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Navy Modeling & Simulation Overview for Modeling & Simulation Committee, NDIA M&S System Engineering Division

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Outline



- **Modeling and Simulation (M&S)
Responsibilities Overview**
- **M&S Enterprise Organization**
- **M&S Problem Statement**
- **Accomplishments**
- **RDT&E Initiatives**
- **Future Focus**



Navy Modeling and Simulation Vision



SECNAVINST 5200.38A

*“Models and simulations will **provide a pervasive set of tools** for operational units and also to support **analysis, training, and acquisition** throughout the ***DON***. To attain this vision, the following objectives will be vigorously pursued:*

- a. Modeling and simulation and associated information technology **will be applied consistently across each of the four pillars of naval M&S**. These pillars are: operations and experimentation; training; acquisition; and analysis and assessment.*
- b. Modeling and simulation technology shall be readily available to the naval warfighter”*



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Modeling and Simulation (M&S) Responsibilities Overview



➤ **DON M&S Executive**

- Senior advisor to DASN(RDT&E) for M&S policies, practices, and processes
- Ensures M&S Enterprise capabilities support is current and aligned to future naval needs
- Established and holds Technical cognizance for Enterprise solutions
- Holds the Naval M&S Strategy Summits
- Established and leads DON learning for M&S workforce initiative
- Focuses on using M&S as a key enabler for improving how DON does business
- Works across communities to produce Enterprise Solutions.
- Aligning M&S across communities
 - Analysis
 - RDA
 - Training
 - USMC



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Modeling and Simulation (M&S) Responsibilities Overview



➤ **Navy Modeling and Simulation Office**

- Serves as single point of contact for USN M&S
- Coordinates with other Services, DoD, Joint Staff, and other Agencies' M&S organizations to ensure standardized approaches to development and use of credible models, simulations, and data
- Represents Navy in M&S-related working groups
- Resources cross-cutting M&S Community projects
- Champions new methods such as conducting VV&A training for the Warfare Centers

➤ **Marine Corps M&S Management Office**

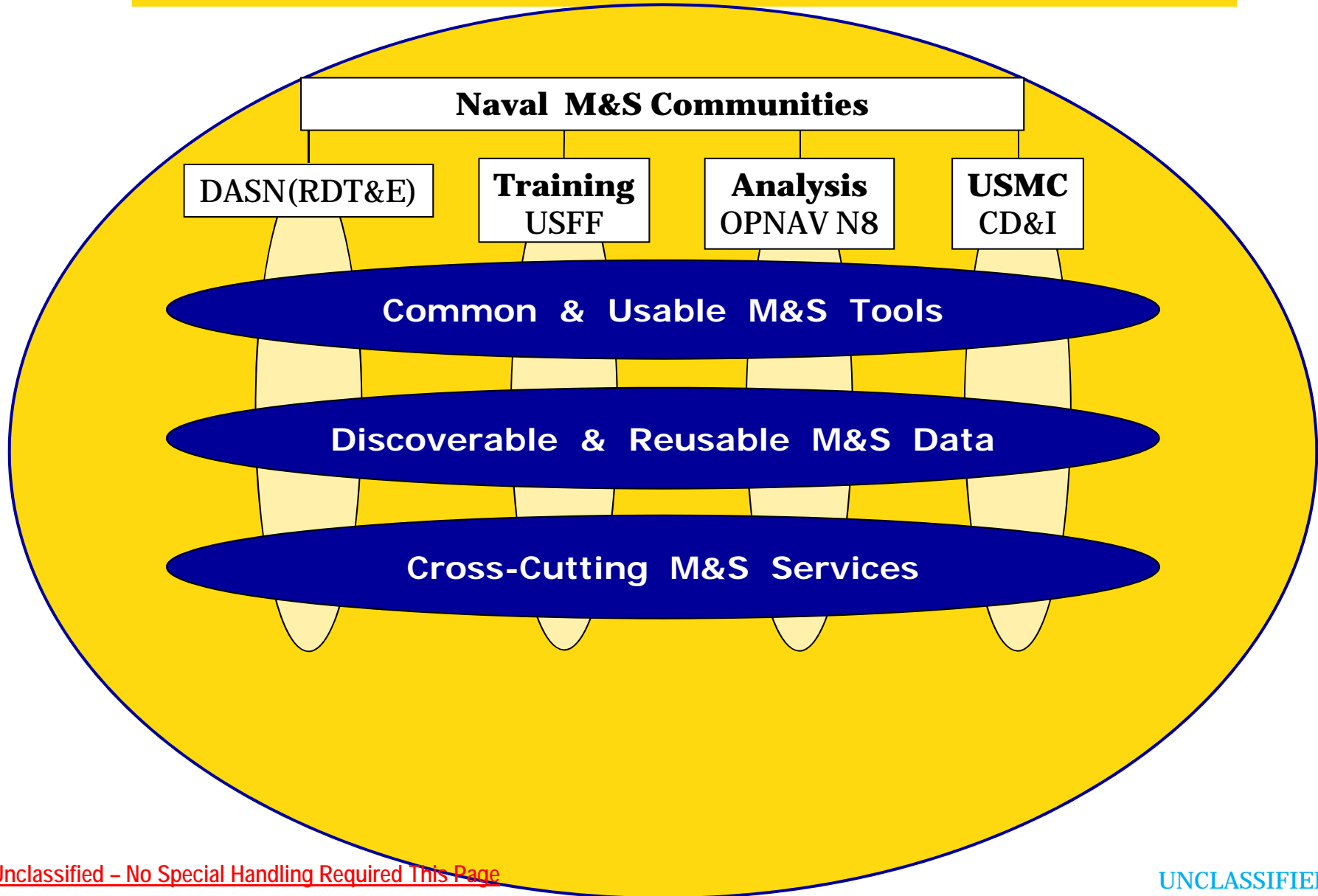
- Serves as single point of contact for USMC M&S
- Coordinates with other Services, DoD, Joint Staff, and other Agencies' M&S organizations
- Leads USMC M&S Integrated Process Team
- Coordinates with USMC activities utilizing M&S



