✓  guidance, navigation & control  
(*x-ray pulsar based navigation*)
- communications
- data management systems
- ✓  propulsion & attitude control  
(*electric propulsion test bed*)
- cryogenic fluids handling
- robotics & autonomous systems
- structures & mechanisms
- ✓  materials  
(*materials on ISS experiment system*)

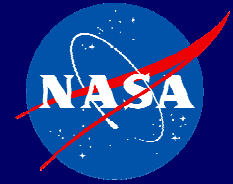


*Exposed Facility  
Accommodations*

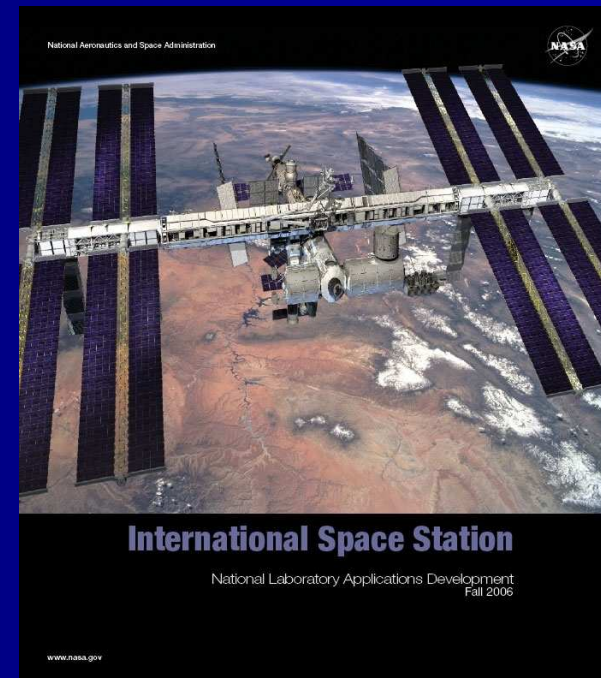


*External Truss  
Accommodations*

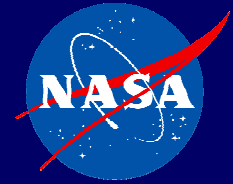
# NASA Actions to Date: Administrator Invitation



- ✓ Secretary of Energy
- ✓ Secretary of Commerce
- ✓ Director, National Institutes of Health
- ✓ Director, National Science Foundation

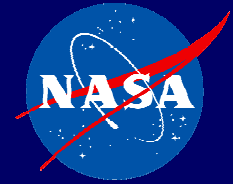
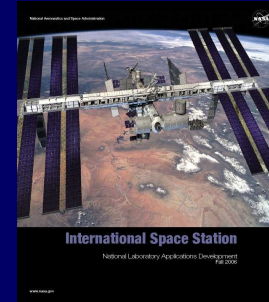


# NASA Actions to Date: Meetings & Conferences



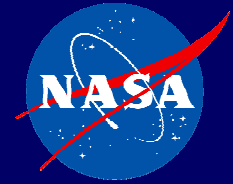
May 16, 2006	NASA Ames Research Center Commercial Space Forum
Sep. 20, 2006	Potential for ISS Educational Initiatives NSF-Hosted Interagency Workshop
Nov. 7, 2006	Annual Meeting of the Space Experiments Review Board DOD/USAF-Hosted
Dec. 4, 2006	NASA Advisory Council Space Operations Committee Fact-Finding Session: ISS as a National Laboratory
Dec. 8, 2006	Meeting on Space-Related Health Research NIH-Hosted Roundtable
Jan. 11, 2007	45th Annual AIAA Aerospace Sciences Meeting Special Session: ISS - A New National Laboratory

# NASA Actions to Date: Publications



- **Congressional Report, June 2006 - *NASA Research and Utilization Plan for the ISS***
- **NASA/TP-2006-213721 - *Inspiring the Next Generation: Student Experiments and Educational Activities on the ISS, 2000 - 2006***
- **NASA/TP-2006-213146 - *International Space Station Research Summary Through Expedition 10***
- **NASA/TP-2005-213166 - *Exploration-Related Research on the ISS: Connecting Science Results to Future Missions***
- **Library of Congress ISBN 0-9710327-2-6 *Reference Guide to the International Space Station***
- **Digital Video Disc - *International Space Station Fly Around Animation***

## Conclusion



- **The National Laboratory concept is an opportunity to expand the US economy in space-based research, applications and operations.**
- **The International Space Station represents a unique and highly visible national asset with surplus capacity available for a wide spectrum of applications.**
- **NASA will continue to cover cost of operating and maintaining the ISS, and is highly motivated to work with other agencies and organizations to pursue applications.**