



STRATDEC 2025

TRANSFORMING VISION
INTO PRACTICE

Strategic and Tactical Digital Engineering Conference

Feb. 4-6



Please see the last pages of the program for more information about each presentation.

8:00	Check-in & Breakfast	
9:00	Welcome	
9:15	Break	
9:25	TRACK 1	TRACK 2
	DIGITAL TWIN AUDITORIUM	DIGITAL COLLABORATION ATRIUM
	A Chip Slapper Digital Twin <i>James Thompson, Lawrence Livermore National Laboratory</i>	Methodology to Support Federated Development of a System of Systems Architecture Model <i>Matt Knitt, Johns Hopkins APL</i>
10:05	Synchronizing System Architecture Models and Cyber Physical Twins <i>Steven Huang, Ashley Burch ManTech</i>	A Metamodel Framework for Managing Complex Programs <i>Keith Works, General Dynamics Mission Systems</i>
10:40	Break	
10:50	Simplifying Digital Threads with DeepLynx, DataFusion and Airflow <i>Jaren Brownlee, Michael Harding Idaho National Laboratory</i>	Data Integration Platform Trade Study <i>Patrick Morrison, Johns Hopkins APL</i>
11:30	Lunch	
12:30	Day 1 Keynote <i>Mr. James Ruocco, SES, PTDO Assistant Secretary of Defense for Acquisition, Office of the Secretary of Defense</i>	
13:20	Break	
13:30	TRACK 3	TRACK 4
	APPLIED MBSE AUDITORIUM	DATA ENGINEERING ATRIUM
	Mission Engineering Architecture Modeling for Electronic Protection Roadmaps <i>Tom Kreitzberg, Johns Hopkins APL</i>	Collaborative Digital Engineering Case Study for a Weapons System Communications Network <i>Hayden Campos, Doug Murphy, Lauren Lowe Wingbrace</i>
14:10	Review of the INCOSE Decision Analysis Data Model (DADM) <i>Devon Clark, INCOSE</i>	Synthetic Data for Performance Evaluation <i>Madhav Patel, Harris Bernstein Johns Hopkins APL</i>
14:45	Break	
14:55	ACEBox: Digital Engineering in Space Mission Concept Development <i>Deb Chattopadhyay, Max Harrow Johns Hopkins APL</i>	Datum: A Scientific Metadata Catalog for a Classified World <i>John Darrington, Idaho National Laboratory</i>
15:35	Test-Driven Approach for Cyber Integration in MBSE <i>Tara Sarathi, Brennen Tucker MIT Lincoln Laboratory</i>	Towards an Ontology of Digital Engineering Terminology to Support Digital Information Exchange <i>Joe Gregory University of Arizona, INCOSE</i>
16:10	Wrap-Up	
16:20	End of Day	

8:00	Check-in & Breakfast	
8:45	Welcome	
9:00	Day 2 Keynote <i>Ms. Linda Palmer, Deputy and Technical Director, Transformation Task Force, Missile Defense Agency</i>	
9:50	Break	
10:00	TRACK 5	TRACK 6
	DIGITAL ACQUISITION AUDITORIUM	MBSE & SIMULATION ATRIUM
	Making Digital Materiel Management Real: Moving from Concept to Achieving Results <i>Will Jinkins, Kyle Hurst Air Force Digital Transformation Office (DTO)</i>	From Models to Requirements: Latency Analysis with ExecSpec <i>Matthew Klatt Johns Hopkins APL</i>
10:40	Modeling CDRLs for Digital Acquisition <i>Derek Bierly, Johns Hopkins APL Natalie Scherington-Battle, U.S. Air Force-SAOC</i>	SWAC MBSE Approach for NAVWAR Force Design <i>Maria Stropky Johns Hopkins APL</i>
11:15	Break	
11:25	Born-Digital Acquisition, Enabling the DoD to Fully Realize the Potential of Digital Transformation <i>Angela Miele, Tony Geisz U.S. Navy</i>	Influencing Modular Design of an Existing Modeling and Simulation Product Using a Combination of SysML and UML in a MBSE Approach <i>Valerie Esposito, Kristina Sebacher, Steven Wysocki Johns Hopkins APL</i>
12:05	Using MBSE and Digital Engineering to Inform Acquisition for Space Battle Management Kill Chains (BMKC) <i>Grace Colonell, Nadia Hussain Johns Hopkins APL</i>	Modeling Standards for OTTI DE Development <i>Hannah Holbert Johns Hopkins APL</i>
12:40	Lunch	
13:40	Panel <i>Moderator: Conrad Grant, APL Deputy COS Will Jinkins, Lead AI Engineer, Air Force Digital Transformation Office Angela Miele, NAVAIR Digital Acquisition Lead Todd Loy, Department of the Navy Chief Engineer, Deputy, DASN RDT&E Paul Lowe, DOT&E Deputy Director (Acting), Operational Test and Evaluation for Strategic Initiatives, Policy and Emerging Technologies RADM Chad Jacoby, Assistant Commandant for Acquisition & CAO, USCG-CG-9</i>	
14:40	Break	
14:45	Science Fair <i>Presentations are listed on the back of this booklet</i>	
15:45	Science Fair/Happy Hour featuring the APL Jazz Band	
16:50	Wrap-Up	
17:00	End of Day	

