Naval Digital Engineering Implementation Overview December 9, 2020

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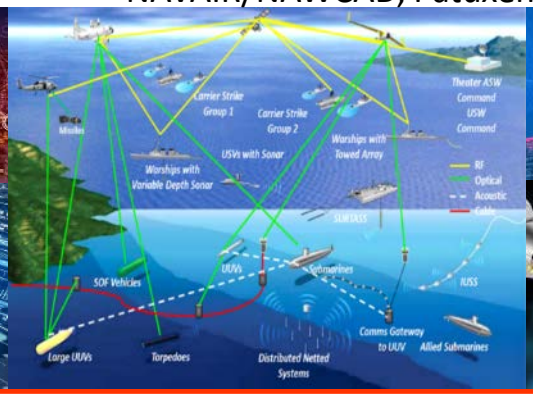
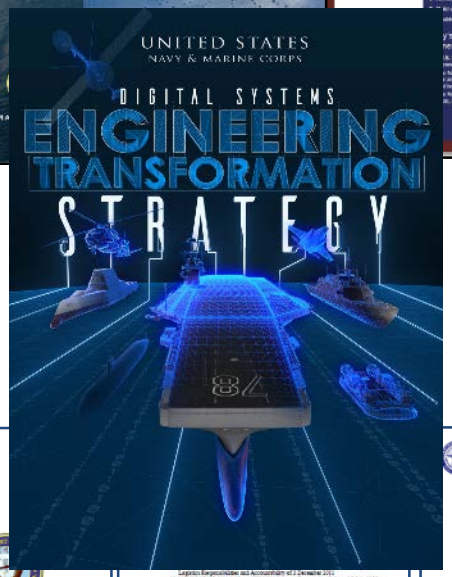
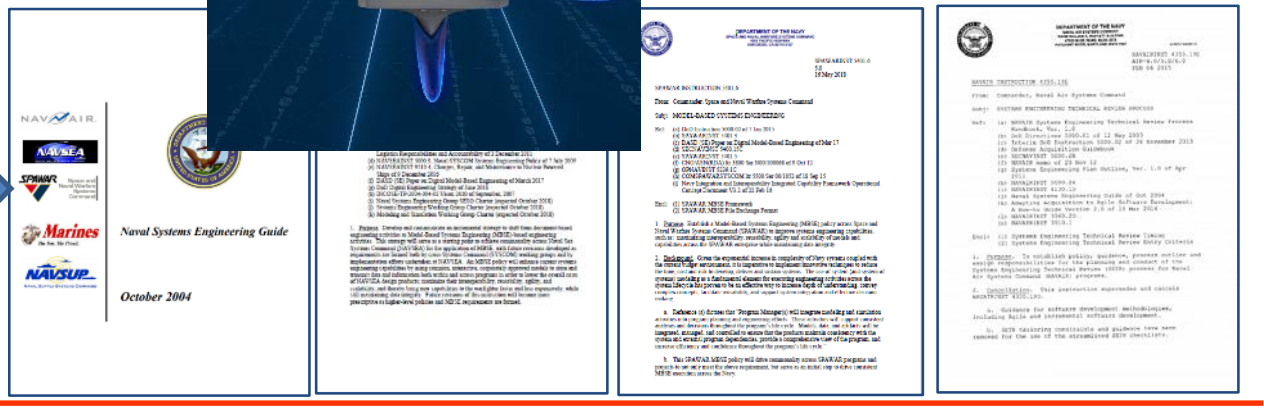


Naval Digital Engineering

Naval Digital Engineering Strategy
Aligned with DoD, Naval and Digital Strategies



Systems Engineering Technical Authorities Supports Engineering Implementation at Naval Systems Commands

