

ABSTRACT

The Aviation Rockets and Missiles Project Management Office (ARM PMO) chose to invest in hardware-in-the-loop (HWIL) simulation as an integral part of their Longbow/HELLFIRE (Helicopter Launched, Fire-and-Forget) program throughout the development and production phases. This investment has resulted in two HWIL simulations, developed by the AMCOM Research Development and Engineering Center, that have had unprecedented success in program support from the early development through production phases. The Millimeter Simulation System 1 (MSS-1) facility is capable of edge-of-the-envelope performance analysis and verification using high-fidelity target, background, and countermeasures signature modeling. The System Test/Acceptance Facility (STAF), developed in partnership with Redstone Technical Test Center, tests full-up missiles for production lot acceptance. Between these two facilities, HWIL simulation is responsible for pre-flight confidence testing of missile hardware and software, software IV&V testing, comprehensive performance evaluation, component verification, production lot acceptance, and data gathering for the shelf life extension program.

The Longbow/HELLFIRE program is now entering a Pre-Planned Product Improvement (PPPI) program to add an anti-jammer capability to the missile program. To support this new phase in the development of the Longbow/HELLFIRE missile system the HWIL facilities must be upgraded to meet the challenges of properly testing these new modes of operation. The areas of upgrade will include MMW scene generation, Synthetic Line of Sight (SLOS) algorithms, and MMW Jammer hardware. This paper will highlight the innovative facility upgrades and modeling techniques that will be utilized to produce HWIL simulations to support both the development and production phases of this PPPI program.