MOS 2.0

Modeling the Next Revolutionary Mission Operations System

Duane Bindschadler &
Ops Revitalization Team
Jet Propulsion Lab, California Inst. Of Technology

Overview

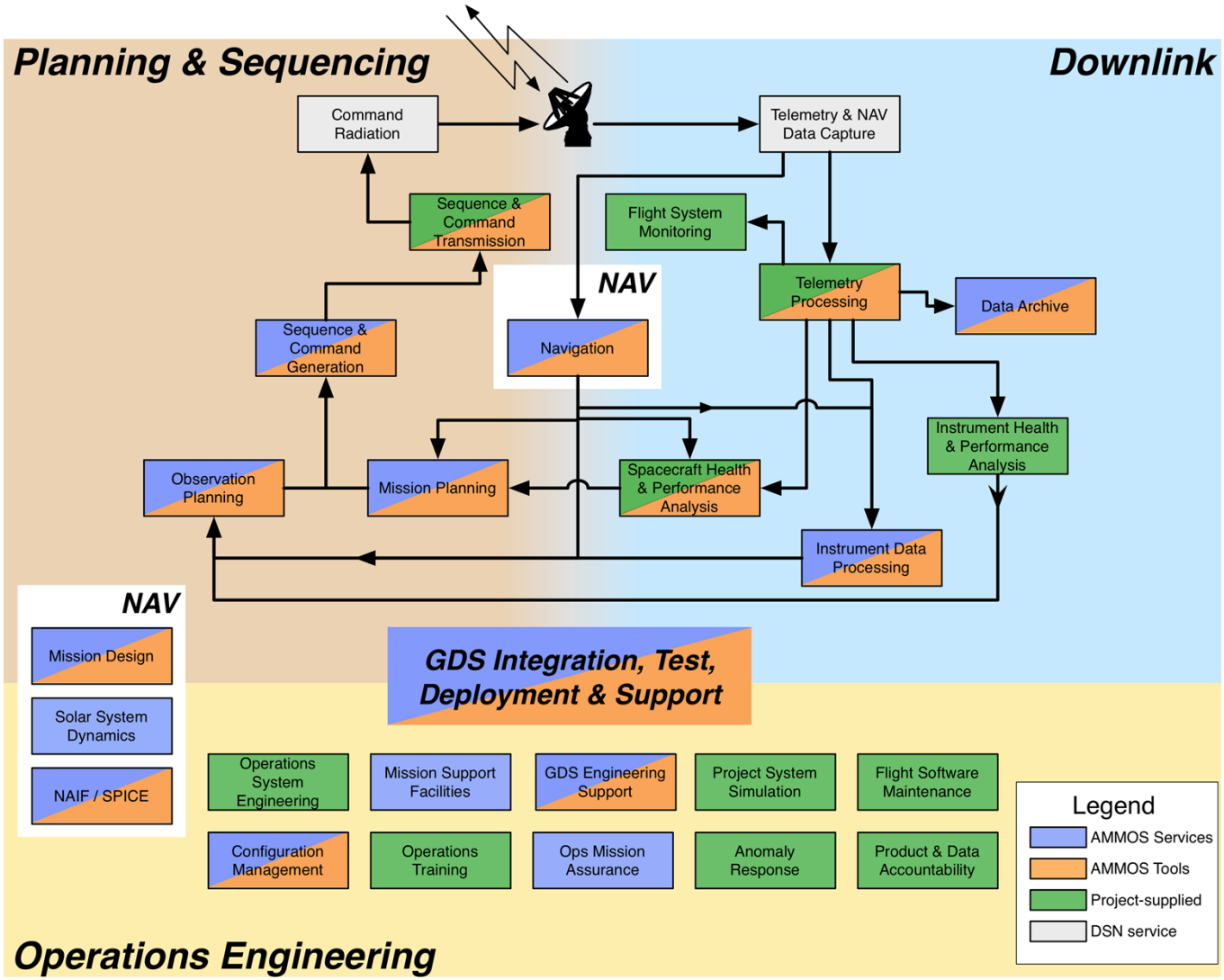
- Definition & Scope
- Future (“To-Be”) System
- Early Results
- Next Steps