8:00	Check-in & Breakfast	
9:00	Welcome	
9:15	Day 3 Keynote <i>Ms. Jennifer Swanson, SES, Deputy Assistant Secretary of the Army for Data, Engineering & Software, U.S. Army</i>	
10:00	Break	
10:10	TRACK 7 AI & AUTOMATION AUDITORIUM Innovating Digitally: iNDi <i>Blake Schreurs, Ian Hughes, Michael Gailey Johns Hopkins APL</i>	TRACK 8 CULTURAL ADOPTION ATRIUM MIT Lincoln Laboratory’s Digital Engineering Transformation: Case Studies in Adoption <i>Dr. Stephanie Sposato, Kimberly Brady MIT Lincoln Laboratory</i>
10:45	Break	
10:55	Rocket Design Workflow Automation with SysML <i>Kelly Popolizio, Amentum</i>	Delivering the EVERYTHING Requirement <i>Emily Christopulos Systems Planning and Analysis, Inc.</i>
11:35	Prototyping an AI-Assistant for Complex Repairs—Merging Digital Engineering, Artificial Intelligence and Augmented Reality <i>Dr. Francisco Aldarondo, Dr. Aakash Bajpai, Dr. Brendan McNelly Johns Hopkins APL</i>	Level Up Your Digital Engineering Storytelling <i>Mimi Davidson OUSD(R&E), DEM&S</i>
12:10	Wrap-Up	
12:30	End of Day Goodbye Lunch	

TRACK 1 – DIGITAL TWIN

A Chip Slapper Digital Twin

James Thompson, thompson151@llnl.gov

This talk focuses on Lawrence Livermore National Laboratory’s state-of-the-art chip slapper performance digital twin, which uses the multiphysics code ALE3D to predict performance of as-built products. The presentation will highlight gaps in the current digital twin and outline a path to achieve a fully representative “true digital twin” throughout the product lifecycle.

Synchronizing System Architecture Models and Cyber Physical Twins

Steven Huang, steven.huang@mantech.com
Ashley Burch, ashley.burch@mantech.com

The value of cyber-physical twin environments would improve significantly if there were an automated way to keep them synchronized with architectural models. While demonstrating a scripted approach for synchronization, our presentation will also highlight the benefits of utilizing standards and metadata stereotypes, the reusability of SDIs for additional use cases and ideas on how to compare models/SDIs at scale.

Simplifying Digital Threads with DeepLynx, DataFusion and Airflow

Jaren Brownlee, jaren.brownlee@inl.gov
Michael Harding, michael.harding@inl.gov

This presentation will showcase the new Timeseries data querying capability available in DeepLynx, discussing the journey that it took to get here, including previous approaches, their shortcomings and how this new capability overcomes those issues. By leveraging Apache DataFusion for in-place file querying and Apache Airflow for data orchestration, we hope to take a significant step forward in the world of DeepLynx digital twins.

TRACK 2 – DIGITAL COLLABORATION

Methodology to Support Federated Development of a System of Systems Architecture Model

Matt Knitt, matt.knitt@jhuapl.edu

Architecture development for a system of systems in the national security space domain is challenging due to the need to federate the architecture across capabilities and organizations where model interoperability is challenged by tool availability, security levels and processes. This presentation will describe a modeling pattern and highlight key aspects of processes to enable federated development of a system of systems architecture for national security space systems.

