Department of the Navy

NAVY SBIR/STTR SUCCESS

Simulation of the Locations and Attack of Mobile Enemy Missiles (SLAMEM)

Simulation of the Locations and Attack of Mobile Enemy Missiles (SLAMEM) is a mission level C4ISR simulation of weapon and sensor systems operating in a battlefield environment.

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THE TECHNOLOGY

SLAMEM is a hardware-in-the-loop and software-in-the-loop simulation test bed used to evaluate data fusion systems against operationally relevant scenarios. Data fusion is the continuous process of determining and refining the meaning of data, collected from one or more sources, to make actionable information--including helping to determine which data to further collect to improve the information. SLAMEM was developed as a method to analyze different approaches of combining tracks from multiple disparate data sources and identify the approach that results in the best overall track quality within the processing and time constraints available. It has the ability to change platforms, sensors, data links, and vignettes to study performance under differing conditions. During the development phase of acquisition, SLAMEM is used to evaluate ISR systems. This assists developing data fusion capabilities to address how fusion helps accomplish missions. This enables risk reduction for integration of data fusion engines via software & hardware in-the-loop testing.

THE CHALLENGE

Autonomous air vehicles, such as BAMS or Firescout, have the ability to track surface targets and often have multiple sensors and sources such as radar, EO/IR, and data streams from other sensors available to track targets. These data sources produce many tracks, sometimes numbering in the thousands, to combine. Furthermore, these various sources will differ in track count, accuracy, update rates, and uncertainty. There are currently several algorithms for merging the tracks from these sensors/sources; however, there had been no method for determining which sets of algorithms work best together to combine the tracks or how much better the track accuracy results will be using a given method.

THE TRANSITION

While in Phase II, SLAMEM was used to evaluate ASA on behalf of Triton IFC-3. Toyon's prompt response during testing at that time allowed PMA-262 to deliver a better product to the warfighter. It was used again as a Phase II.5 to inform PMA-268's selection of a data fusion engine. A second Phase II.5 was awarded to test E-2's currently flying fusion solution (DSSC2 OFP) and provide a fusion test capability to the ESTEL (E-2 System Test and Evaluation Laboratory). The Phase III is to test DSSC3-DSSC5 Data Fusion capabilities on the platform both in software and hardware.

THE NAVAL BENEFIT

Validating data fusion systems and algorithms in operationally relevant environments is extraordinarily difficult and expensive. SLAMEM provides a simulation capability to verify and validate fusion performance in a low cost, repeatable manner. This enables the fleet to iterate and test fusion engines faster, resulting in higher quality, interoperable capabilities.

THE FUTURE

SLAMEM was developed to analyze the performance of coordinated C4ISR and targeting systems against time-critical mobile targets; and is being used today by PMA-231, PMA-262, PMA-290, and PMA-299 to make informed decisions about data fusion engines. Additionally, there are several joint research publications as a result of working metrics and evaluation into the test environment. Today, SLAMEM has the ability to be used both for stand-alone analysis and as a federate in several distributed simulation exercises. (www.toyon.com)

"Navy Intelligence, Surveillance, Reconnaissance and Targeting (ISR&T) is undergoing a complex paradigm shift from human interpretation to algorithmic syntheses of large multi-source information. How does one know when the algorithms work? SLAMEM and associated metrics work offer a bridge between the data fusion academics and platform operators for algorithm developmental and operational testing in a controlled environment. Navy SBIR Transition programs have helped build that bridgE."

Dr. Paul Castleberg, Vice President of Toyon Research Corporation