

NASA PM Challenge Standardization of Interfaces



Benoit Marcotte
Canadian Space Agency
Feb 9th, 2010



Canadian Space
Agency

Agence spatiale
canadienne

Used with Permission

Page 1



Standardization of Interfaces



A large number of lessons learned confirmed the need for standardisation of interfaces on international projects :

- **Lesson 6: Ensure all mission objectives are well integrated**
- **Lesson 13: Apply common standards and tools for developing interfaces**
- **Lesson 14: Apply existing interface designs where available**
- **Lesson 15: Implement processes to establish common interfaces with modular design**
- **Lesson 17: Minimize external interfaces to end-to-end systems**
- **Lesson 18: Verify interface requirements compliance early**
- **Lesson 24: Employ common processes, interfaces and standards**

These lessons are summarized on the following 3 slides:





Standard Interfaces



Standardization and commonality of appropriate interfaces are critical in basic areas of partner interaction.

- Common interfaces and interoperability aspects are critical to success. They simplify the interface definition, reduce uncertainty and lead to on-orbit flexibility and adaptability as situations evolve.
- Commonality of interfaces should be achieved as much as possible in Exploration programs.
- This process is best addressed at the highest level, in international agreement documents.
- Therefore a multi-Partner advisory team is required, to establish, specify and document these common interfaces, before phase A.





Minimize Interfaces



The number of inter-partner interfaces should be minimized.

- It is good practice to partition end-to-end systems minimizing internal interfaces or architectural elements to international partners.
- Whenever possible, a single agency should design, develop, test and integrate hardware to a standard interface as a complete end-to-end system.
- This minimizes the number of architectural elements, the corresponding interfaces, any duplication of effort and also potential disputes between organizations.

CSA learned this lesson as a result of experience encountered with the integration of the Robotic Workstation and as integrator of the entire Mobile Servicing System.





Rigorous Control



To enforce agreed standard interfaces, rigorous interface control must be implemented and managed.

- Only when absolutely necessary, to meet unique challenges, should Partners develop unique capabilities or deviate from agreed interfaces.
- To ensure common understanding, Partners should have mutual access to verification closure materials for interface requirements, and Partners should be invited to all design and test reviews.
- Sharing of verification closure material for interfaces needs to be done early in the development process, in order to minimize rework.