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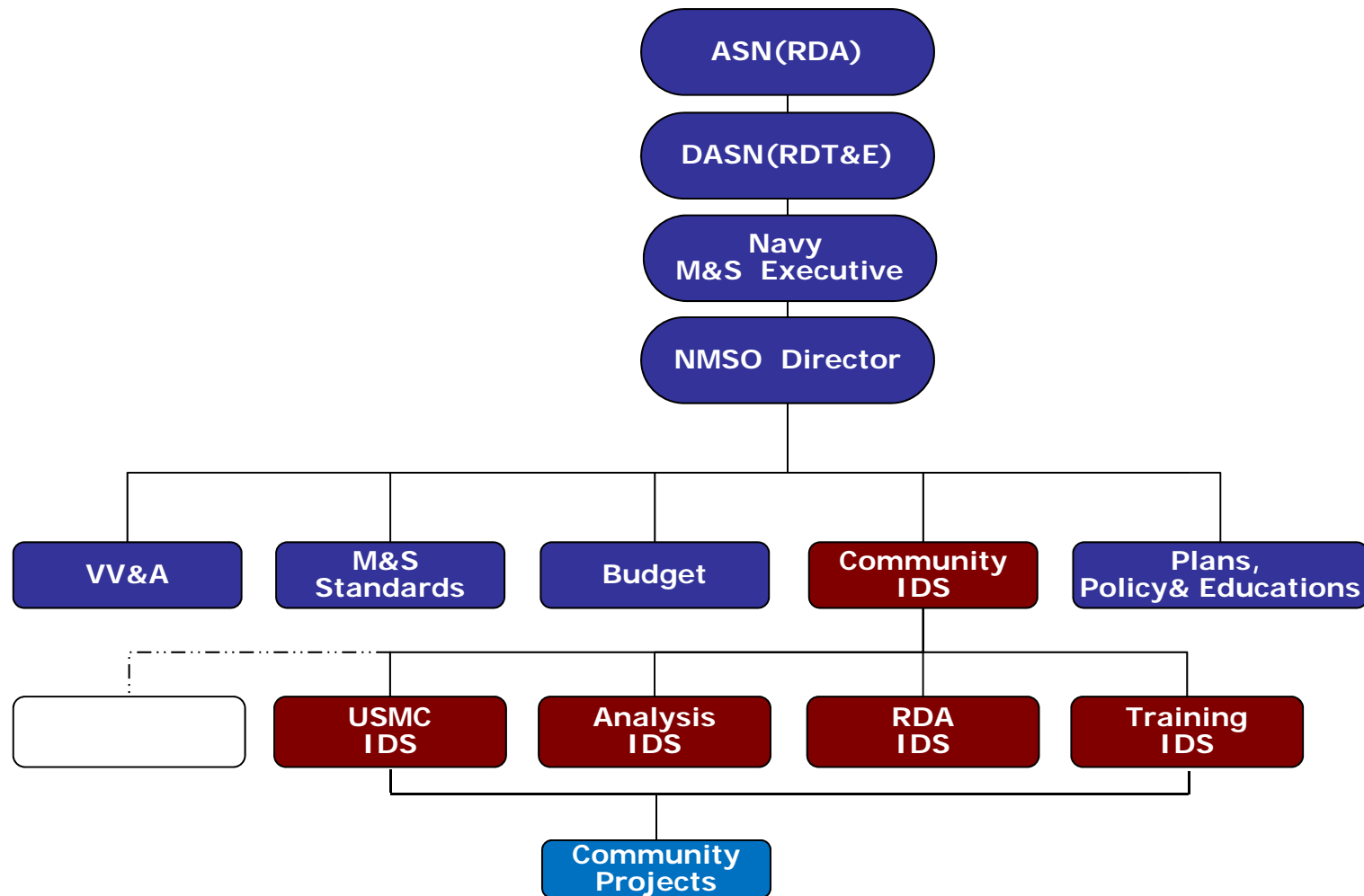
Naval M&S Collaboration Domain





