The Making of a Government LSI

From Warfare Capability to Operational System

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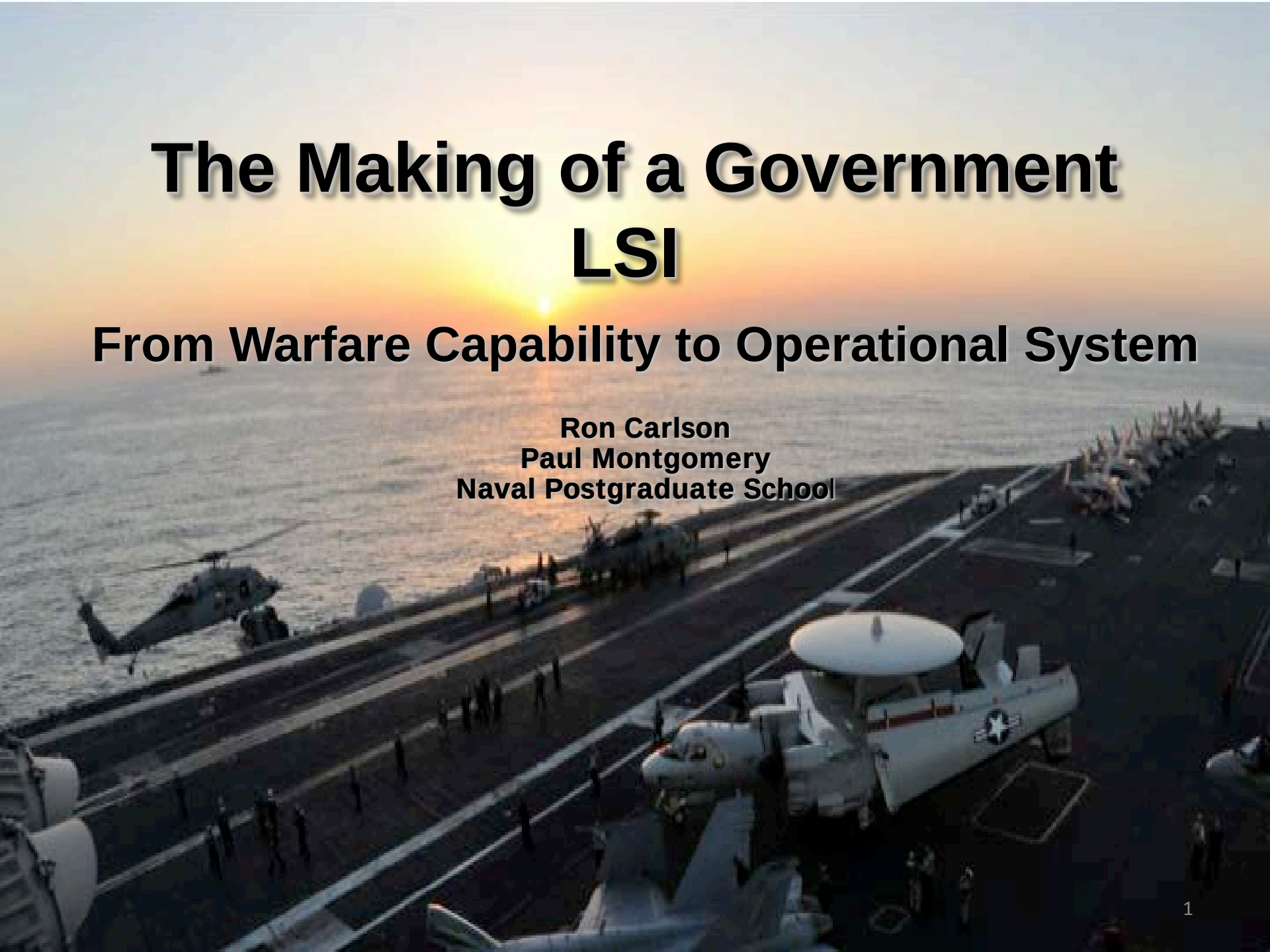