Definitions & Scope

Definitions

- Operations Revitalization Initiative
  - This project
- AMMOS
  - Multimission tools and services, current Ops system
- MOS 2.0
  - Vision and direction for next-generation MOS
  - Ops Revitalization products:
    - New “Operations Layer” for AMMOS

Current System

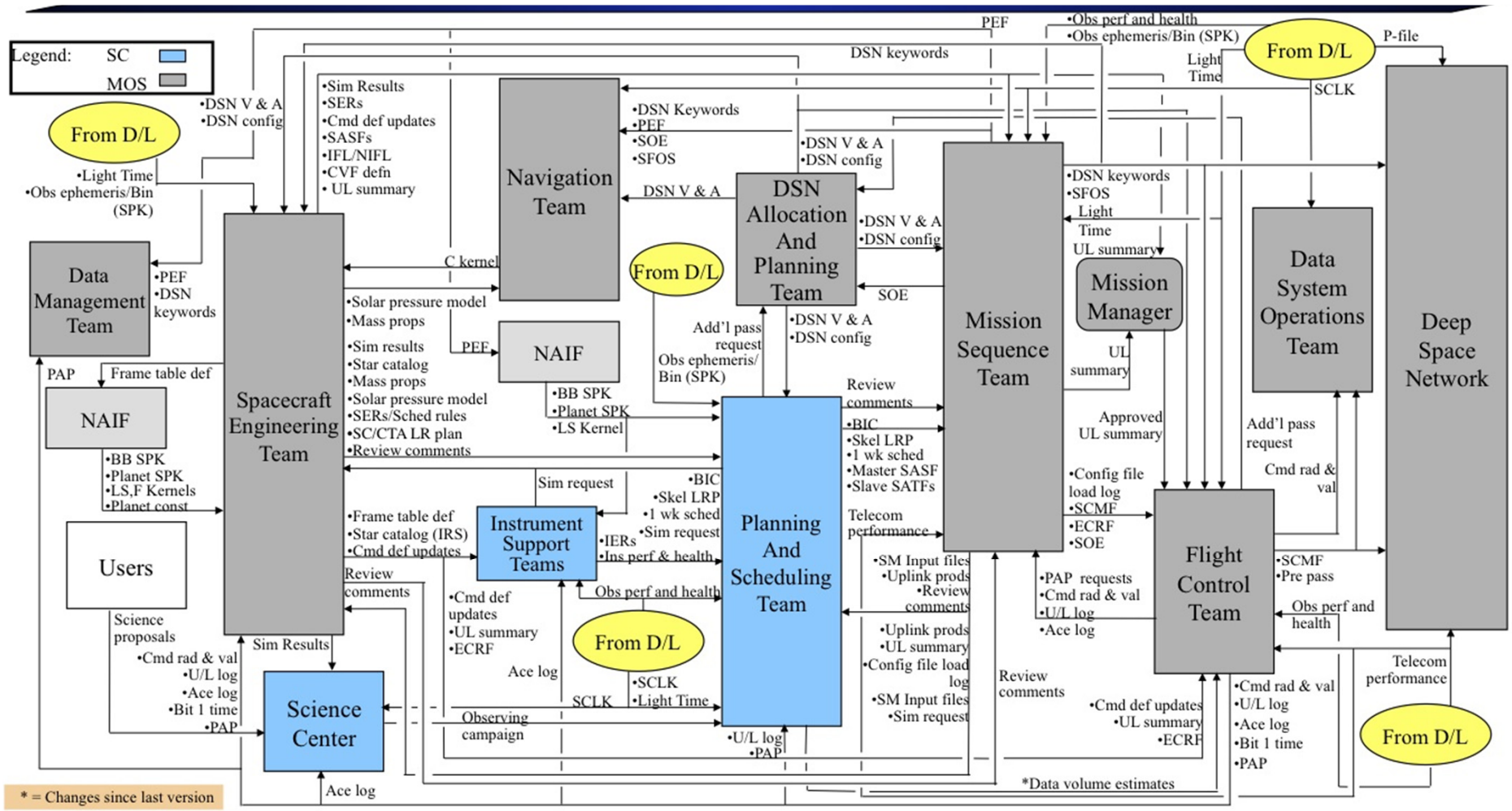


Future System

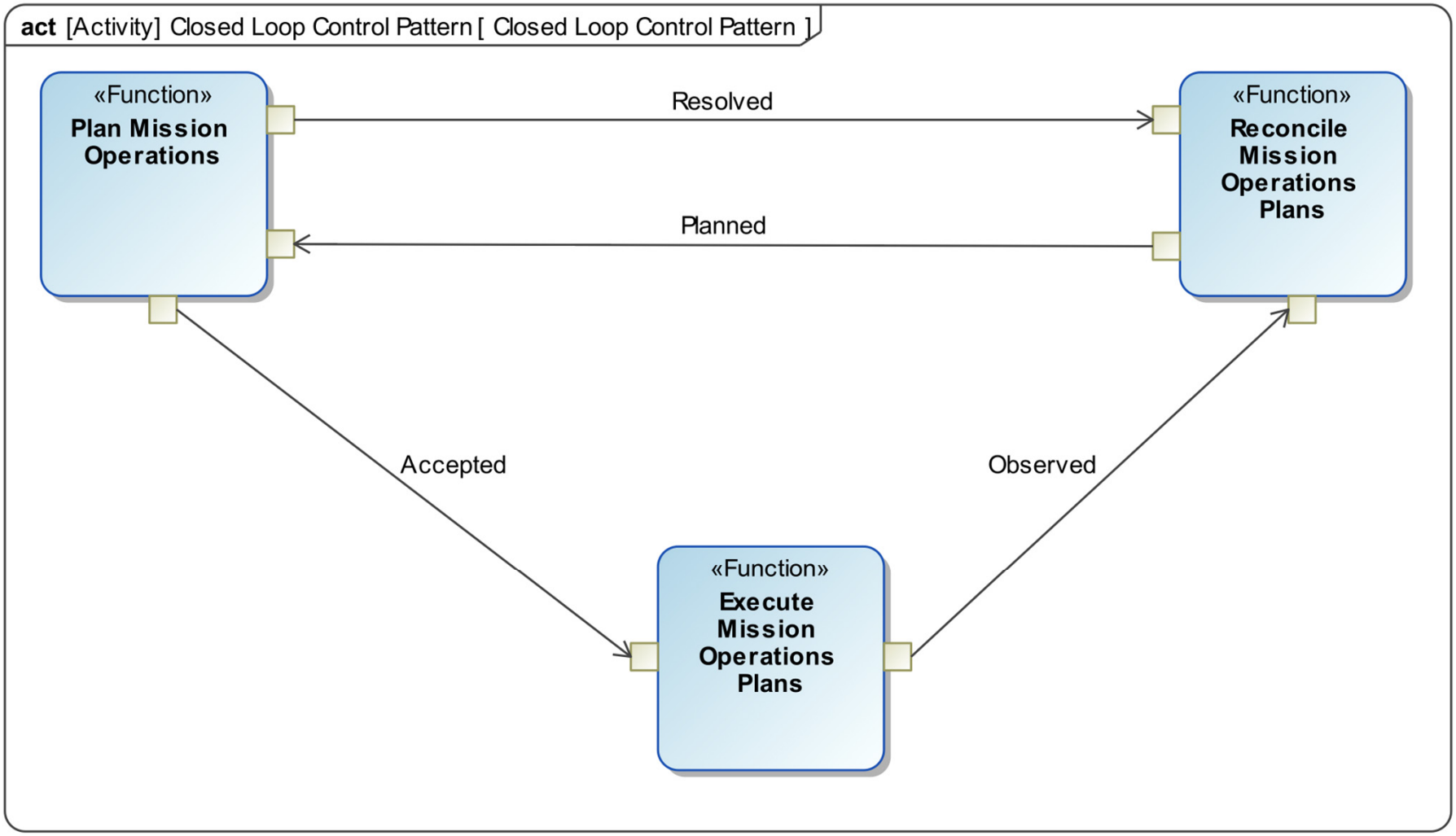
Principles

- MOS as a closed-loop control system
  - Enabled by supporting information model
  - Forces us to think “outside our stovepipes”
- “Develop with what you fly with”
  - “Rapid prototyping” approach to design and implementation of MOS capabilities
  - Exercise system-level functionality early on
- Service orientation
  - Provide multimission capabilities to missions via services
  - Provide multi-mission value to MOS at each Phase in lifecycle

