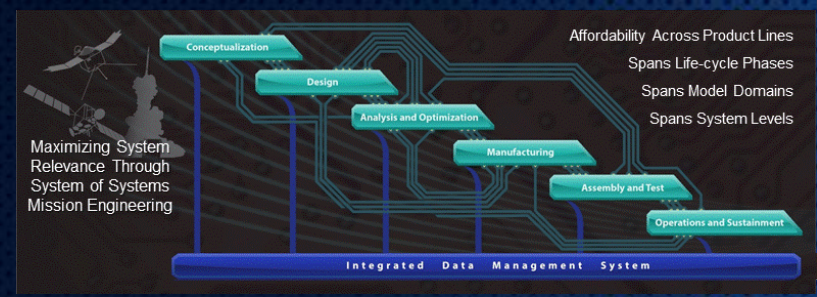# Digital Tapestry:

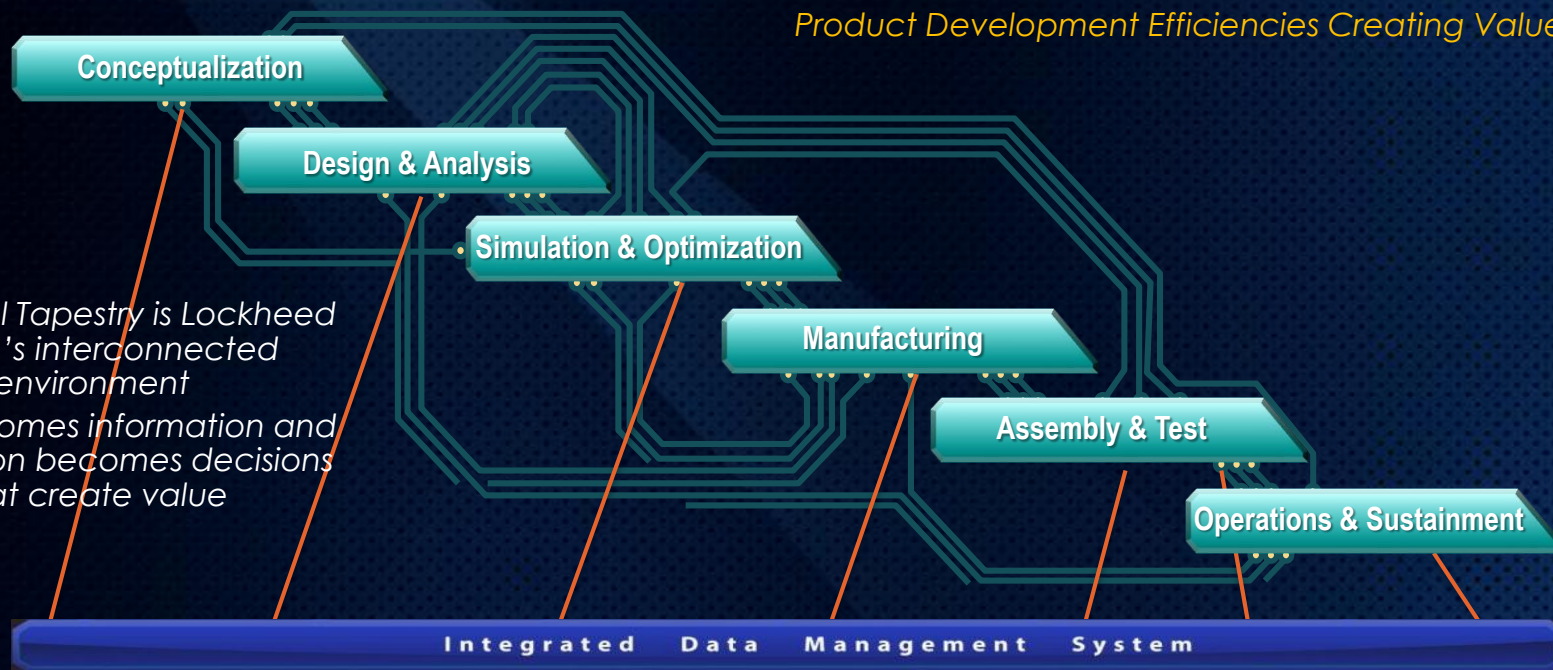Digital System Modeling
at
Lockheed Martin Space
Systems Company

for NDIA M&S
Digital System Model Workshop

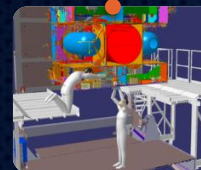# SSC Enterprise Digital Tapestry
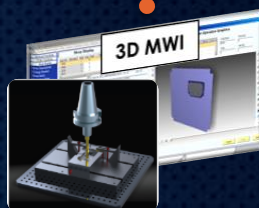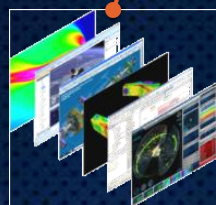
Product Development Efficiencies Creating Value