Background

- **Changes at NAVAIR**
  - Increased emphasis on becoming LSI
    - Helicopter program
    - UAV Program
    - NextGen Jammer Program
  - Mission Driven Acquisition
    - Integrated Warfare Concept (IWC)
    - Mission-centric approach to defining system-of-systems / enterprise requirements
    - Using Model-Based Systems Engineering (MBSE)

IWC MBSE still needs to flow down to Program of Record (PoR) MBSE

Integrated Acquisition Strategy

LSI, SoS, Models
Operational & Mission Reqmts

Workforce, Tools, Training
Documents, Process, System Reqmts

Problem Statement

Problem

DoD implementation of Lead System Integration roles, processes, methods and practices are not completely defined and developed in existing programs of record (PORs) to ensure that overall warfare capabilities defined by the IWC analysis process are achieved.

Research Questions:

- How are the defined roles of LSI emerging?
- How have these roles manifested or impacted the organization?
- How have these roles and organizational changes impacted execution of PoRs?
- How can an Model-Based Acquisition Framework (MBAF) support and underpin the efforts of acquiring system - from Capability-to-PoR?

LSI Attributes

- **Design**:
  - Primary designer (“design agent”) for system and SoS designs
  - Conceptual, Architectural Design (operational, functional, physical, interface, qualification)
  - Responsible for integration and qualification

- **Control**:
  - Trade-off Studies
  - Analysis of System Challenges
  - Risks and Opportunities
  - Resources

LSI Attributes (cont.)

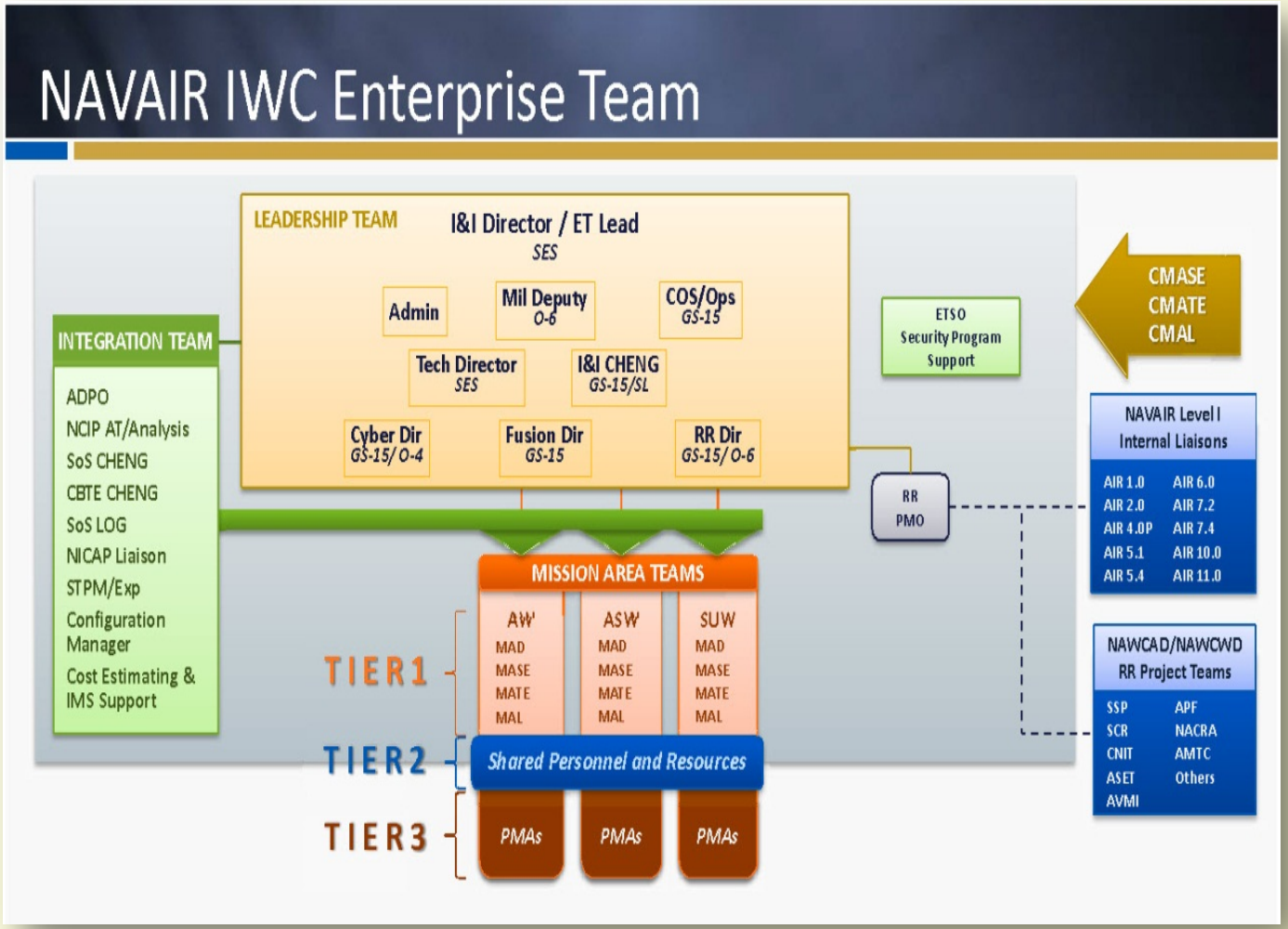
- **System Baseline Management:**
  - Products (Architectures, Configurations, Drawings, Specs)
  - Definition, control, management of baselines/configurations
  - Capability, Operational, Performance, Functional, Allocated, Product
- **Source Selection:**
  - Provides solicitation packages
  - Reviews / Evaluates proposals
- **Vendor Selection:**
  - Selects / Awards Contract to Component, Subsystem, System Components or Services
  - Survey, vetting, and selection of providers