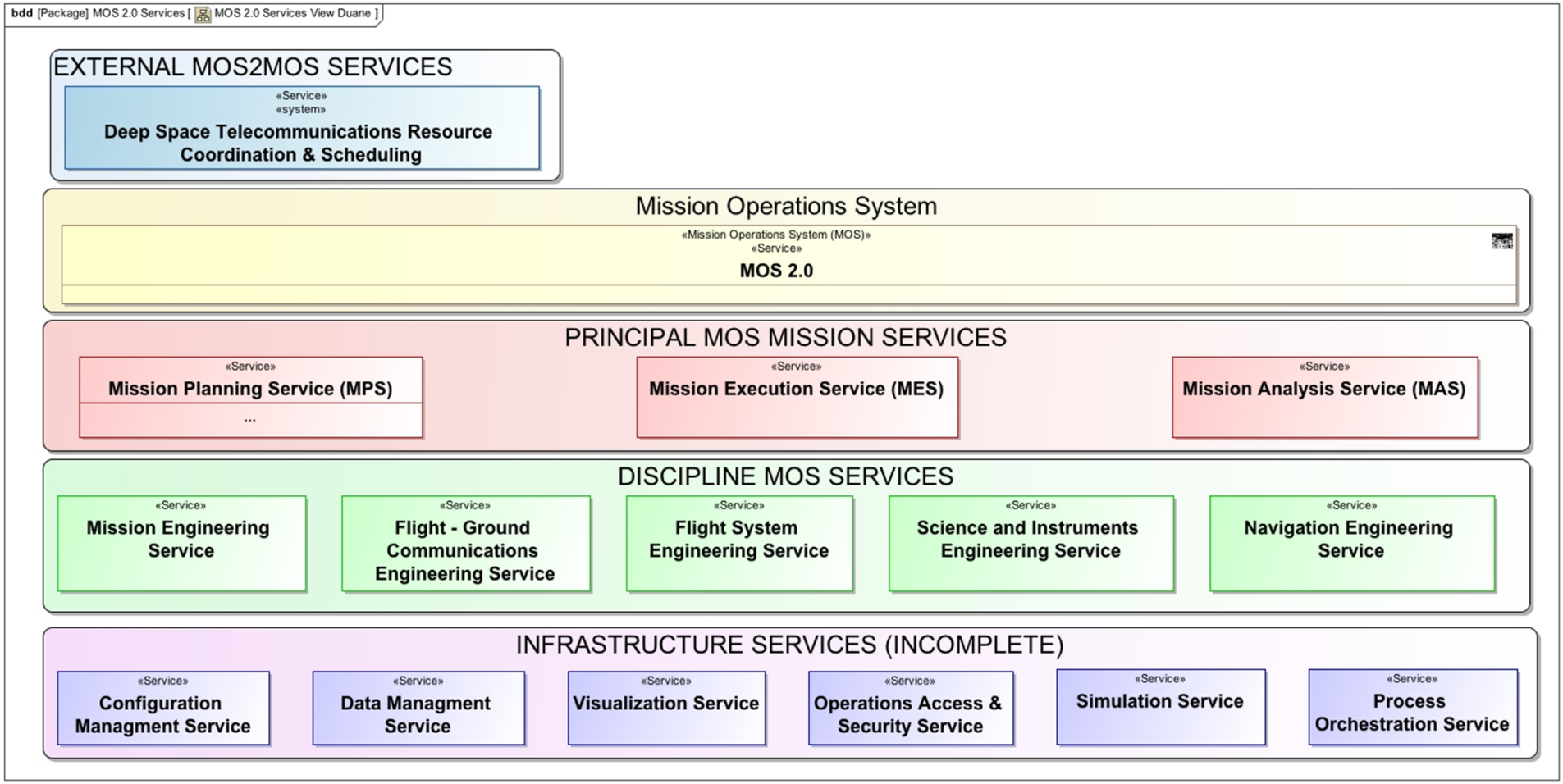
MOS View "As-Is"