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Navy M&S Organization



IDS: Integrated Direct Support

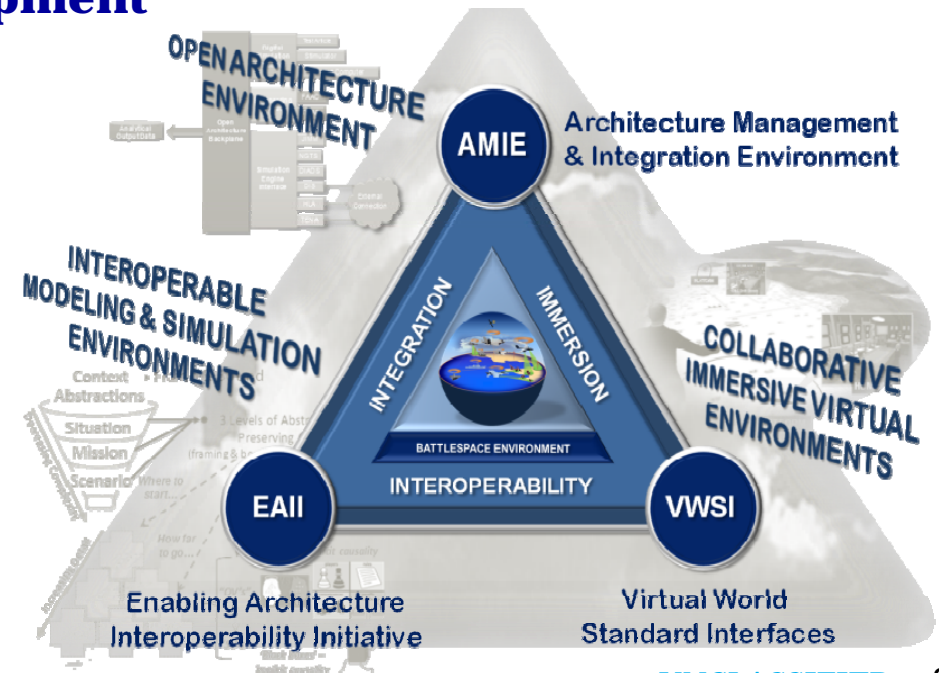


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M&S Problem Statement



- **Technology development is increasing faster than we can keep up**
- **Increasing weapons system complexity and changing threat environment require M&S and LVC solutions to rapidly evolve in times of budget constraint**
 - Program unique simulation/lab solutions lead to point-source proprietary approaches
 - Reduced commonality, efficiency, and savings potential
 - Lack of consistent VV&A
 - Redundant development of threats and battlespace environment
- **Often no set requirements for simulation and lab infrastructure – “take what we can get from development”**
 - Not reusable for T&E or operations
 - Neither contracted for nor delivered
 - Models neither built to standards nor compatible





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Accomplishments

- **Standardize M&S Enterprise capabilities across DON**
 - Architecture Management Integration Environment (AMIE)
 - Net-Centric Evaluation Capability Module (NECM)
 - Virtual World Standard Interfaces (VWSI)
- **Other Projects completed**
 - Enhanced Fleet Synthetic Training events in response to CCDR demand by delivering Full Motion Video from ISR platform capability
 - Tactical Operational Software Engineering Environment (TOSEE) delivered, significantly decreases testing and integration timelines and costs of simulations running on general purpose computers
- **Draft POA&M and over 200 people working at least part time on SENAV's Innovative Initiative on Virtual and Simulated Environments**
- **Draft DoDI 5000.61 (DoD policy for VV&A) submitted to the Defense M&S Coordination Office**



