

EXTENDED ABSTRACT ONLY

U.S. Navy Risk Reduction through Modeling and Simulation Enterprise Tools

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Abstract: The United States Navy has developed an extensive portfolio of Modeling and Simulation (M&S) Enterprise tools, which when used in conjunction with the full spectrum of Test and Evaluation greatly reduces risk of operation, enhances safety, and increases effectiveness. Intensive use of M&S beginning with pure digital models, progressing to integrated models combined with production hardware, then to integration laboratories with aircraft and simulation in the loop, and finally M&S integrated into flight operations has proven to be a cost effective risk reduction technique and an extremely effective Test and Evaluation Methodology.

A common portfolio of Enterprise tools contributes to the success of these efforts. Independent model development in disparate labs, often to accomplish the same ends via different means is not cost effective, and either precludes the distribution of models across the Naval Aviation Enterprise, or makes the reuse by non-developers difficult, requiring adaptation by the receiving labs to their own schema.

The Naval Air Systems Command portfolio includes: The Next Generation Threat System (NGTS), the Architecture Management Integration Environment (AMIE), and the Joint Integrated Mission Level Model (JIMM).

An example of the utilization of such tools from Digital Systems Models to flight test is the Ground Based Sense And Avoid (GBSAA) program. The use of Unmanned Air Vehicles in the conduct of military operations has been a reality for decades. The integration of such systems into civilian airspace teeming with commercial and private traffic, however, remains a daunting task. The portfolio tools were used to generate realistic traffic based on parametric and statistical history, and then seamlessly integrate actual vehicle tracks into the GBSAA system.

The United States Navy Naval Air Systems Command (NAVAIR) has successfully deployed the United States first such Federal Aviation Administration (FAA) approved system for UAS operations in the national airspace system. The use of a portfolio of modeling and simulation tools was critical in driving the risk of integrated operations to an extremely low level.

The use of Portfolio tools is also central to the success of the Royal Australian Air Force (RAAF) F/A-18 A/B/E/F, EA-18G, and P-8A training systems. Each of these systems utilize NGTS and AMIE to provide realistic synthetic representations of both threat and friendly air, land, and surface platforms, and their corresponding weapons and subsystems. NGTS accurately stimulates the avionics models in these training systems using data driven models and authoritative data.

Ms. Markowich's remarks will focus on the reduction of risk with Navy Enterprise tools using the real-world examples cited above.

References:

Dr. Steven O'Day, "Joint UAS Mission Environment Project" Distribution A, PAO 2012-2

Malitsky & Melton, "Distributed Test Environment via the Defense Engineering and Research Network", Distribution A, PAO 2015-694

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