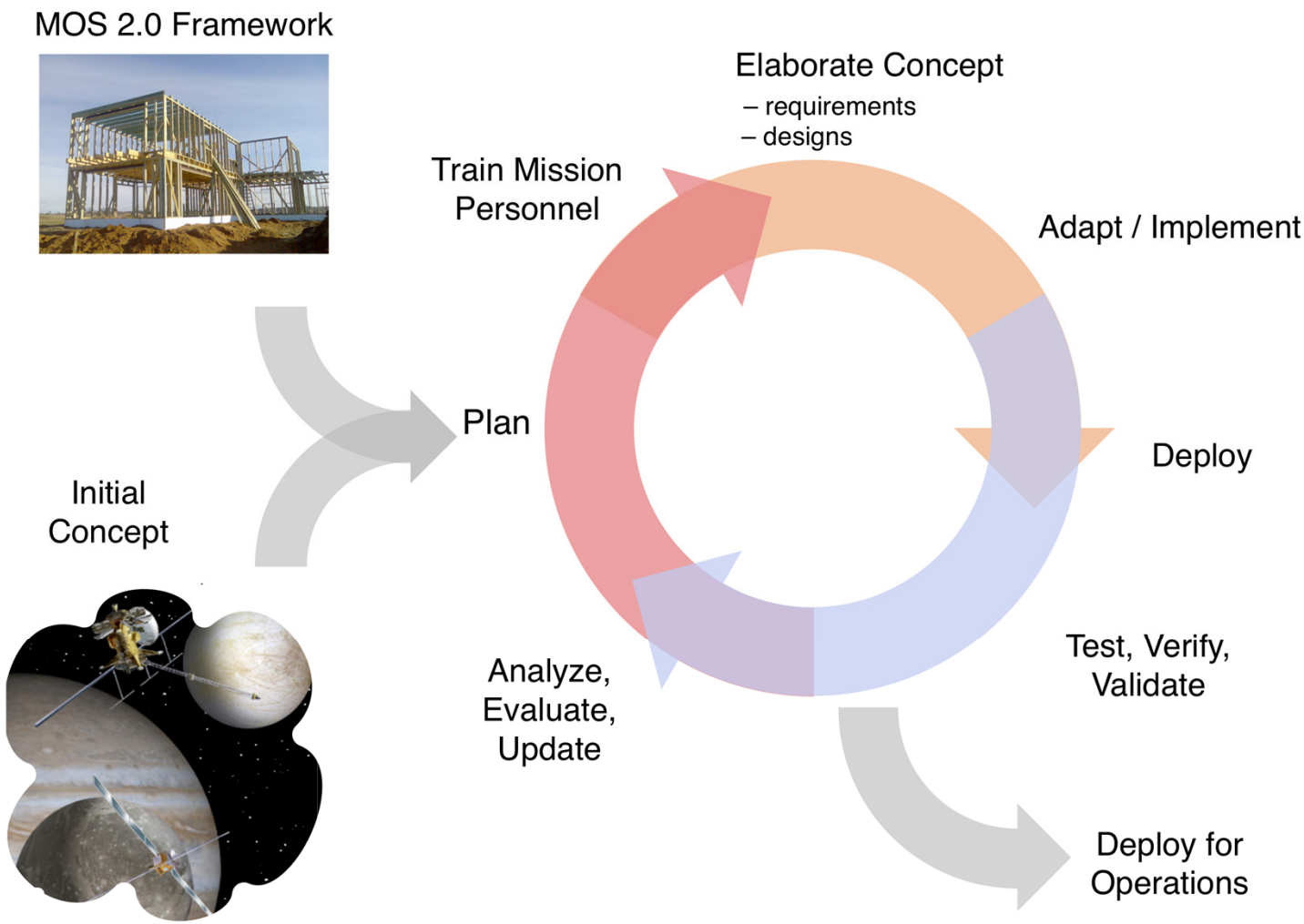
Control System View – "To-Be"