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Ongoing RDT&E Initiatives



- **Development of educational curricula to change behavior model to improve and standardize M&S**
 - **M&S Workforce education is key**
- **Standardized M&S Policy and Implementation**
- **Common Digital Framework and Open Interfaces**
- **Contract language to ensure Industry deliverables/platform representations plug into open Government framework battlespace environment**
- **Assisting the Communities in creating “Best Practices” for M&S use**
- **Promoting reuse and funding Enterprise solutions**



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Future Focus



- **Rebuild budget; initiate Enterprise Services Environment for all M&S across communities, services, academia, industries, and ally users**
 - Sharing SME expertise across M&S Communities
 - Work with M&S Communities to implement best practices and Enterprise Solutions
- **Improve workforce knowledge of M&S through learning (education and training)**
- **Educate the M&S workforce on standards, efficient and effective VV&A**
- **Robust integration plan for any persistently, connectable-digital environment at appropriate security levels.**



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BACKUPS



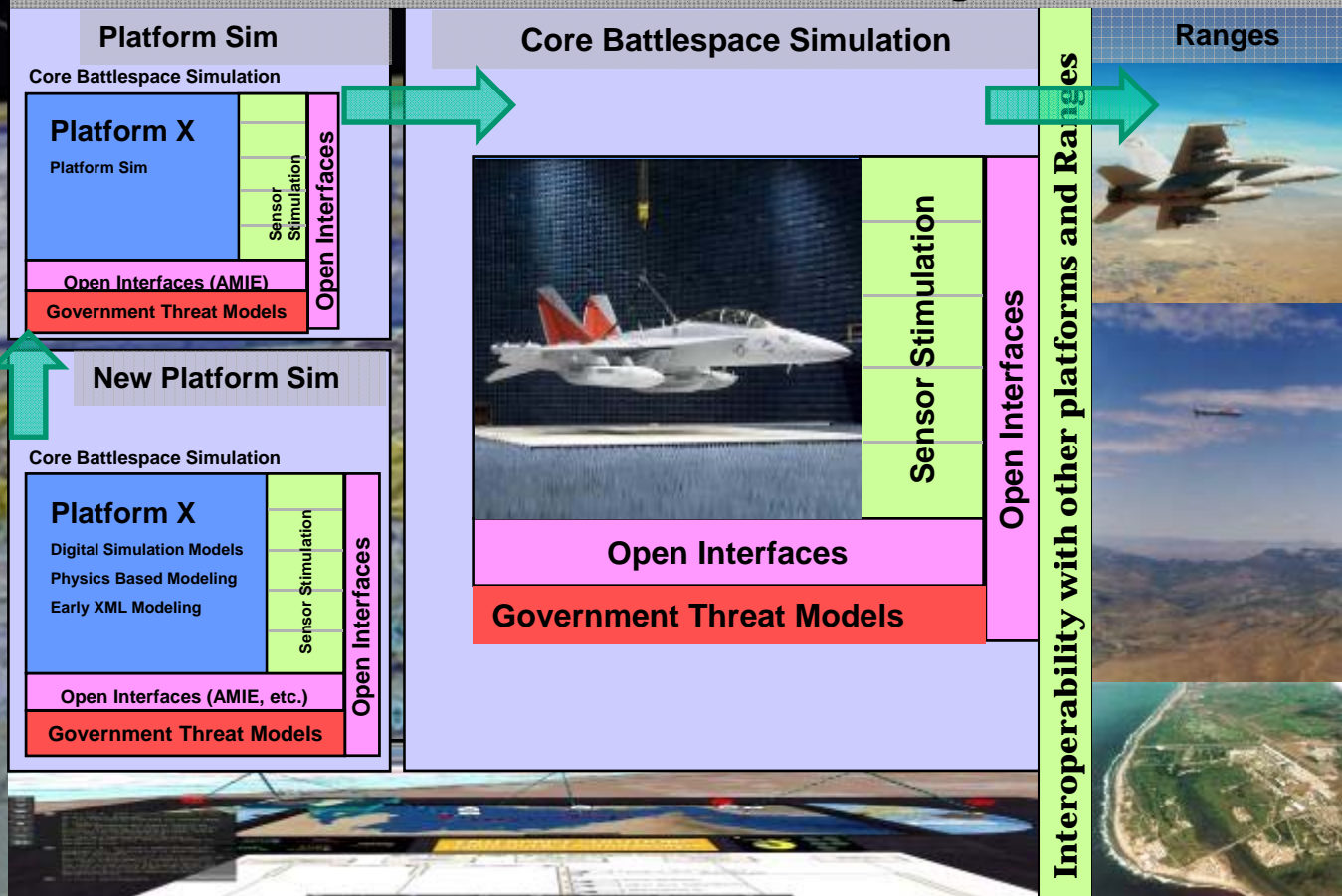


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Common Development Environment



