

Development, Test, and Manufacturing of an Optical Fire Control System



Invariant Corporation graphic

PROBLEM

The U.S. Government has identified a need for portable optical-based fire control systems to support the functional alignment of the Tactical Aviation and Ground Munitions (TAGM) Project Office for continued direct support of Combatant Commands. This includes efforts to reduce the time for development and delivery of modern fire control technology, system engagement, and standoff distance for engagement, along with an increase in flexibility for the maneuver commandery.

OBJECTIVE

The project's primary focus is the development of versatile optical-based fire control systems designed to adapt to evolving requirements, while also ensuring compatibility with joint service and coalition warfighters.

TECHNICAL APPROACH

Task 1: Optical-based fire control system design and development -- Invariant Corporation's approach involves close collaboration with the government's technical team to define comprehensive system requirements. This encompasses Swap considerations, operational ranges, optical performance, target tracking criteria, and munition interface parameters. A thorough analysis will identify optical components and sensors. The project team will procure these components and initiate mechanical design including structural, thermal, and electrical analyses. Additionally, software experts will develop the prototype's user-friendly interfaces and essential functionalities.

Task 2: Optical-based fire control system fabrication and integration -- Building on the design, Invariant will fabricate mechanical fixtures, enclosures, and assemble prototype systems. This will ensure efficient component procurement while adhering to relevant Federal Acquisition Regulations (FAR) clauses. Integration of all subsystems into a cohesive prototype will be carried out and in collaboration NCDMM and Invariant will assess

This project aligns to:



Advanced
Manufacturing

PROJECT START DATE

September 2023

EXPECTED END DATE

September 2026

manufacturing processes for opportunities to improve production efficiency.

Task 3: Optical-based fire control system characterization and testing – Invariant’s testing approach involves a rigorous evaluation of prototype systems at multiple levels, covering optical/sensor systems, mechanical sub-assemblies, and electrical components. This includes collecting comprehensive laboratory and field data and conducting environmental stress screening when necessary. Field test exercises, in close collaboration with the government’s technical team, will ensure accurate planning and risk assessment.

Task 4: Documentation and delivery – The project team commits to delivering fully assembled prototype optical-based fire control systems with potential scalability based on government funding decisions. Each prototype delivery will include comprehensive documentation, covering operational procedures, setup instructions, and user guidance. The project logistics support will facilitate seamless delivery and training, enabling thorough evaluation by the government.

FUNDING

\$795,000 total project budget

PROJECT PARTICIPANTS

Project Principal:

NCDMM/America Makes

Other Project Participants:

Invariant Corporation

Tactical Aviation and Ground Munitions

Project Office (TAGM)

Public Participants:

Office of Naval Research

About NCDMM

NCDMM delivers innovative and collaborative manufacturing solutions that enhance our nation’s workforce and economic competitiveness. NCDMM has extensive knowledge and depth in commercial and defense manufacturing areas to continually innovate, improve, and advance manufacturing technologies and methodologies. Our experienced team specializes in identifying the needs, players, technologies, and processes to attain optimal solutions for our customers. We connect the dots. That’s the NCDMM methodology. NCDMM also manages America Makes, AMARII, AMIIC, and El Paso Makes, and is a subsidiary of the Manufacturing Technology Deployment Group, Inc. (MTDG).