A Metamodel Framework for Managing Complex Programs

Keith Works, keith.works@gd-ms.com

In this presentation, we explore the development and implementation of a metamodel framework designed to facilitate model federation within an increasingly complex

programmatic environment. This framework ensures seamless integration and collaboration among various teams and stakeholders, addressing the unique challenges posed by the concurrent development of existing and new baselines, as well as the need for continuous integration across multiple independent environments.

TRACK 3 – APPLIED MBSE

Mission Engineering Architecture Modeling for Electronic Protection Roadmaps

Tom Kreitzberg, tom.kreitzberg@jhuapl.edu

This presentation provides an overview of the process to develop an enterprise architecture model, written in Unified Architecture Framework (UAF) Modeling Language, capturing missile defense mission threads. A Causal Parametric Diagram models the dependencies between the mission-specific Measures of Effectiveness and Success and the sets of Electronic Protection capabilities considered for fielding, with offline constructive simulation producing the Measures of Performance.

Review of the INCOSE Decision Analysis Data Model (DADM)

Devon Clark, devclark@deloitte.com

In today’s fast-paced data-driven landscape, the capability to make swift, consistent and accurate multi-factored decisions is not just advantageous—it’s imperative. This talk will guide the audience participants through the Decision Analysis Data Model (DADM), a model-based data model for conducting multi-factored decision analyses. Participants will gain an understanding of the DADM and the impact it will have on the future of decision-making.

ACEBox: Digital Engineering in Space Mission Concept Development

Deb Chattopadhyay, debarati.chattopadhyay@jhuapl.edu
Max Harrow, max.harrow@jhuapl.edu
Dannie Smith, dannie.smith@jhuapl.edu

The ACEBox project aims to improve the JHU/APL space mission concurrent engineering process using digital engineering methodologies and MBSE. ACEBox focuses on creating a digital thread to support efficient design iteration by enabling information exchange between a SysML Systems model and an array of spacecraft subsystem analysis tools. It provides an Authoritative Single Source of Truth for the design, facilitates change propagation across subsystems and generates standardized systems engineering products. The project is scheduled for deployment in 2025 to support existing workflows with digital tools and an MBSE approach.

Test-Driven Approach for Cyber Integration in MBSE

Tara Sarathi, tara.sarathi@ll.mit.edu
Brennen Tucker, brennen.tucker@ll.mit.edu

This presentation will cover our efforts to streamline cyber integration into MBSE models using a scalable test-driven approach to cyber compliance. During this presentation, we will walk through the overall approach and provide a working example.

TRACK 4 – APPLIED MBSE

Collaborative Digital Engineering Case Study for a Weapons System Communications Network

Hayden Campos, hcampos@wingbrace.com
Doug Murphy, dmurphy@wingbrace.com
Lauren Lowe, lauren.lowe.3@us.af.mil

This presentation provides an overview of the modeling and visualization pipeline used to merge Air Force and Navy architecture data for the U.S. Nuclear Command, Control and Communications system. It includes a technical discussion of the tools and methods used to build a CAMEO model, as well as how the results are exported, transformed and presented.

Synthetic Data for Performance Evaluation

Madhav Patel, madhav.patel@jhupl.edu
Harris Bernstein, harris.bernstein@jhupl.edu

In an era where sponsors require data-driven decision-making, the absence of an authoritative source of truth (ASOT) in a program’s early life presents significant challenges for reporting, analysis and design. This presentation explores the innovative use of synthetic data as a solution to drive systems engineering for a digital system.

Datum: A Scientific Metadata Catalog for a Classified World

John Darrington, john.darrington@inl.gov

Datum is a metadata catalog that directly targets scientific data, including the tools and networks in which they are used. We will go over the history of Datum, compare it to other catalog solutions and demonstrate its capability to a wider audience.

Towards an Ontology of Digital Engineering Terminology to Support Digital Information Exchange

Joe Gregory, joegregory@arizona.edu

The Digital Engineering Information Exchange (DEIX) Taxonomy Working Group is developing an ontology to standardize terminology related to digital engineering, aiming to enhance interoperability across the system lifecycle. This effort involves defining relevant terms and relationships, informed by standards, use cases and workshops, to support digital information exchange and initiatives like the Digital Viewpoint Model.