Live – Virtual – Constructive Digital Simulation Continuum



- Integrated Collaborative Environment
 - Government Managed
 - Modular
 - Open ICDs
- Government Threat Models
 - Validated
 - Open ICDs
- Platform Mission SW
 - Vendor Managed
 - Open ICDs
 - Sensor Model Integration
- Allows continuum of digital system models, mission SW, and actual air vehicle for Installed Systems Testing

Virtual World Visualizations, FACT Cost T&E Trades, NECM Enterprise Planning

Government and Industry partners use open interfaces and architectures in an integrated collaborative environment. Modularity provides common approach for modeling and simulation use throughout a program's lifecycle.



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Partnership Opportunities with Industry

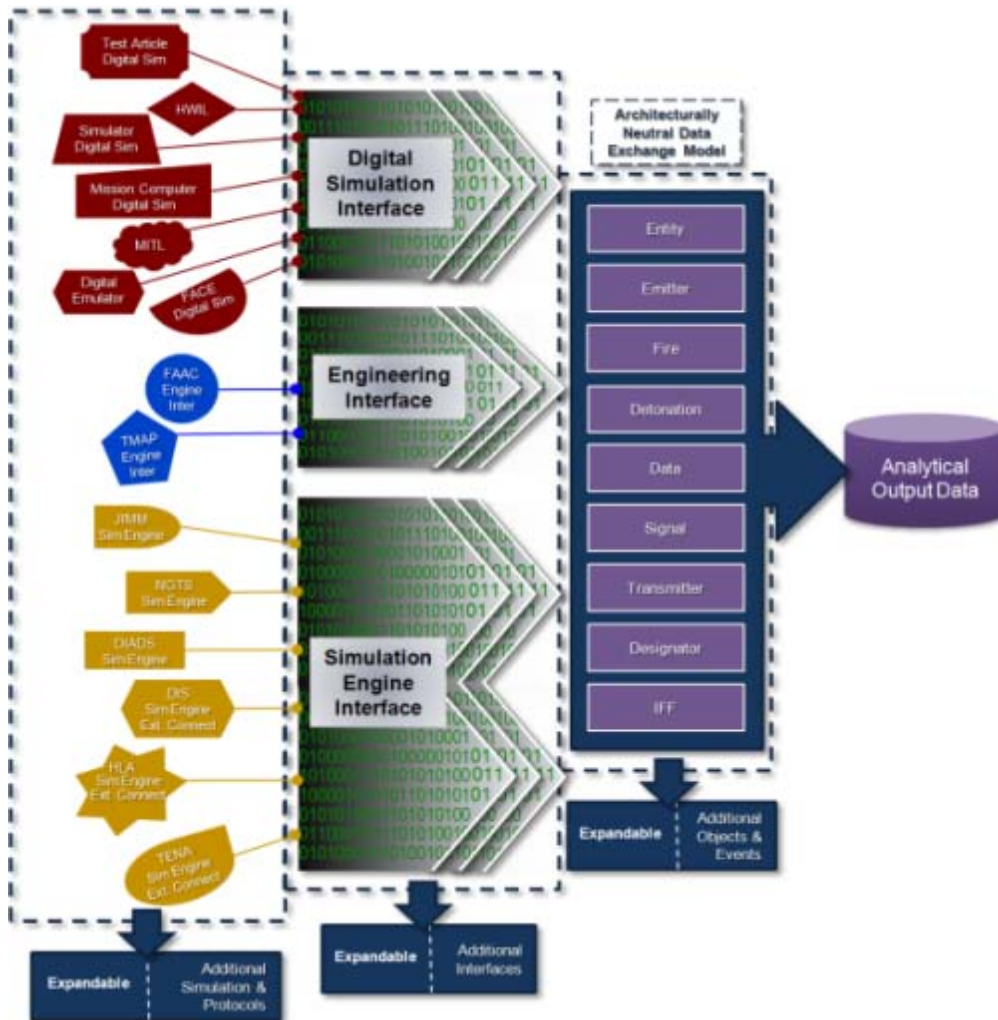


- **Collaborate with Industry on contract language to ensure expectations are clear on deliverables, available government M&S and expected government purpose use**
- **Standardized open architectures and interfaces**
- **Model Based Systems Engineering**
- **Capabilities Based T&E – Operational Mission Environment as early as possible (shift left)**
- **Focus on Integrated Warfighting Capabilities vice Platform development**
- **Test and training simulator design reuse**
- **Open architecture LVC efforts**