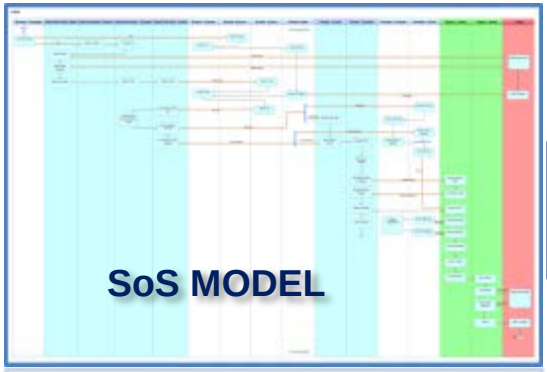


Capability Based Acquisition - Outpacing the Threat

Digital Thread enables rapid delivery of Integrated Capabilities

I & I

Integrated Warfare Analysis establishes CONEMPS and Effects-Chains

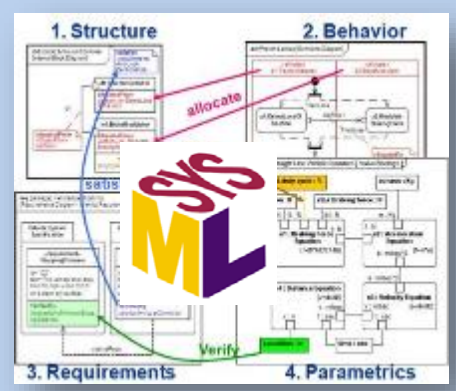


CONEMPS and Effects Chains are modeled at the System of Systems (SoS) level

System models form "Constructive" basis for LVC M&S environment

SE TRANSFORMATION

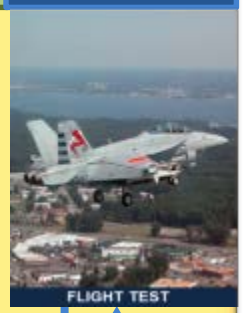
SYSTEM MODELS



Systems are developed in a Model-Based environment

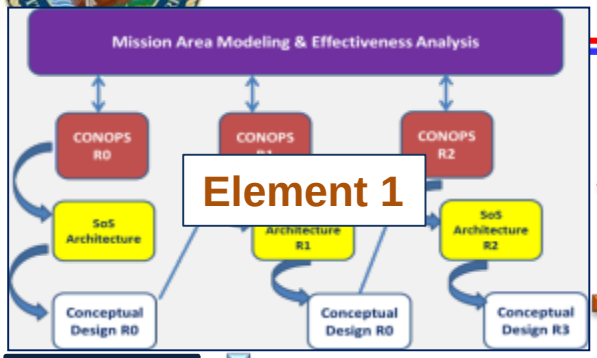
Capabilities-Based T&E

Constructive | **Virtual** | **Live**



LVC-based Training maximizes Fleet proficiency

SET Framework: 4 Elements



Element 1

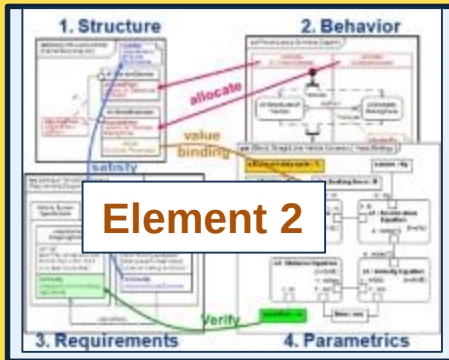
Re-balance as required

Breaking Framework up into 4 Elements

1. **I&I Work – Develop ICTBs which inform CDDs**
2. **Instantiate System Spec in SysML**
3. **Decompose and Allocate rapidly, and instantiate subsystem design in models**
4. **Accelerate design-to-manufacture release thru continuous interaction with Single Source of Truth**

CDD

Single Source of Truth



Element 2

- Mechanical Design Models
- Electrical Design Models
- Software Design Models
- Testing Methods & Models

Element 3

Analysis Tools

Element 4

Design & Manufacture Release

Integration Events

Integrated Test Vehicle #1

MDAO*/SET-BASED DESIGN

** Multi-Disciplinary Analysis & Optimization*

V7.0

SE Transformation Roadmap

1 **Current State Assessment**

3 *Gaps*

2 **Future Vision**

1. Conduct Comprehensive Current State Assessment
2. Clearly Define a Future Vision for SE Transformation
3. Identify Gaps Between Current State and Future Vision
4. Build a Roadmap to the Vision Along these Five Areas: People, Tools, Process, Policy, and Research

