

## Direct Fire Systems Software Engineering Laboratory

The Direct Fire Systems Software Engineering Laboratory, located at U.S. Army ARDEC's Armament Software Engineering Center (SEC) provides organic, comprehensive cradle-to-grave software engineering support for its customers. Personnel are well-versed not just in software engineering and computing principles, but also in the foundations of mathematics, science, and engineering, and have decades of experience providing support to direct-fire fire control systems targeting both ground and airborne targets.

Our capabilities and experience include concept exploration and development, requirements development and management, development of prototypes as well as production-ready designs, integration and testing, model and documentation development, sustainment, problem investigations, reverse engineering, and obsolescence support. Flexible and customizable levels of support are available depending on the project and the customer's needs, ranging from consulting to full support employing CMMI level 5 processes. Supported computing languages run from low-level assembly language to high-level languages such as C, C++, C#, and Java. Collaboration and leveraging of other facilities, personnel, assets, and knowledge at ARDEC and in industry helps us to provide superior products and services, leading to high levels of customer satisfaction. While not co-located in our lab, a variety of vehicle and turret platforms at ARDEC are accessible to us on which to integrate and test our products.

### M1A1 Abrams

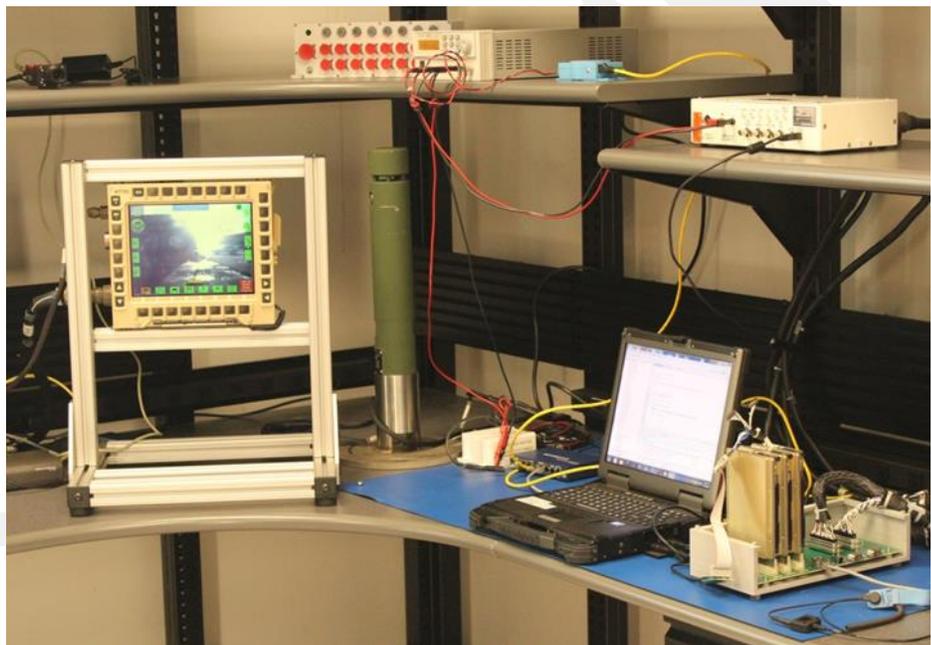


In 1988 the Armament SEC began providing Post Deployment Software Support (PDSS) for the M1A1 Main Battle Tank's Tank Ballistic Computer System Software, we have developed five software releases updating the ballistic equations for thirteen new munitions, supported interface and internal platform changes, as well as collaborated on development of an ammunition data link to program the fuze of an air bursting munition for the U.S. Marine Corps. Our customers include the U.S. Army Product Manager (PdM) Abrams Main Battle Tank (AMBT), the U.S. Army Product Director (PdD) Foreign Military Sales (FMS), and the U.S. Marine Corps' PM Tanks. We have replaced the original software engineering environment with custom-designed tools developed using both organic and contractor

support.

### Advanced Lethality and Accuracy System for Medium Caliber (ALAS-MC)

The ALAS-MC was originally a 5 year Science & Technology (S&T) Demonstration intended to meet the Ground Combat Vehicle, Infantry Fighting Vehicle variant's (GCV-IFV) primary armament objective requirements of achieving greatly enhanced accuracy and lethality in Medium Caliber Armament system technologies to defeat personnel, materiel, and urban targets. Following the dissolution of PM GCV, ALAS-MC has become the Lethality solution for Tank Automotive Research, Development & Engineering Center's (TARDEC's) Combat Vehicle Prototyping (CVP) S&T effort to advancing leap-ahead technologies intended for supporting the U.S. Army's future combat and tactical



vehicle fleets. ALAS-MC plans to address the Objective requirements of the Future Fighting Vehicle (FFV).

The Armament SEC has partnered with the Armored Vehicle & Future Combat Systems Division of Fire Control Directorate to provide a fire control system suite incorporating Victory Architecture and a Scenario-Based Fire Control System. The Fire Control Computer interfaces with the Scenario-Based Graphical User Interface (GUI) as well as a Dynamic Meteorological (MET) Sensor, Down Range Wind Sensor, and an Enhanced Laser Rangefinder. Tactics, techniques and procedures (TTPs) and scenario-based engagement workshops were conducted with the Maneuver Center of Excellence (MCoE) as part of the Requirements Definition and Development process for the fire control system and software development team. These workshops laid the foundations for engagement tactics and firing patterns using Programmable Air Burst Munitions (PABM) as well as conventional ammunition against dismounted infantry and materiel targets.



***“ARDEC has made great strides in their demonstration. This demonstration is key in letting users get their hands on the software to get a feel for how the scenario based engagements provide better effects than current fire control software in both the Abrams and Bradley. We are hopeful that we will be able to provide the best solution to the Warfighter.”***

*MCoE leadership’s report*

#### **Point of Contact**

Armament SEC Business Planning and Development  
usarmy.armamentsec@mail.mil  
<http://www.ardec.army.mil/armamentsec>

(973) 724-ASEC (2732)  
DSN 880-ASEC (2732)