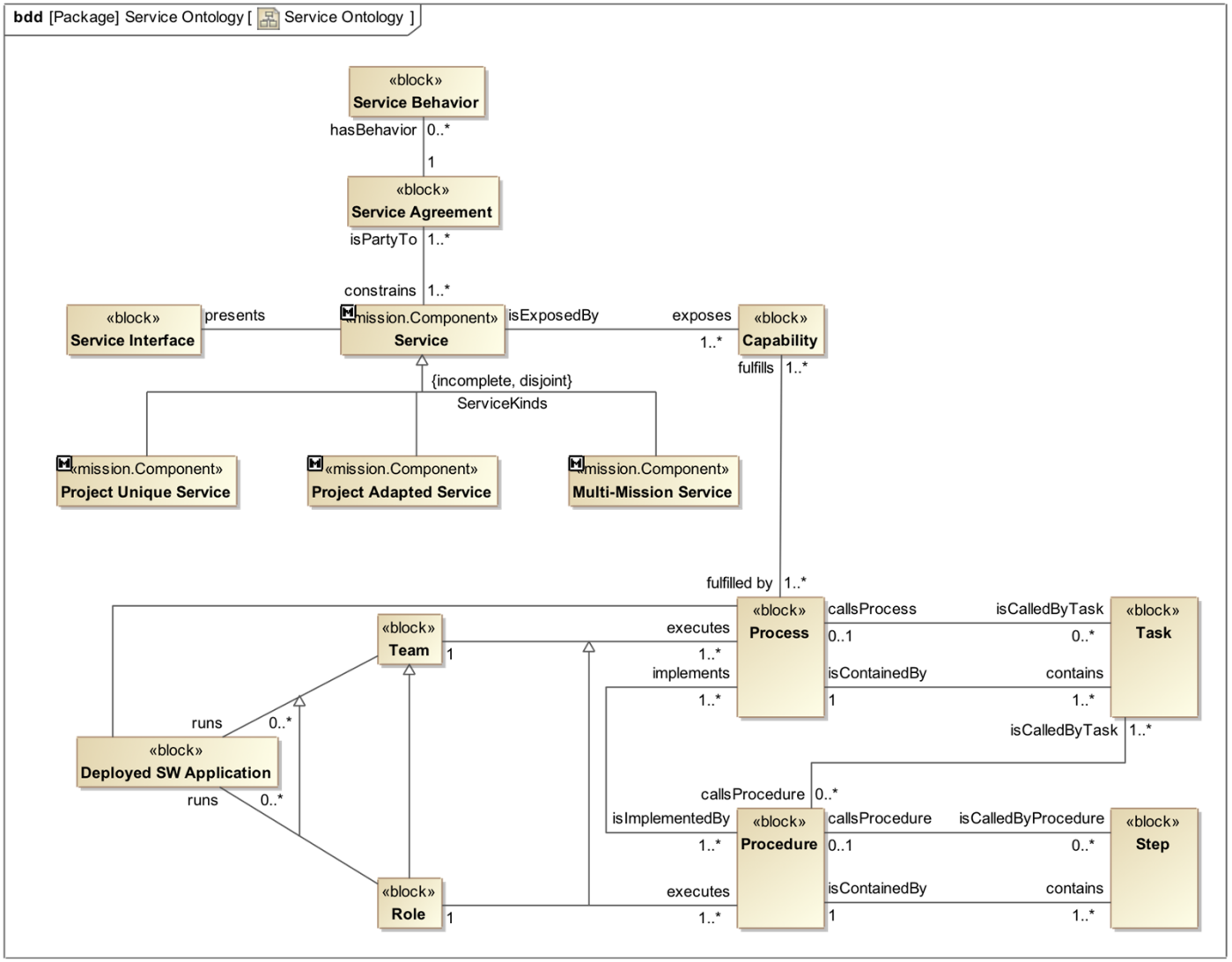
MOS 2.0 Services



To-Be: “Develop with what you fly with”