LSI Attributes (cont.)

- **Supplier Chain Management**
  - Sustain an infrastructure to manage hardware and software configuration item selection, sources of supply, and manufacture
- **Qualification (“V & V”)**
  - Ultimate responsibility for developmental (verification), operational (validation),at all levels
  - Live, Virtual, Constructive Trades

Organizational Changes

- Mission/capability-level requirement identification
- Major reorganization to build and train team

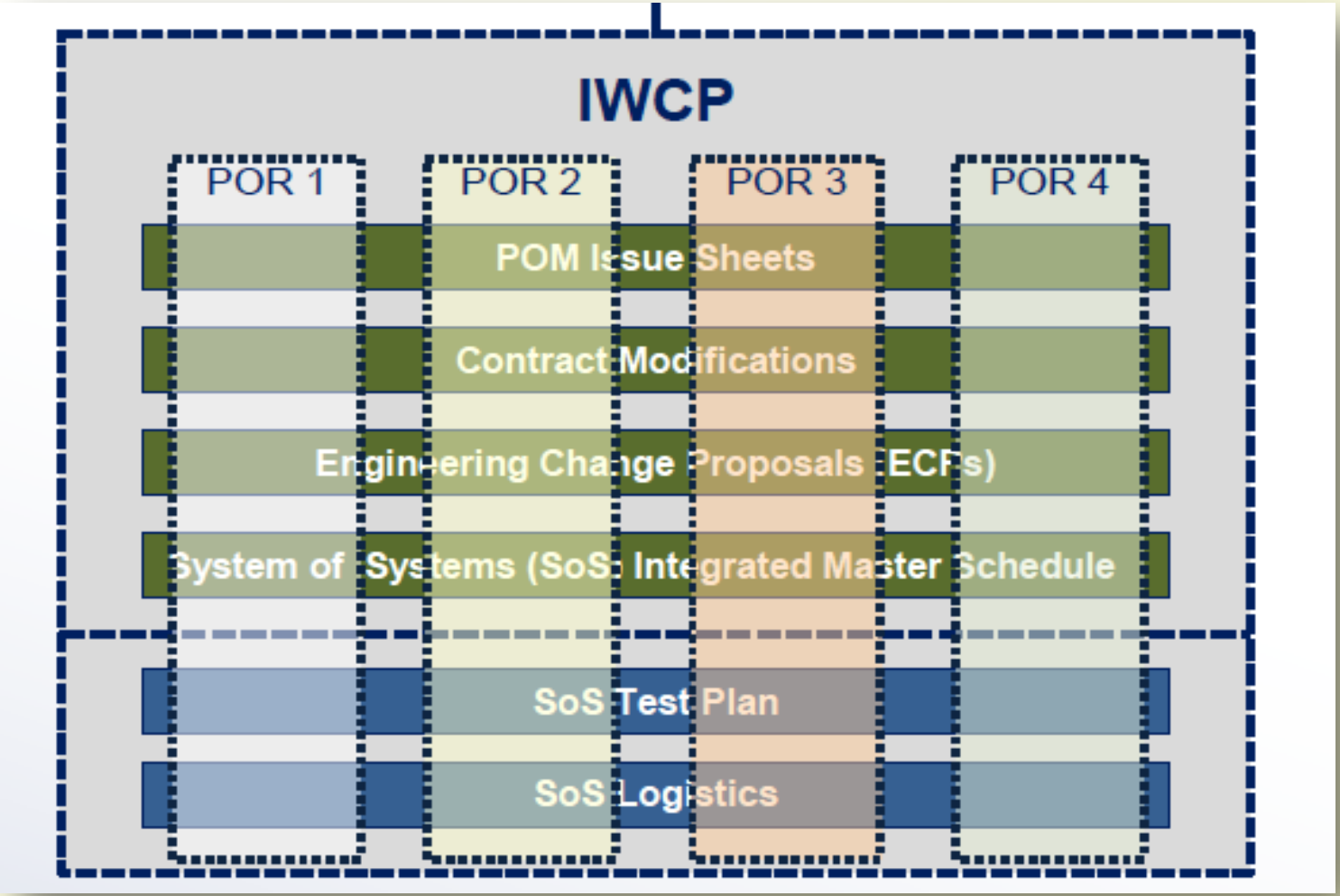


Technical Authority Reorganization

- Reorganized to support top level reorganization
- Mission Area created from Systems Engineering, Analysis
- Rapid Capability created from SE, avionics, analysis, and intel

Integrated Warfare Capability Packages

- IWCPs created from Mission Area analysis
- Capabilities assigned to Programs of Record