4

PEOPLE
Workforce & Culture

TOOLS
Integrated Modeling Environment

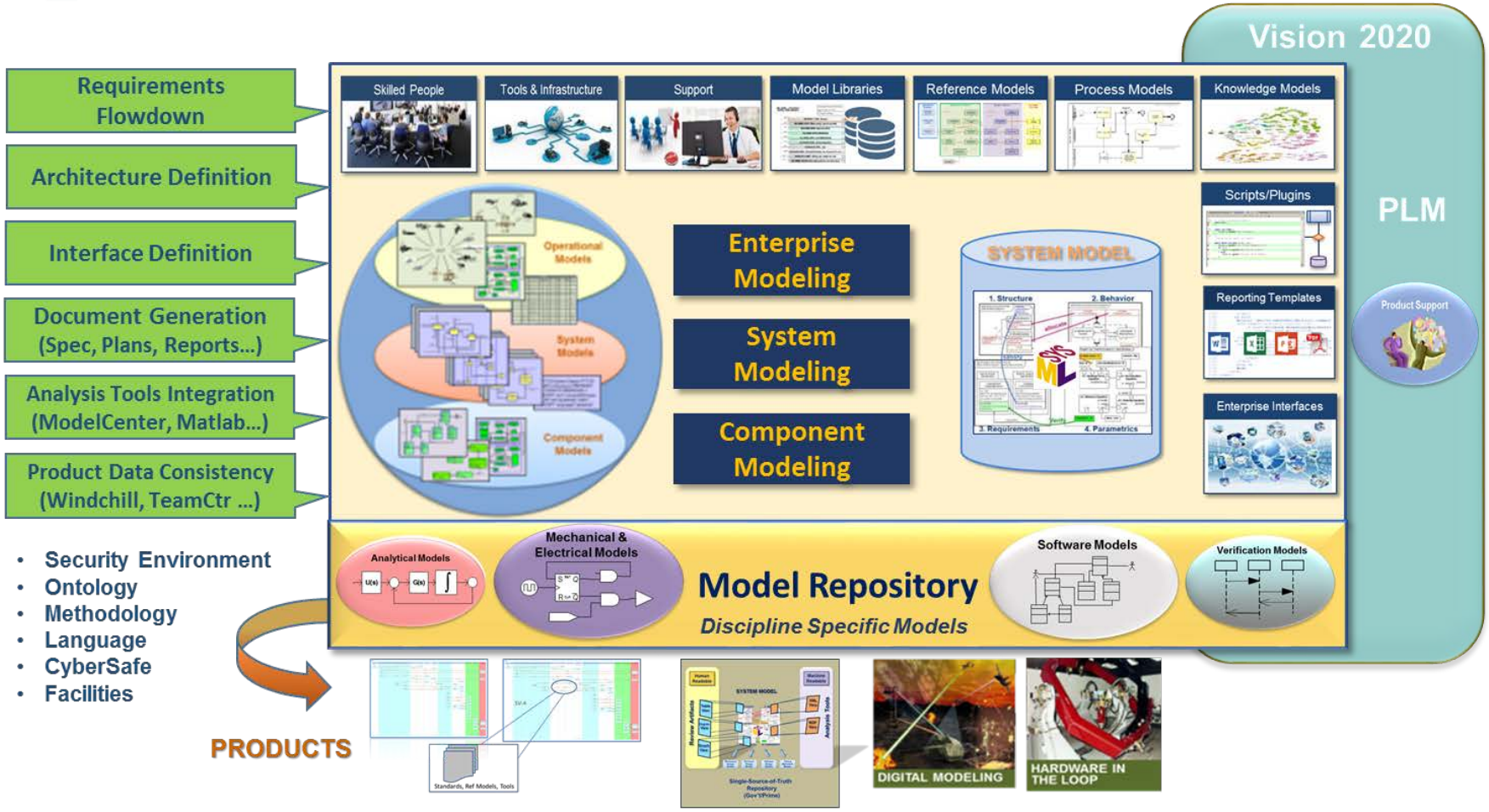
PROCESS
Process & Methods

POLICY
Policy, Contracts & Legal

RESEARCH
Technical Research

V1.0

Integrated Modeling Environment – Vision
(not just tools…)



Naval Integrated Modeling Environment (IME)

"Low Barrier of Entry"

Naval Integrated Modeling Environment (IME)

- Comprehensive, enterprise-wide capability that provides tools, infrastructure, and support for Naval Model-Based Systems Engineering (MBSE) efforts.
- Covers a wide range of areas from shared licenses and server-based repositories to knowledge and data management.
- Available to all Navy and Marine Corps users regardless of network, classification, or location.