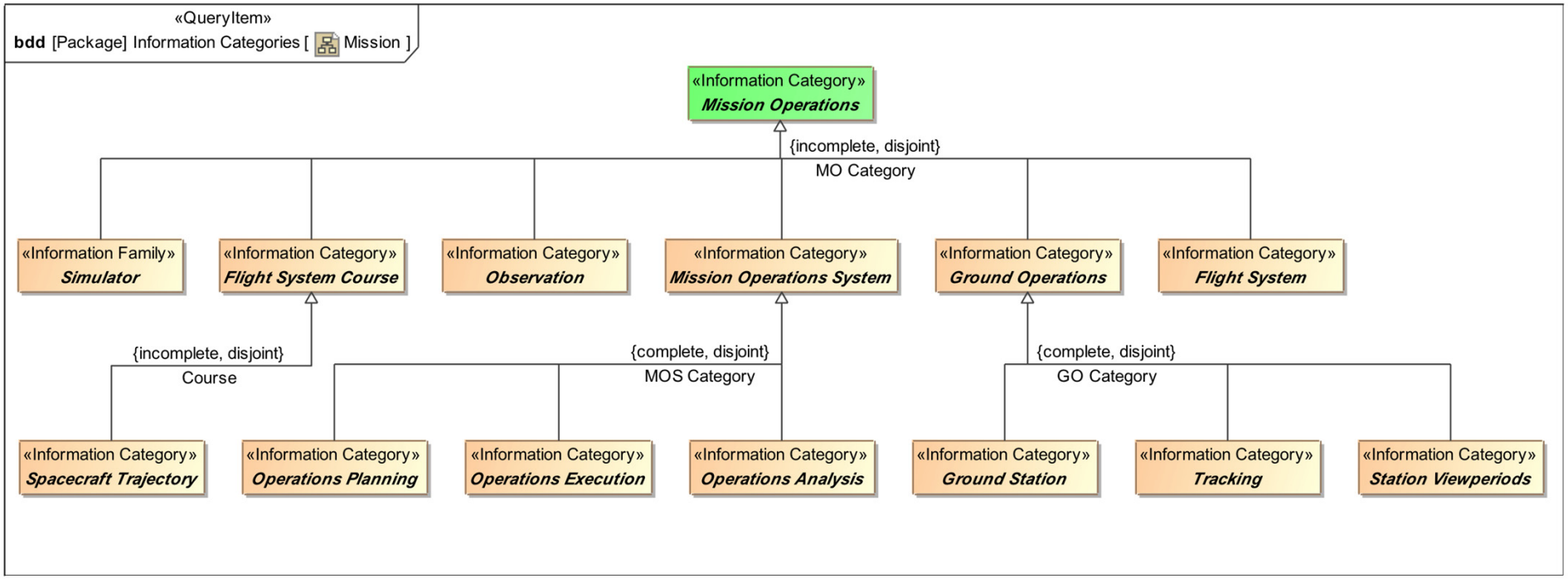


Fundamentals of MOS



Information Architecture

- Re-assert information content over format
- Adopt common, standards-based formats to facilitate interchange

