



## SERVICES

Torch is dedicated to providing superior research, development, engineering and programmatic support services to the Department of Defense. Our employees represent an empowered workforce joined to form a highly specialized core with the breadth of expertise to solve even the most difficult problems. Torch employees currently serve in a number of applications and domains, including the following:

- ✓ Air Defense and Ballistic Missile Defense
- ✓ Tactical Weapons
- ✓ Unmanned Aircraft Systems (UAS)
- ✓ Command, Control, Battle Management, and Communications (C2BMC)
- ✓ ChemBio

Torch expertise is distributed across a number of core competencies, including the following:

- **Systems Engineering & Integration**
- **Modeling & Simulation**
- **Test & Evaluation**
- **Advanced Technologies**
- **Software Engineering & Development**
- **Cybersecurity**
- **Program Support**
- **Prototyping**
- **Information Technology**

### ■ **Systems Engineering & Integration**

Torch applies traditional and non-traditional interdisciplinary engineering expertise to advance the Warfighter's "art of the possible" in broad domains of weapons, manned and unmanned platforms, software, sensors, data fusion, management, and systems integration. We promote collaboration across government/contractor lines and empower our teams to be innovative in our approach to fulfilling technical requirements and engineering solutions. We excel at experimentation and acceleration of technology in lab environments using high-level prototyping to the fullest extent possible to reduce risk, but always with a focus on field application. Our specific capabilities in this area include the following:

- ✓ Requirements Flow Down & Allocation
- ✓ System Interoperability
- ✓ Risk Assessment
- ✓ System Verification

## SOLUTIONS

Torch offers a broad range of hardware and software solutions for improved performance, enhanced mission capability, and testing of aviation and weapon systems. We work directly with the Government to demonstrate technology maturity, develop standards, and benchmark system performance in support of better buying initiatives. Torch holds a number of contracts that support technology solutions development and demonstration to include BAAs and GSA OASIS. Specific areas where we provide technology solutions include the following:

*Algorithms* - Torch develops algorithms for sensor registration, sensor resource management, data fusion, and ChemBio situational awareness for ground-based, air-borne, and space-based sensors.

*Architectures/Integration* - Torch develops architecture concepts, interface definitions, and technology plug-ins to support expanded mission capabilities for integrated UAS, air and missile defense, and EW systems.

*Ground Stations* - Torch develops ground station software for UAS weapon release, aerial target control, and space systems situational awareness.

*Instrumentation* - Torch develops airborne and ground-based optics-based instrumentation for the purpose of kill assessment and warhead characterization, digital flight recorders for aerial targets and digital controllers for ground targets.

*High Fidelity Simulations* - Torch develops target and background models for multi-spectral scene generation, high fidelity 6-DOFs of weapons and aerial targets, RF background models, and distributed systems framework for integrated air and missile defense systems.

*Testing* - Torch develops and maintains a comprehensive suite of tools for System-of-Systems testing spanning the entire test event from provisioning planning to analysis. We are also developing a weapons performance testbed that incorporates the effects of the cyber environment.

*Emerging Technologies* - Torch develops advance technologies in the area of Low Probably of Detection communication systems and encrypted data processing based on Chaos theory.

*Prototype Development and Demonstration* - Torch developed and demonstrated prototype systems for characterizing radar calibration and weapons release off UAS systems.



## SERVICES & SOLUTIONS



### Contact Information

For specific information regarding individual services and products please contact us.

- Phone:** 256-319-6000  
**Address:** 4035 Chris Drive, Suite C  
Huntsville, AL 35802  
**E-mail:** info@TorchTechnologies.com  
**Website:** www.TorchTechnologies.com



EXPERTISE  
INNOVATION  
CUSTOMER FOCUS  
EXCELLENCE ♦ INTEGRITY  
COOPERATION ♦ RELIABILITY

## Modeling & Simulation

Torch manages, develops, and validates a variety of simulations and simulation tools, including emulators and simulators to facilitate a complete understanding of the operational system environment. We develop simulations based on complex mathematical and phenomenology models for a variety of problem domains including the following: platform; interceptor; threat missile trajectories and RF/IR signatures; and Command, Control, Communications and Computers (C4). Torch incorporates these complex models into larger system simulations for analysis of system-wide problems in a variety of areas such as integrated air and missile defense, ballistic missile defense sensor and weapon performance, and integrated UAS weapon system performance. Our specific capabilities in this area include the following:

- ✓ High Fidelity 6-DOF
- ✓ Performance Analysis & System Effectiveness
- ✓ Hardware-in-the-Loop
- ✓ Verification & Validation
- ✓ Virtual Engagement
- ✓ Model-Based Systems Engineering
- ✓ M&S Frameworks



## Software Engineering & Development

Torch designs, develops, tests, delivers, and supports both runtime and real-time software in many different applications. The Torch Technologies Aviation Division has achieved a CMMI Maturity Level 3 rating.