The Naval IME is sponsored by the Digital Warfare Office (DWO)/Navy Digital Integration Support Cell (N-DISC) with team members from various warfare centers across multiple SYSCOM's.

Naval IME Current Products & Services

Tools & Environment Support (No Magic)

CAMEO SYSTEMS MODELER

Primary Modeling Tool

- SysML & UML
- UPDM2 / UAF
- BPMN
- Simulations

Accessible from DoD Networks Only

TEAMWORK CLOUD

Central Model Repository

- Role Based Access
- Element Versioning
- Branch & Merge
- Collaborative Modeling

Accessible from DoD & Commercial Networks

CAMEO COLLABORATOR

Web-Based Collaboration

- View Models in Browser
- Comment & Review
- Multiple Templates
- Document Like Views

Accessible from DoD & Commercial Networks

KNOWLEDGE BASE

Articles, Guides, & Information

- Quick Start Guide
- How-To's & Tutorials
- Announcements
- Environment Status

Accessible from DoD & Commercial Networks

SERVICE DESK

Accounts, Support, & Feedback

- Account Requests
- Help Desk
- Feedback & Questions
- Ticket Management

Accessible from DoD & Commercial Networks

Naval IME Usage Metrics

As of 8 Dec 2020

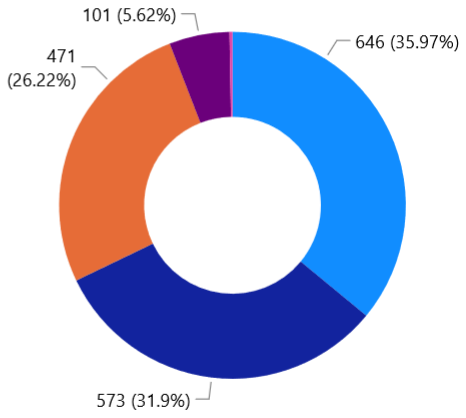
Users	Total Usage	Average Usage	Sessions	Locations
Count	Hours	Hours	Count	Count
1355	672.77K	13.63	143.36K	43

