The background of the slide is a composite image of space exploration elements. At the bottom, the blue and white horizon of Earth is visible. Above it, the grey, cratered surface of the Moon is shown. In the upper right, the reddish-orange surface of Mars is depicted. Various spacecraft are scattered across the blackness of space, including a large white and orange rocket on the left, a smaller orange and white rocket on the right, and several smaller probes and landers. The text is centered over this scene.

Exploration Conference Development and Operations Panel

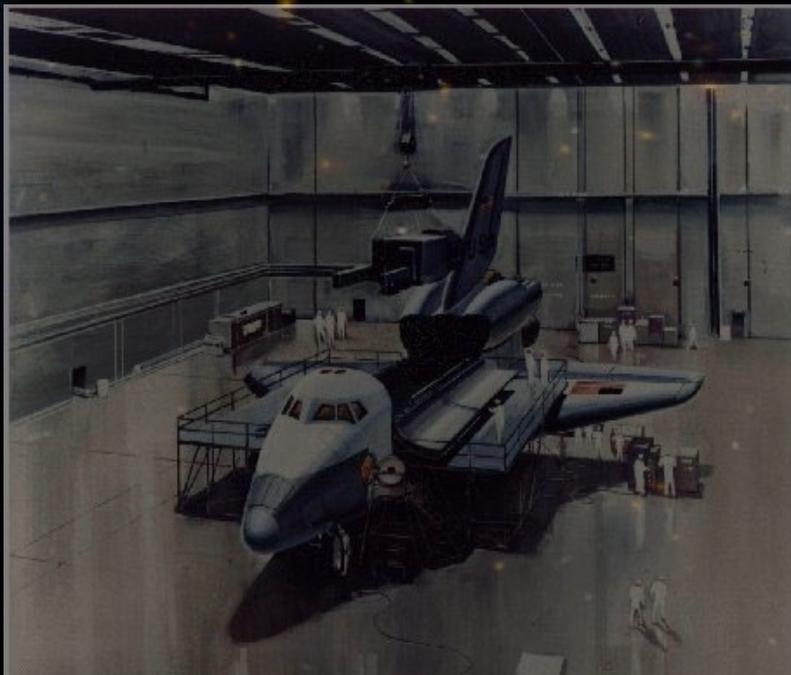
December 5, 2006

Anne Martt / USA

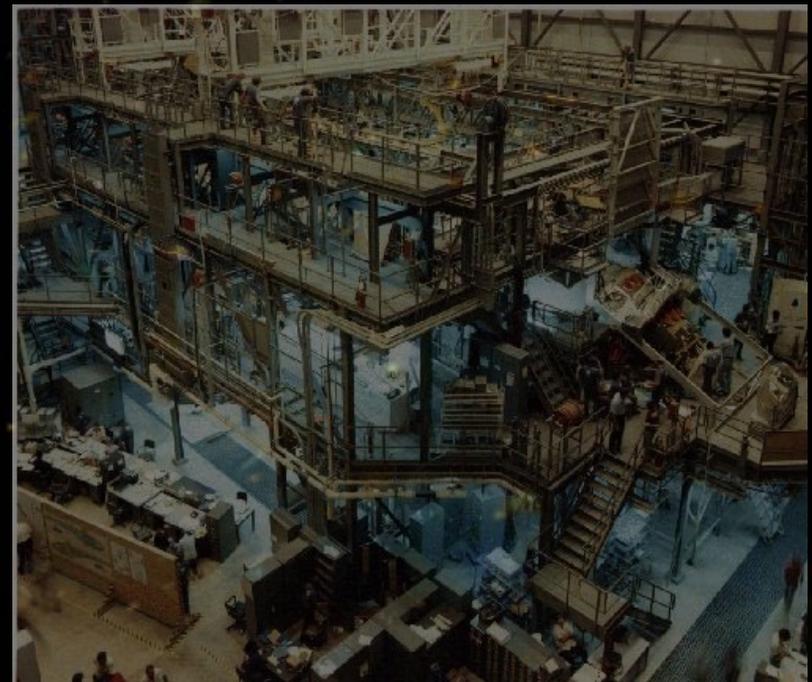
Moving From Concepts to Reality Can Be Expensive



- Developers must adopt a “Design for Support” instead of a “Support the Design” approach, as seen in the Shuttle Program



Plan



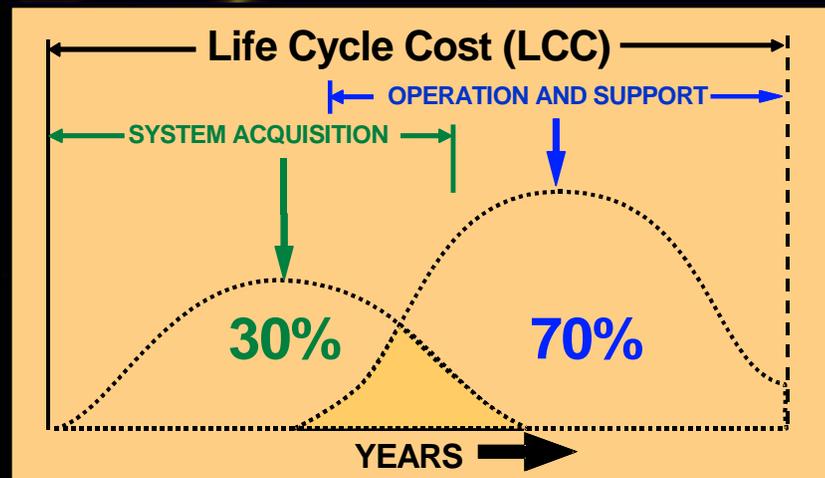
Actual

Implementing the Vision

Development Decisions are Long Reaching



- It is common for up to 70% of a project's life cycle costs to be in Operation and Support



- Decisions made during the development process must consider the long term recurring impacts on operations

Development and Operations Must Collaborate



- The more a system is designed with operations in mind, the more efficient (labor, materials, facilities) it becomes
 - This is especially critical in programs that will be operated for several decades and programs featuring reusability
- Efficiencies lead to the reduction of the recurring overhead costs for processing and operating the system
 - Sustaining engineering
 - Shipping / storage
 - Facilities / equipment
 - Ops planning and execution
 - Processing of reusable hardware

Effective “Developer-Operator” collaborative relationships can successfully ensure a well-balanced and efficient Program

Integrated Design and Operations Approach Utilizes Complimentary Skills and Experience for Best Solution



Design, Development, Test and Evaluation

Operations Concept(s)

System Requirements

Design Reviews (PDR, CDR)

Validation / Certification

Seamless Transition to Operations

Operational Experience and Skills

Lessons LearnedS

Operability & Supportability Design Features

Life Cycle Cost/ Performance Trades

Perform Test and Validation

Validate the Concept of Ops & Operability

Continual Assessment of Risks and Benefits

Design / Cost / Performance Trades to ensure Operability, Reliability, Availability, Maintainability

Integrated Design & Operations Team

Implementing the Vision