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Architecture Management Integration Environment (AMIE)



- Government-owned
- Non-proprietary open architecture
- Integration of cross vendor products
- Efficiencies across the acquisition life-cycle
- Industry labs and components easily integrated in Government-owned facilities
- “Creation of Battlespace”



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Virtual Worlds



- **Allows virtual environments to rapidly integrate M&S, thereby allowing collaborative interactions across a broader community at a greater fidelity**
- **Supports multiple domains including applications in immersive training and accelerated acquisition engineering**
- **Enables improved interoperability between warfighter and engineers for: immersive learning simulations; scenario-based training; rapid development of requirements; DOTMLPF solutions; and design alternatives**



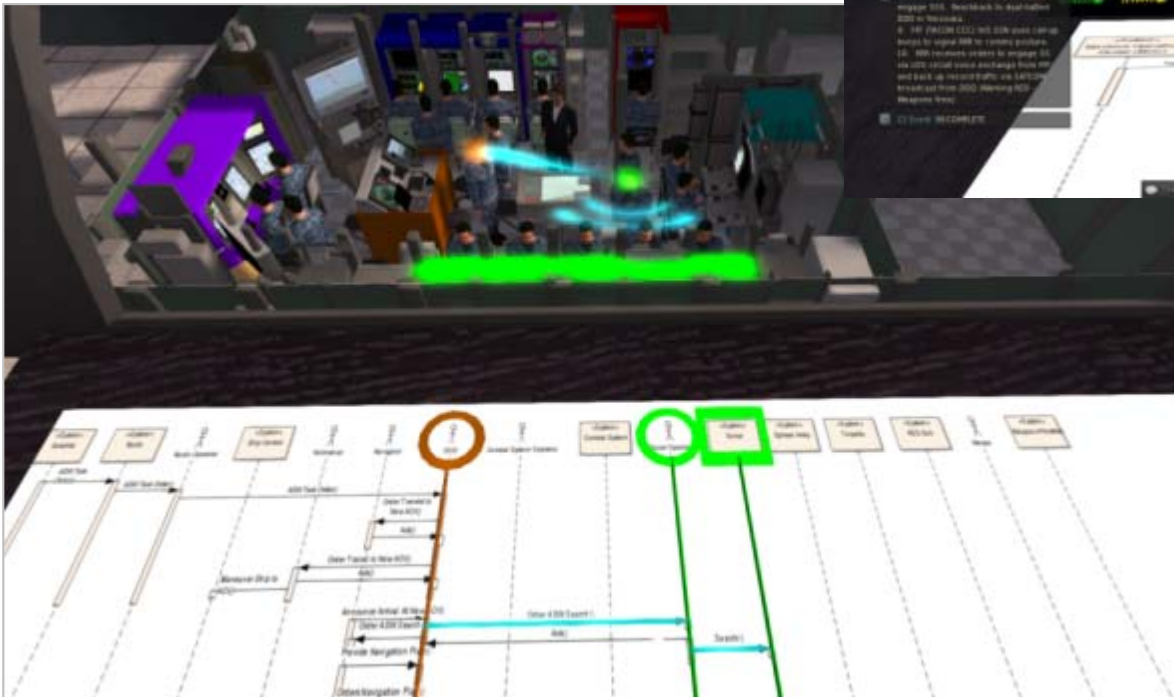
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Virtual World Visualization Tools



Supporting:

- Architecture and warfighter interactions
- DOTMLPF analysis of alternatives
- Engineering and testing
- Immersive learning simulations
- Scenario-based training





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M&S Support Plan (MSSP)



- Describes how a program intends to use M&S to generate critical insights, support needed analysis, extend experimentation and T&E results, and ultimately - support key acquisition decisions
- Characterizes, in a holistic manner, how M&S will be efficiently and effectively employed by a program across the acquisition lifecycle and how, key enabling constructs, will be applied
- Provides value to the program, the enterprise, and addresses DoD and DON policy guidance
- A template has been developed that provides a logical and thorough structure in-which to place essential content
- This initiative has been briefed to OSD and is being adopted by Navy

