



How Has Effective Systems Engineering Benefited Our Defense Programs

Industry Systems Engineering Panel

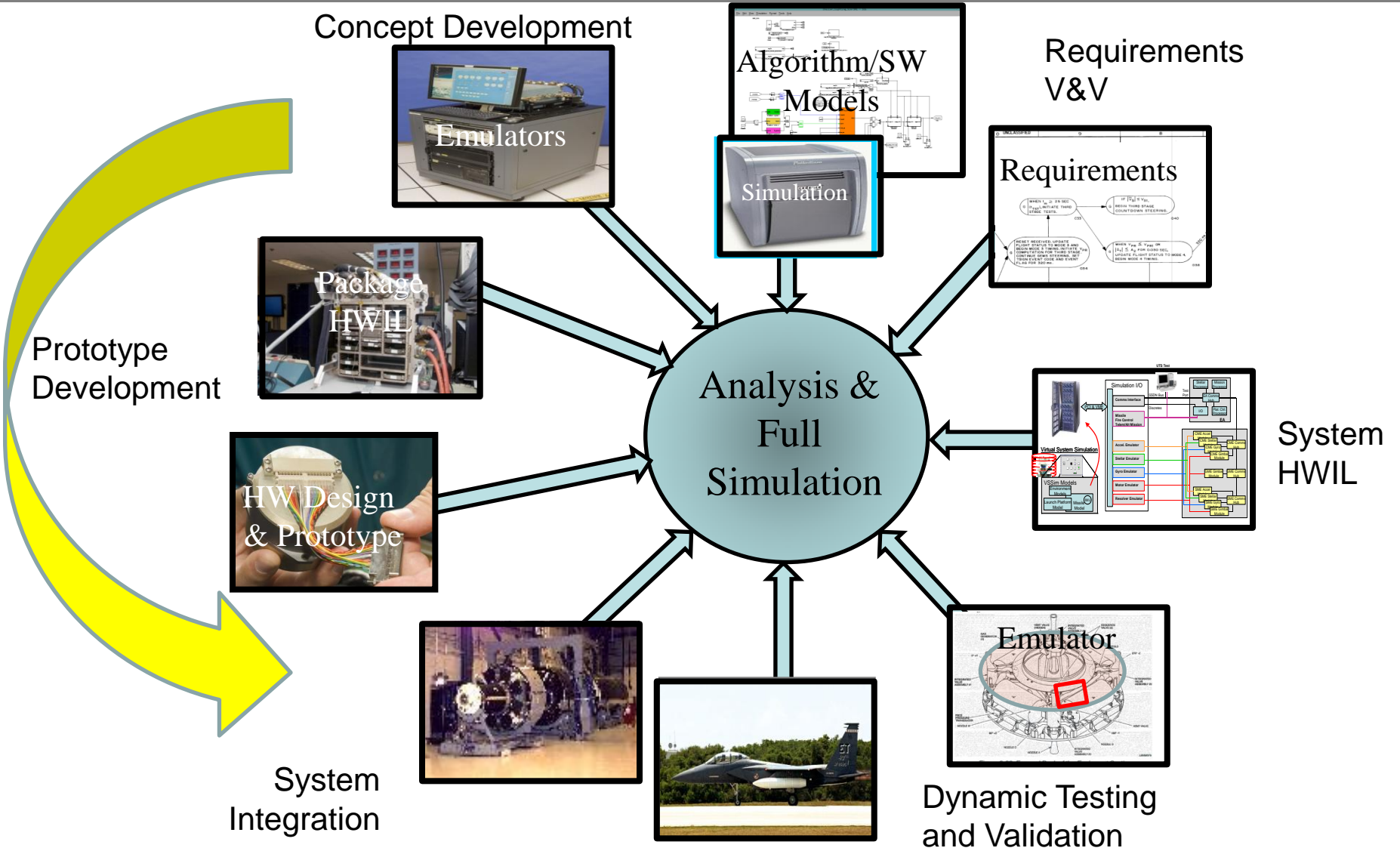
NDIA Systems Engineering Conference
23 October 2012

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Overview

- Categories of Benefit
 - Improved mission needs satisfaction
 - Early empirical validation of designs through modeling and simulation-driven, system prototypes
 - Integrated legacy system sustainment and system upgrade
 - Enhanced reliability designs

Model-Based Engineering Life Cycle



Effective SE Leverages Integrated T&E

Deployment Phase

- Where major life-cycle cost is incurred
- Many guidance systems spend most of their operational life in readiness testing
- T&E 'at the launcher' is a primary consideration for early design trade-offs



Production Phase

- Align the functional & physical partitioning of the design to enable cost effective specification, procurement and acceptance test of major component products



