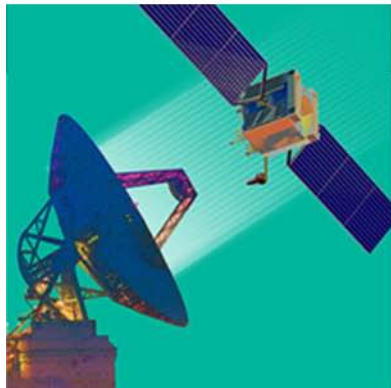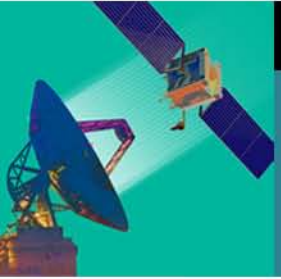Working Group Outbrief

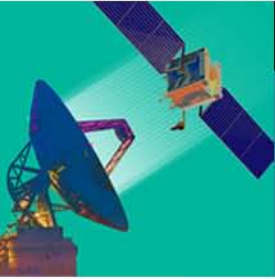## Ground System Architectures Workshop

Session 11B

Human Systems Integration: Tools, Techniques, and Challenges Ahead

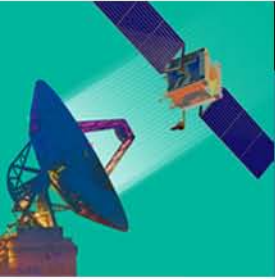*Suzanne M. Dawes, The Aerospace Corporation*

Session Goals

- Space systems acquisitions have inherent Human Systems Integration challenges:
  - increasing information demands on operators,
  - requirements for operators to perform jobs in new/different ways, and
  - continuing pressure to reduce manpower.
- Workshop addressed how and where HSI should be involved in systems development.
- Presentations and panel discussions used to explore HSI from a variety of viewpoints.
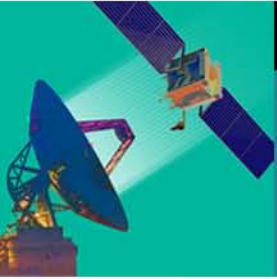
Presenters

- Try Before You Buy?! How to get users to buy off on your "yet to be developed" system
  - Suzanne M. Dawes, Stephanie L. Heers, Tanisha Church, Jesus L. Rivera, Steven Lazar, Paul DeNaray, The Aerospace Corporation

- Strategies for Communicating Human Systems Integration Findings?
  - Janeen Sharma Northrop Grumman Corporation

- The development of a matrix to assess the completeness and robustness of human systems integration products
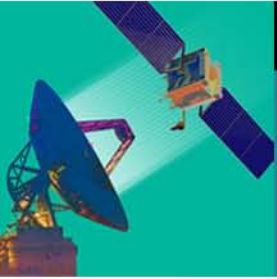 - Stephanie L. Heers, Stacey L. Schwartz, The Aerospace Corporation

Panelists

- Major Veronica Harris, Program Manager, GPS Next Generation Control Segment, Phase A, USAF GPS OCX Program Office

- Ms. Janeen Sharma, Human Factors Engineer, Northrop-Grumman Corporation

- Mr. Norman Goyette, Project Engineer Senior, System Test Support, Space Based Surveillance Division, The Aerospace Corporation

- Mr. Jeff Holmes, Associate Director, Ground Systems Infrastructure Development Department, The Aerospace Corporation

- Ms. Roberta Gleiter, Engineering Specialist, Software Architecture & Engineering, Engineering & Technology Group, The Aerospace Corporation

- Capt. Walter Miller, Chief, Warfighter Ops, GPS Next Generation Control Segment, Phase A, USAF GPS OCX Program Office
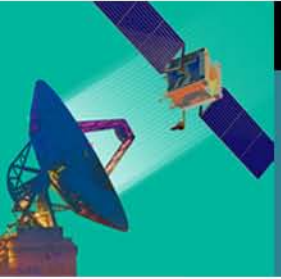
Key Points - Successes

- "Consideration of operators [is] too little and too late within [the] development process" (Dr. Sandra Steere, CNES)

- As a community we are starting to address the user requirements earlier in the acquisition.

- Operator Involvement Days
  - Tension between contractor desire for interaction vs. real-world job requirements of the operations community.
  - Challenge to keep "requirements creep" under control. This is not a "shopping spree".
  - Requirement for acquiring agency to provide the guidance for a controlled and structured approach for user (operator, maintainer, support, stakeholder) interaction with developing organization.

Key Points - Challenges

- Human factors engineers often asked to join programs at the end of the program – asked to perform "Human Factors Magic".

- From a contractor perspective, the high turnover in stakeholders remains an ongoing challenge.

- Often times there are workarounds of workarounds, they build up and become a major challenge.

- Automation is a double-edged sword, it has eliminated some sources of error but introduced new sources.
  - Trust in automation and situation awareness must be addressed.

Conclusions

- Commitment from leadership is essential to HSI success.

- HSI is a team sport.

- Identify key insertion points within the process.

- Include the appropriate requirements, data items, specifications on contract from the beginning.

- Continue to develop tools that show HSI progress to the operations community and management.

- Need additional focus on providing clear, unambiguous, testable requirements.