TRACK 5 – DIGITAL ACQUISITION

Making Digital Materiel Management Real: Moving from Concept to Achieving Results

William Jinkins, william.jinkins@us.af.mil
Kyle Hurst, james.hurst.18@us.af.mil

The purpose of this Actualization Strategy is to document how Air Force Materiel Command (AFMC) will make Digital Materiel Management (DMM) a reality across the Acquisition enterprise and lifecycle. The Department of

the Air Force (DAF) Digital Transformation Office (DTO) will outline strategies and tactics highlighting three pillars to success: Forming the Foundation, Establishing the Ecosystem, and Accelerating Adoption, Adaptation and Alignment. Efforts across all three elements will progress simultaneously, building upon completed efforts until DMM is fully actualized.

Modeling CDRLs for Digital Acquisition

Derek Bierly, derek.bierly@jhupl.edu
Natalie Scherington-Battle, natalie.scherington-battle@us.af.mil

In the digital engineering landscape, traditional CDRL documents lack the traceability to effectively support digital acquisition. To address this gap, the SAOC digital engineering team has developed a novel approach for modeling CDRLs to align contractual language to engineering and program execution terminology via SAOC’s digital architecture.

Born-Digital Acquisition, Enabling the DoD to Fully Realize the Potential of Digital Transformation

Angela Miele, Angela.r.miele.civ@us.navy.mil
Tony Geisz, anton.j.geisz3.ctr@us.navy.mil

Join us on a journey navigating a revolutionary approach to acquisition, where data and models form the foundation of an acquisition program. You’ll hear from innovators who have led 4.5 and 6th Gen Weapon Systems Programs and see the phases of a Born-Digital Acquisition program. Find your role in enabling effectiveness and lethality life-based lifecycle management, early defect discovery, reduction of sustainment and system upgrade costs, and informed decision-making focused on mission outcomes.

Using MBSE and Digital Engineering to Inform Acquisition for Space Battle Management Kill Chains (BMKC)

Grace Colonell, grace.colonell@jhupl.edu
Nadia Hussain, nadia.hussain@jhupl.edu

The Battle Management Kill Chain (BMKC) is a modeling, simulation and analysis effort that leverages MBSE and digital engineering to help decision-makers identify resourceful and strategic needs for critical operational assets. Through modeling, analysis and simulation, the BMKC effort is able to help identify functional requirements for critical acquisition systems. BMKC is an example of an innovative approach to digital engineering with executable model-based analysis that can be leveraged for other DoD programs for acquisition purposes.

TRACK 6 – MBSE & SIMULATION

From Models to Requirements: Latency Analysis with ExecSpec

Matthew Klatt, matthew.klatt@jhupl.edu

ExecSpec was used to simulate operational process flows modeled in MBSE applications for latency analysis, leveraging Monte Carlo techniques to assess system

performance under varying conditions. The results, including statistics and critical path analysis, informed system requirements and helped optimize process efficiency by identifying latency bottlenecks.

SWAC MBSE Approach for NAVWAR Force Design

Maria Stropky, maria.stropky@jhupl.edu

This presentation describes the MBSE approach taken by the Space Warfighting Analysis Center (SWAC) NAVWAR Division in the analysis, development and assessment of the Position, Navigation and Timing (PNT) Force Design. The MBSE approach consisted of using SysML models and simulation tools to help determine the resilience and performance of a proposed PNT constellation, measure the effectiveness in an operational environment, and evaluate the utility in a wargame environment.

Influencing Modular Design of an Existing Modeling and Simulation Product Using a Combination of SysML and UML in a MBSE Approach

Valerie Esposito, valerie.esposito@jhupl.edu
Kristina Sebacher, kristina.sebacher@jhupl.edu
Steven Wysocki, steven.wysocki@jhupl.edu

This presentation explores the MBSE approach of influencing modular design of an existing modeling and simulation product using a combination of SysML and UML. Through our approach, we have found improvements to team collaboration, elimination of dead code, identification of requirement gaps and more.

Modeling Standards for OTTI DE Development

Hannah Holbert, hannah.holbert@jhupl.edu

This presentation will cover the work done by the APL program STEAM to define model types and their associated fidelity levels. It will also discuss how these fidelity definitions have successfully been used and how they can benefit the space digital engineering community.

TRACK 7 – AI & AUTOMATION

Innovating Digitally: iNDi

Blake Schreurs, blake.schreurs@jhupl.edu

iNDi is a digital collaboration tool designed to empower designers and engineers by providing a mechanism to communicate their designs in virtual reality, augmented reality or on desktop PC. iNDi addresses many of the unique needs of organizations, such as APL, by combining COTS hardware with a modular architecture designed for secure enterprise environments.

