NASA INTEGRATED MODEL-CENTRIC ARCHITECTURE

NIMA
Document-centric to a Data/Model-centric Architecture

Advance from our current document-centric engineering practice to one in which model-based data representing the technical designs, as well as Program Management & Systems Engineering information, are integrated and evolve throughout the life-cycle, supporting trade studies, design verification and system V&V.

Today: Document driven & standalone models

Future: Model-based data exchange among disciplines, domains, and partners

To do this we must:

- Enhance the ability to share and exchange information
- Improve workforce knowledge, skills and abilities
- Facilitate the exchange and adoption of model-based practices and technical solutions
MBSE (Model Based Systems Engineering) - A formalized application of modeling to support system requirements, design, analysis, technical management, verification and validation activities beginning in the conceptual design phase and continuing throughout development and later life cycle phases. (17 SE Processes 7123)

MBE (Model Based Engineering) - An approach to engineering that uses models as an integral part of the technical baseline that includes requirements, analysis, design, implementation, and verification of a capability, system and/or product throughout the acquisition life cycle. (NDIA M&S)

MBD (Model Based Design) - Mathematical and visual method of addressing problems associated with designing complex control signal processing and communication systems

MBPC (Model Based Project Control) - A formalized application of modeling to support schedule, budget, organizational activities related to the system(s) of interest.

MBMO - Model Based Manufacturing and Operations - A formalized application of modeling to support manufacturing and operations
NIMA Approach

Develop, implement, and exercise a technologies & methodologies infusion pathway to help move the Agency from a Document-centric to a Data/Model-centric Capability and Culture.
NIMA-to-Project View

A cross-center team working to enable/facilitate transition from document-centric to data/model-centric process/practices/culture within and across NASA

**Access to model-centric solutions**

**Enabling Systems**
Definition of required enabling capabilities, e.g. workforce training, IT, ...

**GUIDANCE**
Standards, Requirements, and Guidance for MC Data exchange & management and MC methodologies

**PILOTS**
Testing & limited implementation of NIMA practices and technical solutions

**Treatment**
PILOTING: training & limited implementation of NIMA practices and technical solutions

**App Store**
Access to model-centric solutions

**NASA Projects**
- Model-based practices and technical solutions are available to Project personnel
- Training needed to use NIMA processes and practices are identified and made available to project personnel
- Enabling IT requirements for resources and capabilities are identified
- Standards guide data exchange and management for interoperability, consistency, and integrity

**OCE SEWG CoPs**
- MBSE
- PDLM
- M&S
- CAD

**Subject Matter Experts & Other Resources**
Industry
Academia
Centers (e.g. HR)
Vendors
FY14 NIMA Infrastructure Development

• Define processes to ID, Filter, Prioritize, and Select candidates for AppStore, Standards, Handbooks, & Training
• Define and develop AppStore functionality
• Define processes to capture/develop content for AppStore, Standards, Handbooks, & Training
Initial FY 2014 Focus Areas for AppStore and Standards/Handbooks Content:

- Refinement and utilization of a SE Process Model (based on NPR 7123.1).
- Assessment of DARPA Adaptive Vehicle Make (AVM).
- Two study efforts, consisting of research, benchmarking, and development of follow-on recommendations:
  - CM/DM of models/databases
  - Contractual language for the exchange of models and electronic data