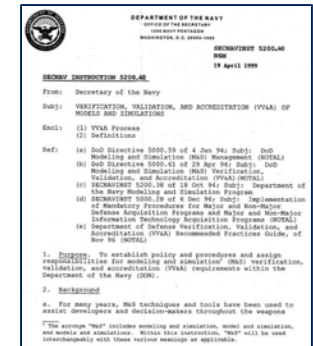


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DON M&S VV&A Policy



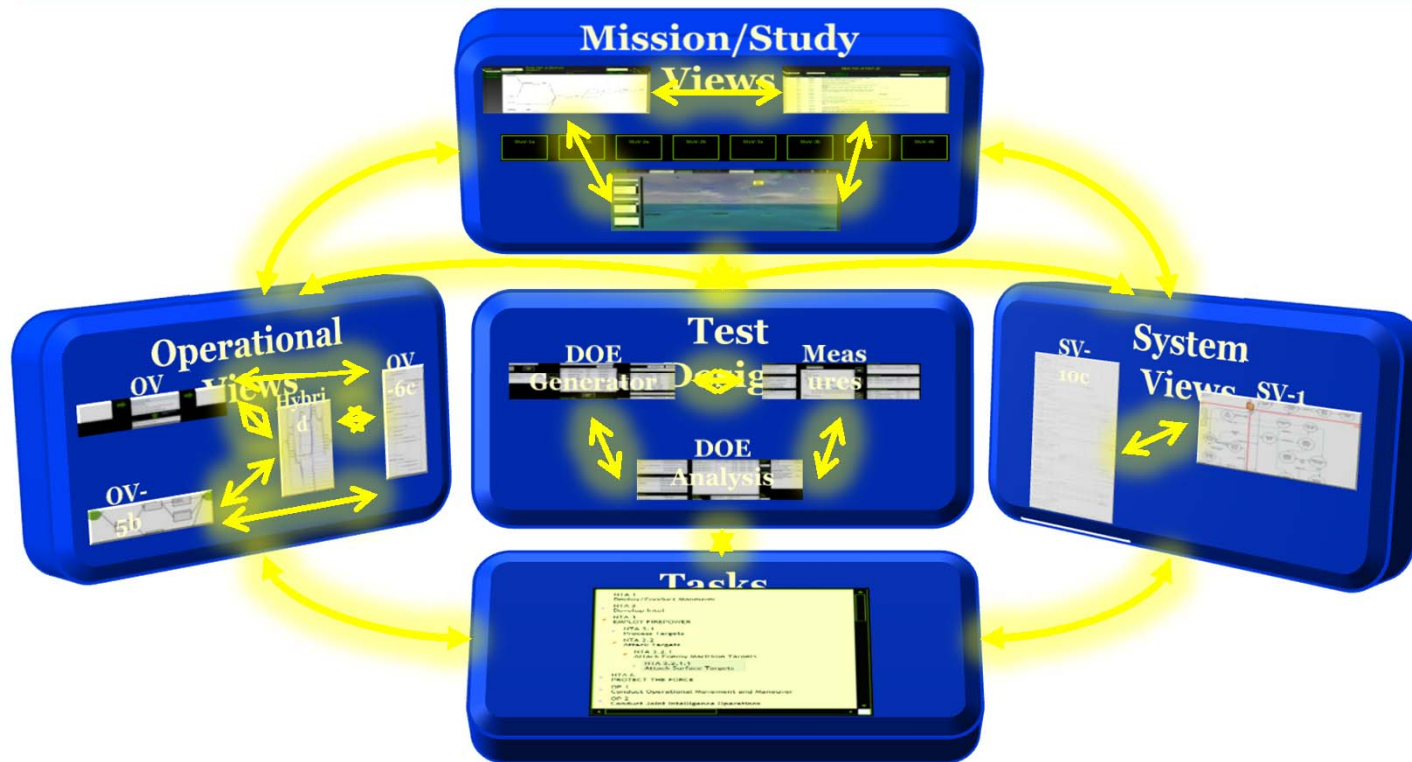
- DON is significantly revising SECNAVINST 5200.40
- Including M&S and associated data
- Updating and streamlining policy
- **VV&A shall be:**
 - Implemented commensurate with the importance, risk, and the impacts of using M&S and its associated data...
 - Flexible and adapted to meet specific requirements and objectives...
 - Incorporated into the M&S life-cycle management process...
 - Documented in accordance with appropriate standards...
- Including new areas of concern; e.g., M&S of Cyber Operations
- Updating responsibilities for organizations with VV&A roles
- Includes two new Enclosures
 - Implementation Procedures, Documentation Procedures





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Net-centric Capability Evaluation Module (NECM)



- Enables users to systematically document context, assumptions, content and constraints of authoritative warfare events and warfare environment.
- Real-Time analysis tools for tracing mission thread data and mission effectiveness measures within the T&E enterprise.
- Provides test design automation and Design of Experiment (DOE) analysis.

