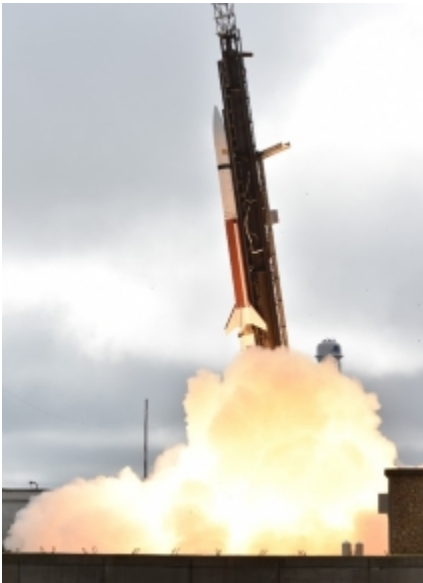


WHO

SYSCOM: SSP
Sponsoring Program: Navy Surface Warfare Center (NSWC) Crane
Transition Target: CPS
TPOC: SSP.SBIR@ssp.navy.mil

Other Transition Opportunities: Other Navy or DoD organizations using M&S for system design, analysis of alternatives (AoA), strategic planning, course of action analysis, verification and validation (V&V), or other decision support applications.

Notes: OptTek's industry-leading simulation optimization software technology integrates with existing simulations to quickly determine the system configurations that produce optimal outcomes for the system or scenario being simulated. Therefore, it is ideal for M&S environments that are used for system design, trade space assessments, and test and evaluation. This technology is integrated with multiple DoD simulations and a version of the technology is also already in use commercially.



U.S. Navy photo,
<https://www.navy.mil/Resources/Photo-Gallery/igphoto/2003104874/>

WHAT

Operational Need and Improvement: Insertion of new technology into hypersonic systems can improve system probability of kill (Pk) for different missions. Many system and scenario parameters influence Pk in hypersonic missions. The Navy seeks an analysis framework to identify the family of technologies that optimizes Pk across a variety of possible technology infusion and mission scenarios.

Specifications Required: A system-of-systems framework that models the components of Pk as a function of hypersonic technologies and optimizes technology selections to maximize Pk across relevant missions. This capability will integrate models of varying fidelity to model the impact of technology options on Pk across several technology infusion and mission scenarios and identify decisions that optimize one or more objective(s). This includes scenarios where Pk may be impacted by supporting systems, and non-target adversary systems and their behaviors. The framework will enable sensitivity analysis of identified solutions to assess solution robustness and identify the most influential system parameters. This framework will be able to run a large number of simulations in parallel to rapidly explore large trade spaces.

Technology Developed: OptTek has developed state-of-the art simulation optimization and analysis software that integrates with hypersonic system models in the Advanced Framework for Simulation, Integration, and Modeling (AFSIM) and detailed lethality models to explore technology insertion options in mission scenarios. The optimization and analysis software provides a general simulation execution framework that can also be readily adapted for use with other simulation tools.

Warfighter Value: This technology enables a modeling and simulation (M&S) capability to quantify technology insertion options for hypersonics in a mission-level context to support decisions that can improve weapon systems design and reduce system lifecycle costs. Automation, parallelization, and efficient algorithms allow for a rate of analysis that is responsive to changes in the hypersonic systems operational environment and the availability of new technologies for system insertion.

WHEN

Contract Number: N68335-22-C-0669 **Ending on:** Mar 29, 2024

Milestone	Risk Level	Measure of Success	Ending TRL	Date
1. Simulation optimization software integration with notional AFSIM hypersonic mission simulations and a lifecycle cost model	N/A	Demonstration of unclassified analysis	4	3rd QTR FY21
2. Enhanced unclassified mission scenario and simulation optimization and analysis framework	N/A	Demonstration of implemented enhancements	5	3rd QTR FY23
3. Deployment of developed framework in Navy Crane unclassified computing environment and training of Navy analysts	Low	Deployment of the simulation optimization and analysis framework in the Navy M&S environment	6	1st QTR FY24
4. Demonstration of higher-fidelity analysis using developed framework	Low	Demonstration of an analysis with realistic models and scenarios. Decrease time to complete analysis by 20%	6	2nd QTR FY24
5. Full implementation of developed framework to support real-world Navy decision	Medium	Successful Navy technology insertion decision following analysis completed in the Navy M&S environment	7	4th QTR FY24

HOW

Projected Business Model: This technology is a direct development for the Government. As such, OptTek will provide the developed state-of-the art simulation optimization software to the Navy and supporting contractors without licensing costs to include a specifically negotiated license for our OptQuest commercial software, which is our core optimization algorithms technology. Beyond Phase II, OptTek intends to develop new integration software and maintain, support, and enhance the delivered software to support hypersonic system models and other Navy or contractor modeling and simulation tools.

Company Objectives: Computer simulation models are used widely in the government and private sectors to perform descriptive, diagnostic, and predictive analysis; however, these simulation models are rarely exploited to provide the prescriptive analysis that is possible using our developed technology. Therefore, our Forum for SBIR/STTR Transition (FST) objective is to meet and engage with Navy and prime contractor champions of modeling, simulation, and analysis. More broadly, our goal is to improve modeling, simulation, and analysis for government departments and agencies and private sector companies that use complex constructive computer simulation models.

Potential Commercial Applications: In the commercial sphere, modeling and simulation is heavily used by organizations involved in manufacturing, energy, transportation, logistics, and health care. Industries like these can use this technology to find the best ways to configure and employ their existing resources to enhance the performance of their systems, products, and services. Using our developed technology will allow these organizations to get the most out of their current resources without the need for new capital expenditures. This technology is immediately transferable and available through a software license purchase agreement that includes maintenance and support options.

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