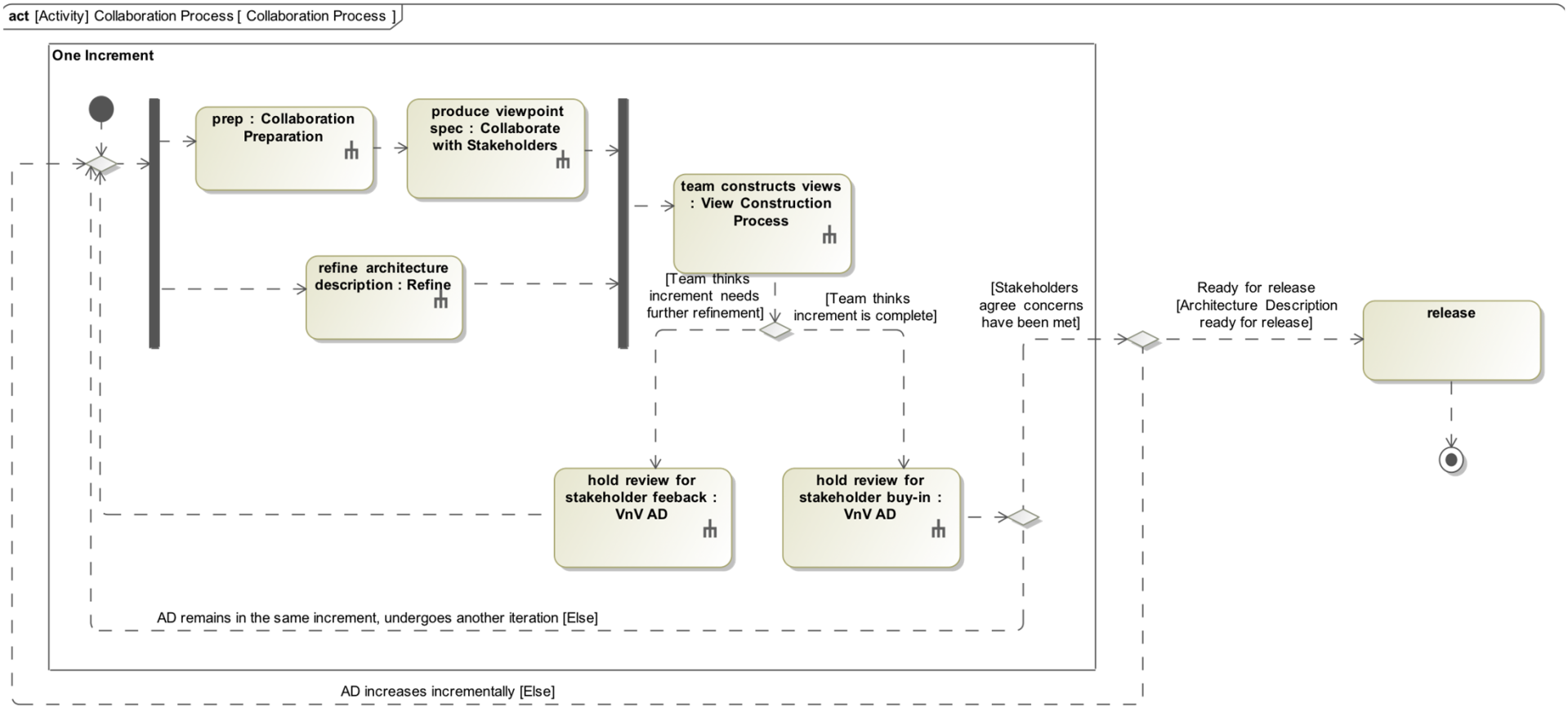


Approach

Stakeholders

- Addressing stakeholder concerns is central to Ops Revitalization
  - Called for by architecture standard
    - ISO 42010 / IEEE-1471
  - *"People support what they help create. People affected by a change must be allowed active participation and a sense of ownership in the planning and conduct of the change"*
    - Richard Beckhard (1969). *Organization development: strategies and models*

Stakeholder Collaboration



Some Early Results

Early Benefits

- Automated Document generation
  - MBSE methods don't yet replace docs
    - Still needed for review, communication
  - Simple, adaptable scripting capability
    - Builds document into models
  - "Pushbutton" updates to documents
    - Engineers spend less time in Word, Visio, Excel, Powerpoint…
  - Lower cost for review products at Project KDPs

New Capabilities

- MOS Metamodel
  - Fundamental basis for modeling MOS
  - Ontology ("Language") for rigorous description of key MOS concepts
    - Capability, Service, Process, Procedure…
    - Timeline (for describing most MOS information)
  - Enables MSL to model Tactical Uplink and to establish clear relationships between functional process and software needs

New Capabilities

- Scenario Catalog / Process Dashboard
  - Central repository for adaptable mission scenarios & processes
  - User-friendly, non-expert authoring tool for
    - Developing Ops Concepts & scenarios
    - Developing rigorous Ops processes
    - Deploying process to Ops & enabling situational awareness & collection of metrics
  - Transfer to/from expert tools as needed
  - Facilitates adoption, enables reuse, enhances quality

Future

MOS 2.0 Products	Description	Planned Completion
System Architecture	Views, Documentation, and Model of MOS 2.0	FY 2012
Information Architecture	Views, Documentation, and Model of Information Products used in MOS 2.0	FY 2012
Planning, Execution, Analysis Service	Views, Documents, Models of the Principal Services	FY 2011
Discipline Services	Services Available to Missions for Phases A-E	FY 2011-14