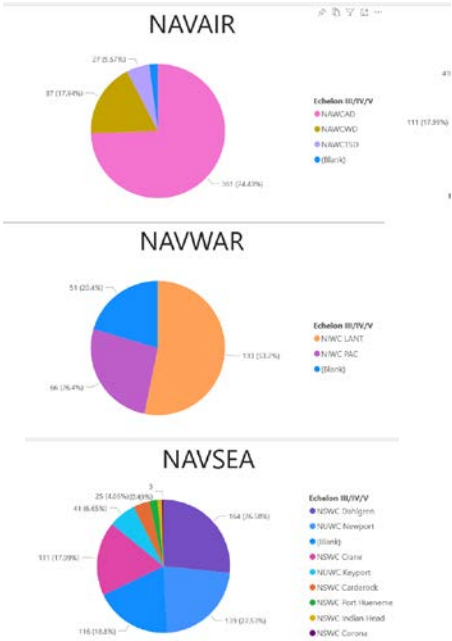
Unclassified

Users	Models
1795	1384

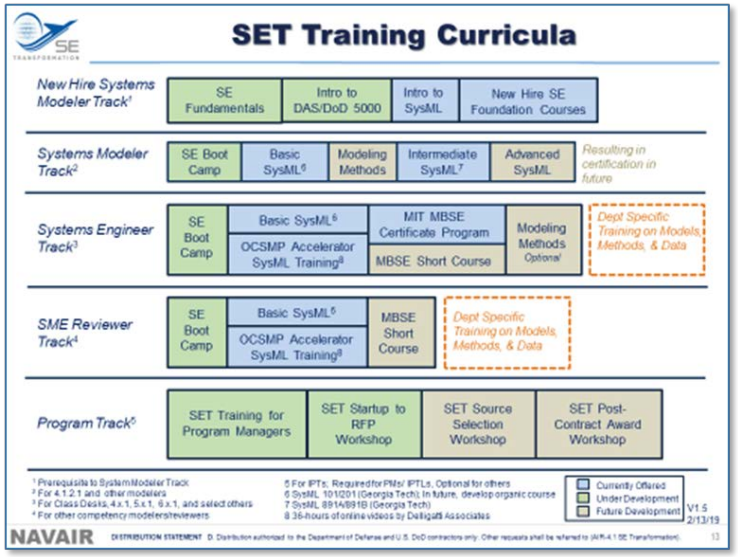
Categories	Collaborator
173	206

Users by Ech 2





Navy Training Metrics
Total Trained 6,000+ (Dec 2020)



COURSE Samples
1. Basic SysML course
2. Basic SysML BLS Course
3. SysML Lite
4. MIT MBSE Certificate Program Cohort
5. MIT MBSE Short Course
6. SE Bootcamp Beta
7. SET for PMs and IPTLs
8. OCSMP (Delligatti online)
9. OCSMP (Delligatti guided cohort)
10. Intermediate SysML 891A/B
11. Intro to SysML on NAVAIR U

Training Totals

User Training Sessions	4TH Q 19	1ST Q 20	2ND Q 20	3RD Q 20	4TH Q 20
NAVSEA	715	811	923	1074	1207
NAVAIR	1052	1160	1647	1929	2711
NAVWAR	660	660	735	1650	2224
OTHER					
	2427	**2631**	**3305**	**4653**	**6142**

Digital Engineering Training and Certification Interest

Consider Joint NDIA/DAU/Navy Systems Engineering education and training project

1. **SE Foundational Workforce Training Certifications / Credentialing**

   Current Workforce Development

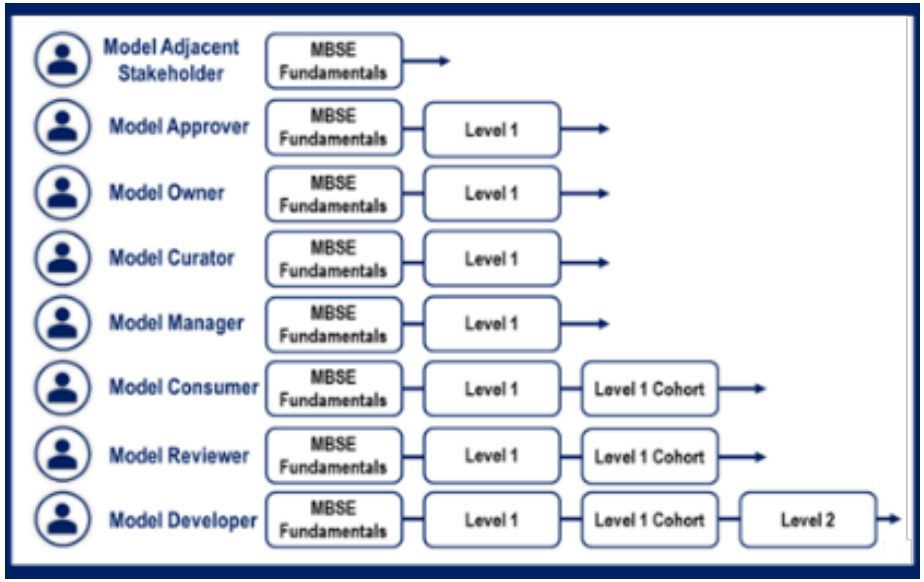
2. **SE Undergraduate Education Curriculum Development**

   New Workforce Development and Hiring of Personnel Using a Credentialed BS Curriculum

3. **SE Focus Area Collaboration aligning Education & Training pipeline pathway**

   Aligning with OSD, DAU, NPS endeavors

CERTIFICATIONS



CREDENTIALED CURRICULUM

SE Fundamentals	Working in Teams
Systems Thinking and Approaches	Agile, Cloud Services
Systems Modeling	Modeling in T&E, LVC
SE Methods, Deployment, Use	Unmanned Systems
Systems of Systems	Reliability, Maintainability in Model
Software Eng	SE Standards
SE and Project Mgt / Industrial Engineering	Life Cycle Models


Q&A