System Integration & Design Verification Phase

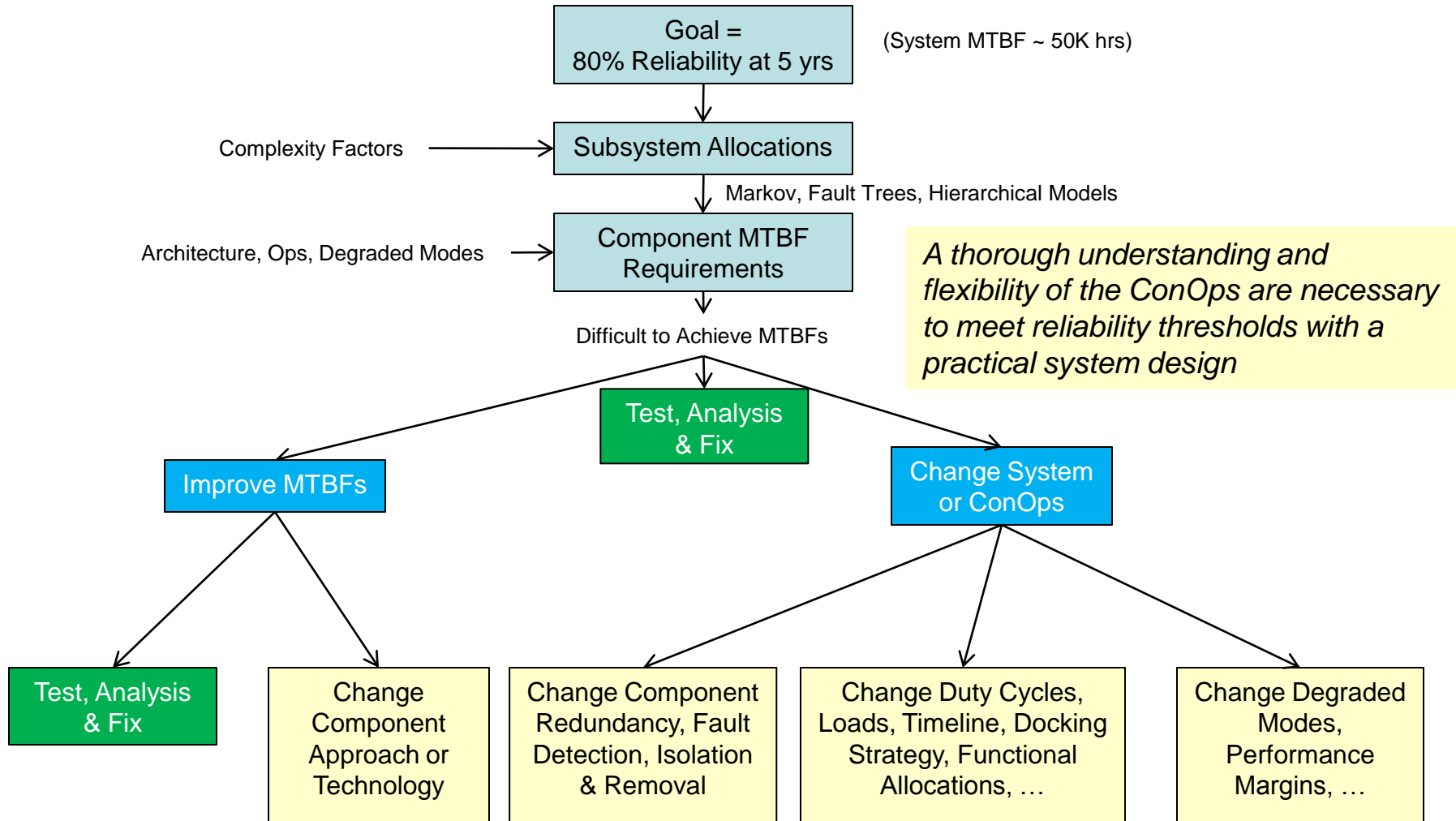
- T&E considerations drive the internal communications architecture and partitioning of models
- Results in streamlined I&T, reducing risk during deployment phase

Effective SE for Upgrade Programs

- Aligning SE, DT&E and OT&E during upgrades and sustainment
 - In the future, an increasing proportion of our systems engineering efforts will involve an upgrade to an existing system
 - During upgrades the operational system becomes a critical element
 - Source to document the actual use scenarios
 - Employ as a DT&E and OT&E element



System Design for Extreme Reliability



Closing Remarks

Effective Systems Engineering reaps benefits for programs in four areas

- Meeting mission needs
- Early system design validation through M&S
- Improved legacy system upgrade through integrated T&E
- Enhanced system reliability