DEPARTMENT OF THE NAVY
SBIR/STTR TRANSITION PROGRAM

SUCCESS STORY

TOPIC NUMBER: N172-111

SBIR INVESTMENT: $124,828

PHASE III FUNDING: $2,950,998.88

JOINT SIMULATION ENVIRONMENT (JSE)

Systems & Technology Research LLC conducted ultra-high frequency clutter research for its application in the government-owned and operated Joint Simulation Environment (JSE), where warfighters train in a high-fidelity simulation of operational battlespace.

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THE CHALLENGE

The DoD wanted to develop a method of evaluating weapon systems to accurately replicate the threat complexity or density of threats that weapon systems are exposed to in theater. To address this challenge, the Navy and Air Force collectively built a Joint Simulation Environment (JSE), using technology developed by Systems & Technology Research LLC (STR), to provide a digital test range where threat complexity and density can be created to understand how weapon systems will perform in a global conflict.

THE TECHNOLOGY

Originally designed for F-35 need, the JSE is a simulation environment comprised of six building blocks. A physical computing infrastructure implements a modular software battlespace environment which builds on a solid foundation of existing DoD modeling and simulation technologies. Realistic cockpits, software and visual display systems match the F-35, so pilots can fly the simulator like they would fly the actual jet. The JSE creates an environment that makes the F-35 simulator behave as if it is in the real world by providing it with radio frequency data, infrared information, weather, and other factors that affect the jet during flight. This is then connected with the threat environment. These capabilities allow the warfighter to execute testing, training or tactics development and validation in a simulated dense threat environment.

THE TRANSITION

The simulator environment now incorporates technology from STR's Phase I project, "Ultra-High Frequency Clutter Model For Airborne Surveillance Data." Although STR's initial model was developed for the E-2D, it has been adapted to support next generation technology insertion into JSE. STR was awarded a cost-plus-fixed-fee order dependent contract in 2022 to extend their research and development services to allow JSE the ability to integrate other capabilities, including additional aviation platforms across the DoD.

THE NAVAL BENEFIT

JSE enables complex weapon system operational test and high-end tactics training in a high-fidelity, high-density threat environment. The technology provides realistic platform representation which supports platform mission effectiveness assessments. As a digital playground allowing the Navy and Air Force to see how different weapons systems and platforms interact together in a complex threat environment, JSE enables integrated warfighting capabilities. While realistic complex weapon system assessments are not possible on open air ranges, JSE provides these assessments. JSE is affordable compared to open air testing, as modern live systems-of-systems complexity is prohibitively expensive. Since realistic environments for high-end multi-platform tactics training are severely limited, JSE provides a digital range for enhancing warfighter readiness.

THE FUTURE

Because the JSE has been successful, the Navy and Air Force intend to integrate additional aviation platforms and sixth generation weapon systems into the environment. STR is extending their technology to support this broader vision across the DoD. The initial JSE is located at Naval Air Station Patuxent River in Maryland. Future sites for JSE include Edwards Air Force Base in California, and Nellis Air Force Base and Naval Air Station Fallon in Nevada.

"Industry partnership is key to our success across the JSE Enterprise. Small business involvement enables increased innovation and capability development to support the growing DoD demands."

Blaine Summers, JSE Director, NAWCAD