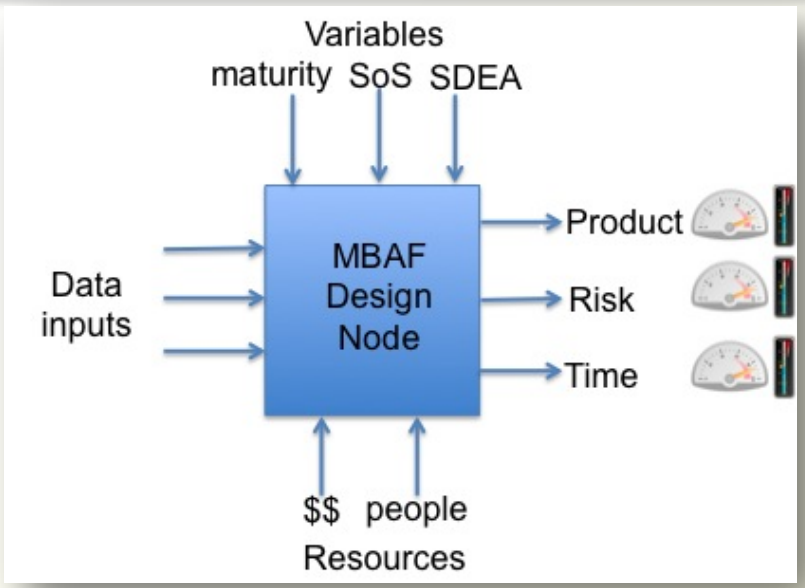
Program of Record Execution

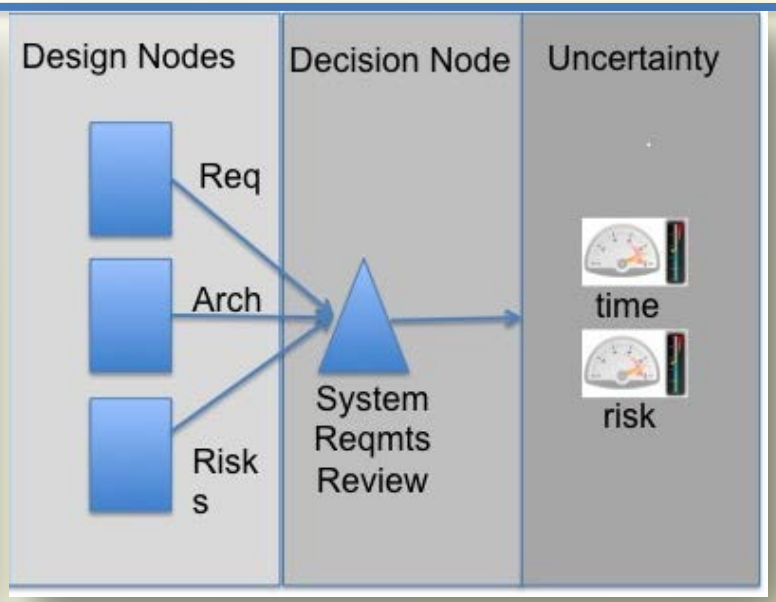
- **PMA-268 – UCLASS**
  - Cross segment interface control and Architecture.
  - Anomaly/deficiency adjudication and resource allocation for correction of issues that span multiple IPTs.
  - Configuration management of hardware and software.
  - System design trade studies and decisions.
  - Verification of the total integrated system.

