Opportunities and Challenges with SBIR

NASA Space Operations Mission Directorate

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Technology and Innovation in Space Operations

SBIR - Innovation Opportunities

1. Mission Focused Innovation – Needed to conduct the primary mission
   - Life Extension
   - Reliability of Systems
2. New or enhancement capabilities that allow for a more robust solution or lower long term operation costs or risks
   - Acquisition – Can the government be more commercial like or enable future commercial markets through our acquisition approaches?
   - Can we use SBIR Phase 1 and 2 to set up more commercial like opportunities for Phase 3 Awards?
3. SBIR the prime outside innovation source
   - Need to ensure the right decision makers are involved with SBIR to maximize the chance for mission pull

- How do we continue to build the framework for the next step?
  - Need to integrate new tools and solution discovery methods on an ongoing basis.
  - How do we make this part of our day-to-day business? How do we organize?
  - How do we marry these with our current process? Or do we marry it?

Mission Focused

Example – The completion and operation of the International Space Station

The International Space Station Vision - A human outpost in space bringing nations together for the benefit of life on Earth … and beyond.

dimensions:
240 ft. long, 291 ft. wide, 45 ft. high, 25,640 cubic feet of living space.

Weight at completion:
420,500 kg.

science capabilities:
laboratories from four international space agencies – U.S., Russia, Europe, and Japan.

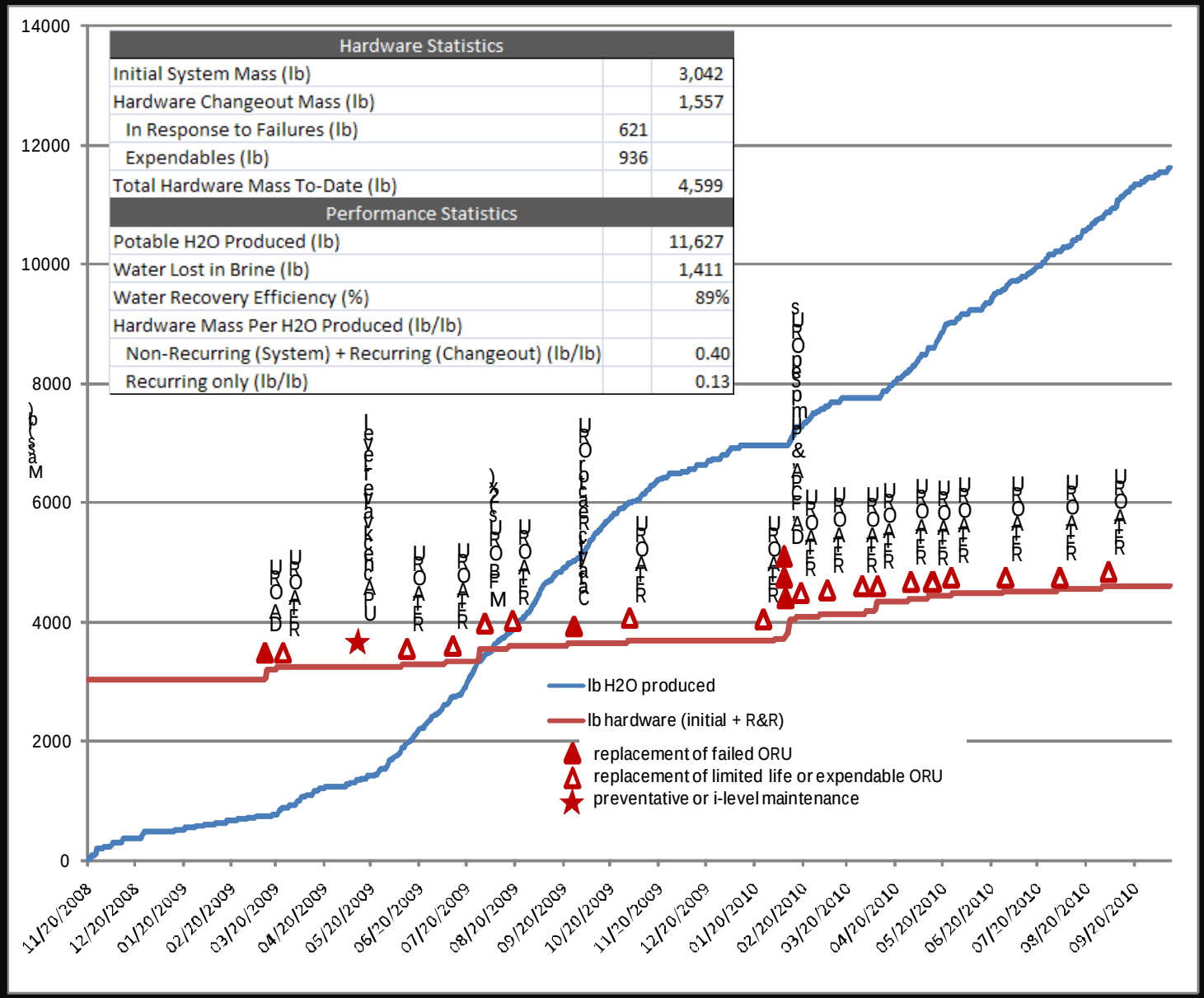
orbital inclination/path:
51.6 degrees, covering 90% of the world's population.