Conceptualization

Design & Analysis

Simulation & Optimization

Manufacturing

Assembly & Test

Operations & Sustainment

The Digital Tapestry is Lockheed Martin's interconnected environment

data becomes information and information becomes decisions that create value

Integrated Data Management System

Simulation Based Mission Validation

Model Based Definition

Simulations & Auto-coding

CAD Based Manufacturing Operations

Virtual Build

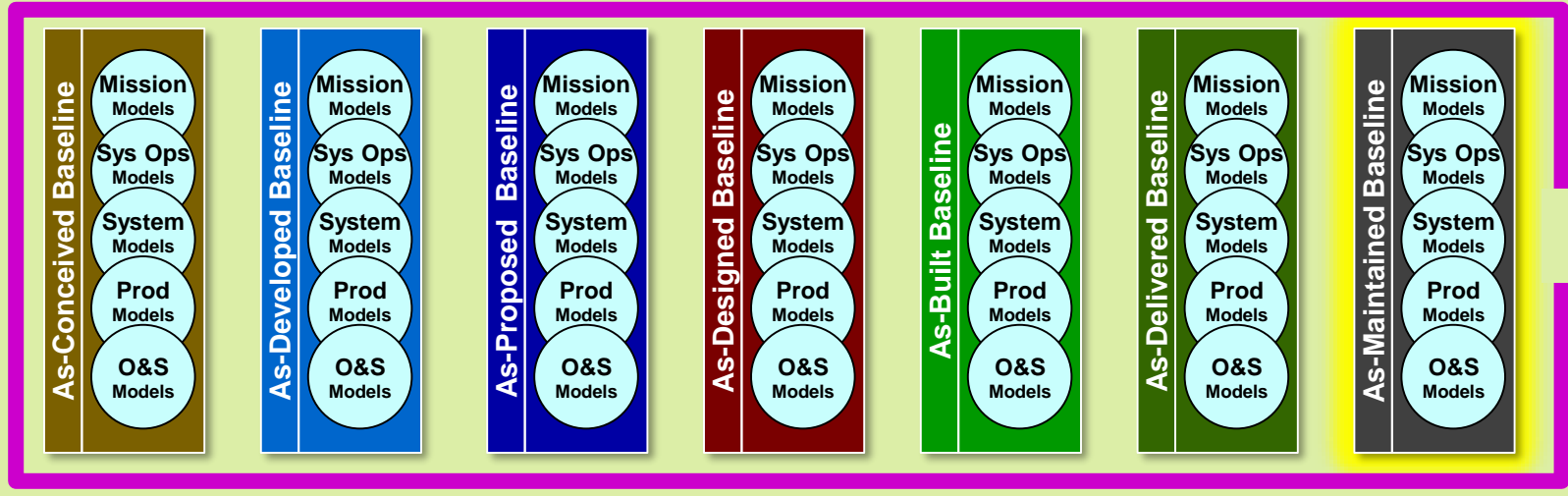**Model Based Inspection & Test**

Integrated Program Mgmt. Dashboards

Digital Tapestry – The Integrated System Model

Integrated Model Set and Data Repository

As-Conceived Baseline — Mission Models, Sys Ops Models, System Models, Prod Models, O&S Models

As-Developed Baseline — Mission Models, Sys Ops Models, System Models, Prod Models, O&S Models

As-Proposed Baseline — Mission Models, Sys Ops Models, System Models, Prod Models, O&S Models

As-Designed Baseline — Mission Models, Sys Ops Models, System Models, Prod Models, O&S Models

As-Built Baseline — Mission Models, Sys Ops Models, System Models, Prod Models, O&S Models

As-Delivered Baseline — Mission Models, Sys Ops Models, System Models, Prod Models, O&S Models

As-Maintained Baseline — Mission Models, Sys Ops Models, System Models, Prod Models, O&S Models

- Beyond As-Designed
- Matured Data-Set throughout Life-Cycle
- Fully Integrated, Delivered, Maintained

Significant Engagements

- NASA NIMA
  - Model-Centric Architecture
  - Across NASA Centers
- AFRL DT/ERS
  - Lockheed Martin CRADA
  - Focus on several areas of study
  - Guided by BBP 3.0 and Affordability Initiatives
- Others across Lockheed Martin engagements

Challenges & Opportunities for DSM

- Standards defining DSM contents
- Given desires for DSM integration . . .
  - Interoperability for domain modeling tools
  - Concepts for data set integration
  - Abstractions for customer-level analyses
- Constructs for Model-Based System Performance Characterization
- Constructs for handling IP in a Model-Based Paradigm
- Tool Integrations Easily Compatible in Classified Environments

Digital Twin – Notional Operations

As Built Configuration

Predictive Analytics

Operational Digital Twin (Simulated Mission Planning)

Product Certifications & Traceability

Visualized Real-Time Telemetry

Digital Twin Simulated Telemetry

Hi Fidelity Physical Models

The Digital Twin

Image Credit: NASA & USAF

As Maintained Software Configuration

Near Real Time Anomaly Assessments