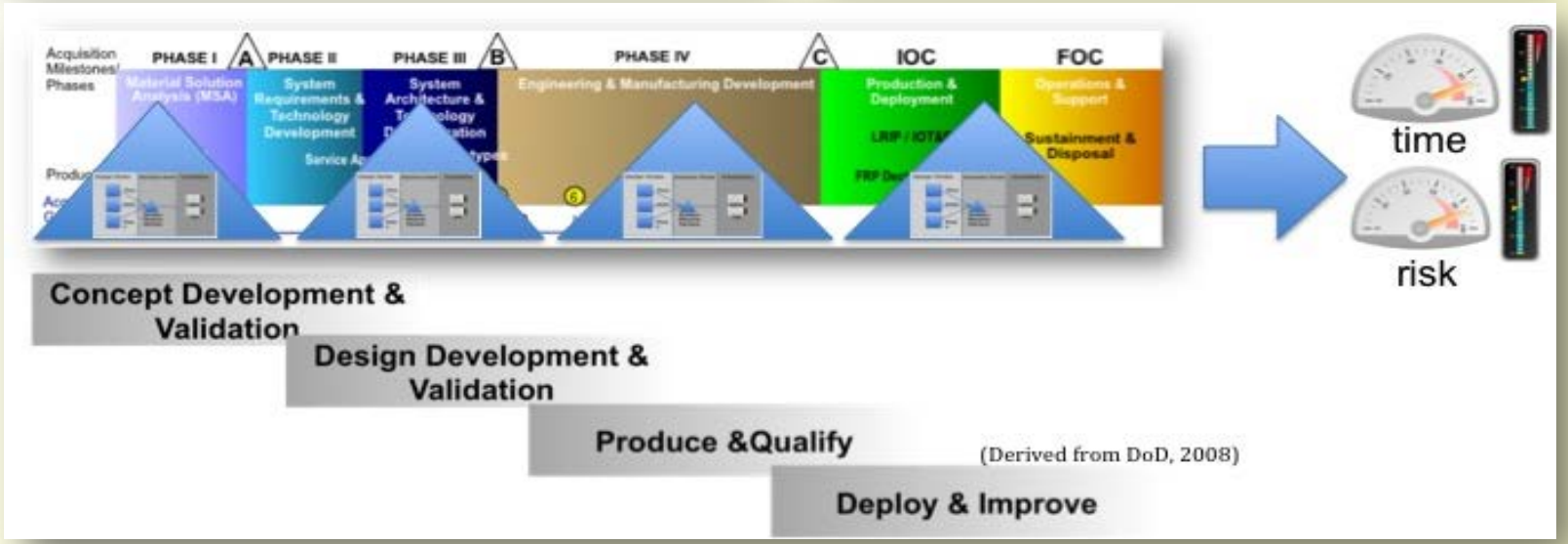
Additional POR example

- **PMA-234 – Next Generation Jammer (NGJ)**
  - Provide clear unambiguous lines of authority in program acquisition governance.
  - Allocate work, cost and schedule across contracts
  - Organize teams to enable collaboration between contractors and government agencies.
  - Manage trade space, interfaces across contract boundaries
  - Develop/maintain *system* level requirements, architectures, risk management for the NGJ system
  - Develop/manage configuration of *system* technical baselines via centralized databases.
  - Integrate pod and aircraft

Model-Based Acquistion Framework (MBAF)





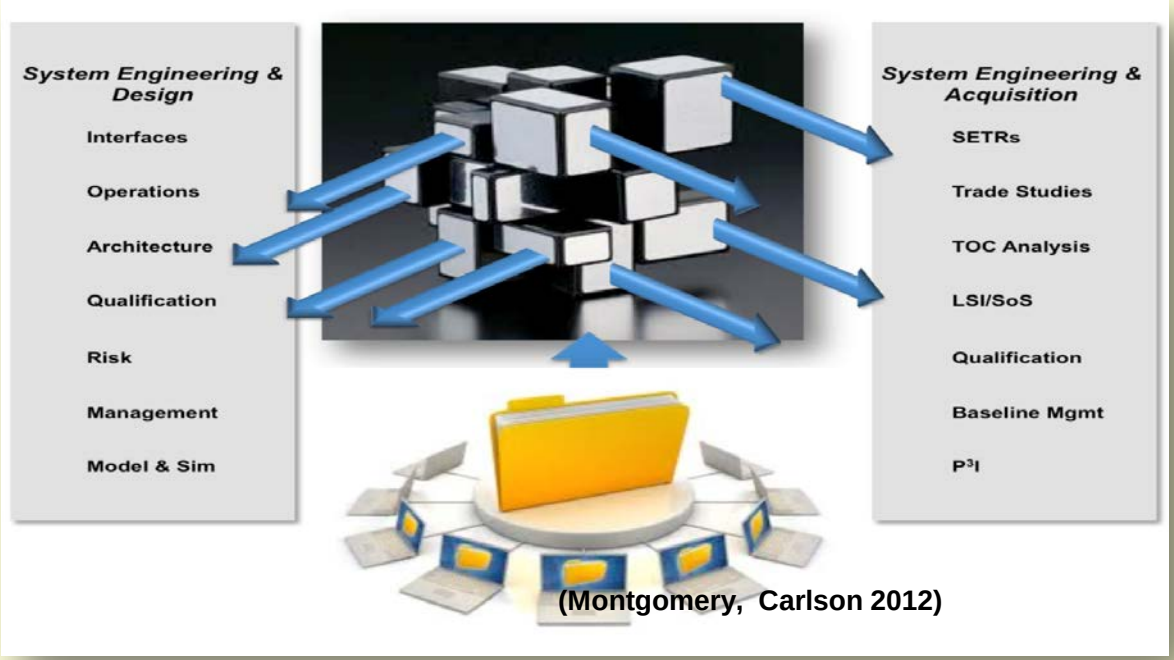


Implications for MBAF

- **MBAF support for POR development**
  - Serve as a development tool to create the system, including LSI trade decisions.
  - Allow for earlier determination of if the system will work.
  - Provide estimates of attributes such as time to produce and risk.
  - Create semantics across the entire acquisition process.
  - Serve as a way to look back up into the IWC mission-capability model to ensure that the POR meets mission needs.

Conclusions/Future Research

- LSI Attributes and when to apply them requires additional definition.
- Governance across the organization to accomplish mission level centered PORs continues to be defined
- Development of a Model Based Acquisition Framework may provide
  - A development tool to create the system, ID LSI trade space
  - Early determination of if the system will perform its requirements
  - Estimates of attributes such as time to produce and risk.
  - A way to integrate up into the mission-capability model for verification



(Montgomery, Carlson 2012)

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