altitude:
approximately 220 miles above the Earth.

speed:
17,500 miles per hour, orbiting the Earth 16 times a day.

INTERNATIONAL SPACE STATION

ISS WRS Life Cycle Mass
(from startup 11/20/08 through 10/13/10)



Identifying Opportunities in the Mission

Finding Gaps or improvements that don’t have to work but rather improve capabilities

Find Gaps that align with larger user base (commercial and government) – example Low Cost Access to Space

Technical Capability as a Service

- ISS Is serving as a platform for Research, Commercial, and Engineering Test Bed activities but there is more we can use it for
- Problem? Does NASA lack innovation in acquisition?

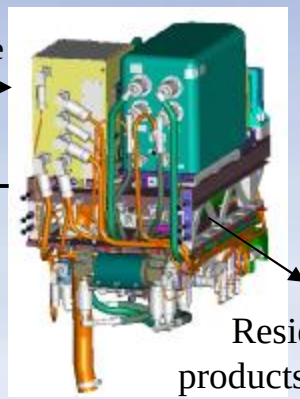
  NASA NEEDS INNOVATION IN ACQUISITION
- Claims?
  - Contractors claim that if NASA would just tell us what they want the hardware to do and what the interfaces are, they can build it …..
    - Faster
    - Cheaper
    - Just as reliable
    - Without any more risk

OK….. But are they ready to take the risk?

Money on the line?

- Why not use ISS requirements as a way to test some of the concepts?
- The Industrial Base that supplies NASA is shrinking? Why?

Technical Capability on a Service Contract



$4H_2 + CO_2 \rightleftharpoons 2H_2O + CH_4$

Water Production Services on the ISS

What does it mean?

- NASA pays for a service instead of a piece of hardware
- Don't own the hardware once it is built

What does it look like?

- Looks like a utility contract at your house
- You pay for the availability of the service (whether you use it or not, like your land phone line) or the amount used (water, sewer, power)
- Have to define limits on resources used to enable the service
  - In this case: upmass, crew time, and system interfaces

Why would you do it?

- Minimizes NASA risk because we only pay for the service when it is available
  - Fixed price for the service defines NASA maximum commitment and puts the contractor's "skin in the game" throughout the entire life cycle
- Minimizes NASA involvement in design and development
  - If the contractor only gets paid when and if it works, they are more motivated than anyone else to build a high quality/high reliability system
- Demonstrate another type of contract that moves closer to commercialization of space

SBIR as a primer for future service contracts

Acquisition – Can the government be more commercial like or enable future commercial markets through our acquisition approaches?

Can we use SBIR Phase 1 and 2 to set up more commercial like opportunities for Phase 3 Awards?

SBIR to balance Internal projects

As the Agency embarks on significant level of internal development projects

- SBIR can serve as one of the prime outside innovation sources

- Need to ensure the right decision makers are involved with SBIR to maximize the chance for mission pull
- SOMD has been working hard to ensure the right decision makers are involved
    - Targeting Sub-Topic Managers
    - Use of Topic Advisory Committees

Questions……

How do we continue or ensure SBIR solutions are being considered by the system owners and developers?

We need to ensure the companies and technologies have a broad commercial base beyond NASA. NASA almost never has the volume to be the only customer.

To ensure the success you must develop a integrated and flexible strategy that is based on portfolio definition and gaps analysis, understanding the types of collaboration, and an integrated management team.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