Provides Unique Traceability between Mission Views, Tasks, and Test Designs



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6202 M&S Officer Subspecialty



- Service Departments are required to:
 - “Assess their respective graduate education program posture to ensure a cadre of highly qualified officers is developed and maintained in fields that fulfill present needs, anticipated requirements, or future capabilities.”*
- NMSO initiated an assessment of 6202 Subspecialty Billet qualifications, population, and work force management. It:
 - Identified Navy active duty M&S officers and DON’s requirements
 - Established current 6202P subspecialty billets and qualified officers
 - Analyzed emerging DON M&S policy for possible M&S officer billets
- Results include:
 - 20 billets are currently identified as M&S subspecialty related
 - 16 billets perform M&S duties but not identified as M&S subspecialty related
 - 35 billets have been classified as having an M&S subspecialty requirement
- NMSO is pursuing the establishment and staffing of 6202s



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SECNAV VE Initiative – Policy



- *Virtual and simulated environments offer an unprecedented opportunity for the DON to transform how it connects people, ideas, and information. R. Mabus*
- Task: Analyze and Determine DON Policy, and What Changes Need to be Implemented
- Researched Current VE, LVC, and M&S Policies
- Analyzing for Coverage, Gaps, etc.

Organization	VE	LVC	M&S
DoD	1	2	39
Joint	0	2	14
Navy	2	5	61
Marine Corps	1	2	6
Air Force	2	10	81
Army	4	3	22



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Training Integrated Direct Support (IDS)



**M&S support to M&S Community Leaders as defined by
Navy M&S Governance Board; specifically**

- **Promote M&S initiatives within the Training M&S Community**
- **Community representation for the Community Lead / POC at DoD Community activities**
- **Coordinate with other IDS to help identify and prioritize between and across Community M&S capability needs and requirements**
- **Recommend implementations for M&S policies and standards in their Community**



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Training IDS

Requirements / Alignment

- **Community leads require subject matter expert support to ensure they provide current, relevant, accurate support to the M&S Governance Board and to NMSO.**
- **NMSO requires staff embedded in the Communities to ensure that the wider Navy is aware of the NMSO's products and services, initiatives, processes, and standards.**
- **IDSs enable real time discussion and input between NMSO and the rest of the Navy M&S enterprise.**
- **Provide leadership and strategy support for Training M&S initiatives, including Live, Virtual, Constructive integration**
- **Assist Community in identifying, planning, developing, and implementing new and innovative M&S technologies and approaches**



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Training IDS

<u>Source of Tasking</u>	<u>Functional Responsibilities</u>
<p>Explicit, Implied or Derived Leadership Direction: DoDD 5000.59; SECNAVINST 5200.38A; NMSO Charter</p> <p>Problem to Solve: Assist the Navy Training Community in establishing and managing an M&S capability to deliver ready forces on time and within costs. Ensure that Navy Training Community initiatives are in line with Joint, DoD, and DoN M&S policies and initiatives. Ensure their equities are represented in the same.</p> <p>Primary Customers: US Fleet Forces Command (Navy Training Community Lead)</p> <p>Secondary Customers: All Fleet Training organizations world wide; Navy Warfare Development Command.</p>	<p>What are the weekly, monthly, quarterly duties assigned to this billet?</p> <ol style="list-style-type: none">1. Provide daily interaction and support to the Navy Training Community Lead (USFF)2. Review / assist in the development of modeling and simulation plans, policy, and engineering solutions for USFF to ensure adequacy, compliance and efficacy of the plans, policies and solutions.3. Serve as a subject matter expert for USFF in various meeting with outside organizations (JFCOM, other COCOMS, etc.) regarding modeling and simulation plans, policy and engineering solutions.4. Assist in the planning and execution of quarterly Fleet Training Integration Panel (FTIP) meetings. The FTIP is comprised of 15 two- and three-star flag officers focused on solving issues in the navy training enterprise. The FTIP has direct visibility by ADM Davidson and ADM Swift.
<u>Deliverables / Influence</u>	<u>Critical Impacts</u>
<ol style="list-style-type: none">1. Specific Deliverables or Programs<ol style="list-style-type: none">i. Influence: Navy Continuous Training Environment (NCTE)ii. Influence: Fleet Synthetic Training (FST) Programiii. Influence: Joint National Training Capability (JNTC)2. Expected Outcomes<ol style="list-style-type: none">i. Reduced cost / increased capability to train the Naval force in an integrated, Joint operations environment.ii. Increased ability to train in port / in garrison, reducing unnecessary time away from home station.	<p>Alignment to DON Leadership Objectives: “get everybody (R&D community) into the act with a meaningful exercise / experimentation program,” ADM Harvey, CFFC, 9Sep10</p>