Rocket Design Workflow Automation with SysML

Kelly S. Popolizio, kelly.popolizio.ctr@us.af.mil

This presentation covers efforts to increase the efficiency of complex studies through the automation of workflows using SysML. The workflows used by trajectory analysis tools, such

as QuickShot and POST, were chosen for this implementation to demonstrate how SysML can improve the workflow of these studies.

Prototyping an AI Assistant for Complex Repairs—Merging Digital Engineering, Artificial Intelligence and Augmented Reality

Dr. Francisco Aldarondo, francisco.aldarondo@jhupl.edu
Dr. Aakash Bajpai, aakash.bajpai@jhupl.edu
Dr. Brendan McNelly, brendan.mcnelly@jhupl.edu

The interactive AI Assistant developed as part of the Real-Time Evaluation and Predictive Artificial Intelligence for Repairs (REPAIR) project focuses on developing an innovative AI-enhanced “Automated Assistant” for technicians, enabling them to efficiently troubleshoot and resolve critical repair tasks with minimal training. Using an AR headset, REPAIR provides an intuitive interface powered by generative AI and advanced analytics models.

TRACK 8 – CULTURAL ADOPTION

MIT Lincoln Laboratory’s Digital Engineering Transformation: Case Studies in Adoption

Dr. Stephanie Sposato, sposato@ll.mit.edu
Kimberly Brady, kimberly.brady@ll.mit.edu

MIT Lincoln Laboratory has embarked on a significant transformation to integrate digital engineering capabilities across its diverse prototyping programs. This presentation will share details of the Laboratory’s digital engineering adoption framework and progress, as well as two case studies: Retiring Legacy Systems and Growing Adoption in Fabrication.

Delivering the EVERYTHING Requirement

Emily Christopulos, emily.christopulos@spa.com
Ramon Nunez, ramon.nunez@baesystems.us

The Sentinel ICBM program will modernize and replace the Minuteman III ICBM weapon system of 400 operationally deployed missiles and 450 launch facilities. This presentation will discuss collaboration methodology for Process Model development of transition and deployment activities using SysML.

Level Up Your Digital Engineering Storytelling

Mimi Davidson, mary.e.davidson39.ctr@mail.mil

This session highlights the power of storytelling in securing leadership buy-in and stakeholder engagement for digital engineering initiatives. Attendees will gain actionable strategies to communicate vision, inspire change, and bridge the gap between technical goals and organizational objectives.

SCIENCE FAIR PRESENTATIONS

Shifting the Paradigm—Technical Success and Risk Reduction Working with Contractors Inside Their Integrated Digital Environment

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Unreal Engine in Digital Engineering

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Prototyping an AI-Assistant for Complex Repairs—Merging Digital Engineering, Artificial Intelligence and Augmented Reality

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Innovating Digitally: iNDi

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Cyber + Model-Based Engineering (C+MBE) Profile

Vanessa Nuhn, vanessa.nuhn@jhuapl.edu

Enhancing Digital Engineering Through Threat-Informed Tactics and Techniques for Secured and Resilient Weapon Systems

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Wide-Eyed: An Exploration of Pragmatic Digital Engineering and Artificial Intelligence Integration Points

Christopher Scudder, chris.scudder@jhuapl.edu

ACEBox: Digital Engineering in Space Mission Concept Development

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Intersection of STIX, CTI and Digital Engineering

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Ensuring Model Consistency with ORCUS

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VR x Logistics Digital Thread

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Modeling, Cyber and Simulation Analysis to Support Capability-Based T&E—Recap of Hackathon 2.0

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Automated Processes to Evaluate the Performance of an Executable MBSE Model

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Forming the DMM Foundation

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Bridging the Gap: Digital Guides for Better Collaboration with Confluence Wiki

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SysML v2 Transition Guidance Effort

Henry Merchant, henry.t.merchant.ctr@mail.mil

Digital Engineering Ecosystem Tool Evaluation Template (DETECT) Overview

Kelly Burton, kelly.w.burton.ctr@mail.mil

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Thank you for attending
STRATDEC 2025!

To help us improve future events, we'd appreciate your feedback. Please take a few minutes to complete this survey and let us know your thoughts.