Torch has developed software for safety-critical functions such as Fire Control, UAS message traffic, and Ground Control Station interfaces. Our experience with software development comprises both Linux and Windows operating systems and has been tested with both classified and unclassified systems. Torch frequently uses programming languages such as C#, C++, Java, and Python. We use Integrated Development Environments such as Visual Studio, Eclipse, and NetBeans. Additionally, software for embedded systems is developed using Green Hill's Integrity and Wind River's VxWorks, along with Model Driven Architecture (MDA) tools for embedded code development. We have developed runtime applications for both single and cluster computing environments. Our specific capabilities in this area include the following:

- ✓ Model-Based Software
- ✓ CMMI Level 3 Rating
- ✓ Open Architecture
- ✓ Runtime/Real-time Applications
- ✓ Operational Software



## Prototyping

Torch possesses prototyping capabilities in electromechanical, mechanical, optical, and software systems. We perform state-of-the-art design, fabrication, testing, and evaluation of electronic, electromechanical, and mechanical partial and full-scale systems. We use the results in concept development, proof of concept, component integration, and live system test and evaluation. We conduct electronic design and fabrication at all levels, including breadboard, brassboard, and flight-qualified printed circuit board (PCB). Results are integrated with mechanical design and machined assemblies to make up the final test articles. Our delivered systems include a multipurpose miniaturized airborne data logger, specialized airborne underwing video pods, multi-band optical flight hardware, sensor registration algorithms, and UAS/weapons control software. All of these programs involve an extensive use of inexpensive Commercial Off the Shelf (COTS) hardware and software components. Our specific capabilities in this area include the following:

- ✓ Optical Systems
- ✓ Test Fixtures
- ✓ Digital Test Equipment
- ✓ Weapon Integration Laboratories
- ✓ Compressive Sensing
- ✓ Kill Assessment Instrumentation



## Test & Evaluation

Torch provides engineering, scientific, and analytical disciplines to ensure that developed systems have been properly tested and evaluated. These disciplines include test architecture and scenario design, test planning, test resources and provisioning, pre-mission risk reduction analysis, and post-mission data reduction and analysis. We develop software to parse, reduce, and analyze raw data collected from the tested system. Torch supports a full range of test articles (component, system, system of systems) and test venues (HWIL, flight test, ground test). Our specific capabilities in this area include the following:

- ✓ Pre-Mission Risk Reduction Analysis
- ✓ Post-Mission Data Reduction & Analysis
- ✓ Test Architecture & Scenario Design
- ✓ Test Resources & Provisioning



## Cybersecurity

Torch uses Cybersecurity best practices and processes to develop, implement, monitor, analyze, and determine risk to DoD Enterprise Systems, Sensors, and Weapons Systems using Interview, Test, and Observation data. We conduct Cybersecurity testing using vulnerability scanners such as eEYE Retina, NESSUS (stand alone), ACAS, Security Content Automation Protocol (SCAP), and Fortify360. eMASS is used to achieve cybersecurity workflow management. Torch personnel routinely produce DIACAP packages, Security Assessment Report (SAR), Source Code Security Analysis Reports, Scan only reports, Authorizations To Operate (ATO), Authorizations To Connect (ATC), Interim Authorizations To Test (IATT), and other authorizations required by the Authorizing Official (AO). Torch uses its proven processes and cybersecurity knowledge to accomplish risk management, event detection and reporting, containment, and post incident analysis. Our specific capabilities in this area include the following:

- ✓ DIACAP/RMF
- ✓ Software Code Review
- ✓ Computer Network Defense (CND)
- ✓ Enterprise to Weapons Systems



## Information Technology

Torch provides IT solutions for data management and scientific computing applications. Torch personnel have database development, web application programming, and enterprise software development experience. We perform design and requirements analysis, implementation, quality assurance, training, documentation, and deployment. This experience is used to develop and maintain data warehouses, enterprise reporting systems, data analysis tools, and management information systems. We also develop and support enterprise-wide information systems to include designing, developing, installing, modifying, and maintaining computer hardware, software, and associated peripherals and licensing agreements. We manage routine upgrades, system security scans and configuration, security accreditation, and disaster recovery programs. Torch is also responsible for network support for classified and unclassified systems. Our specific capabilities in this area include the following:



## Advanced Technologies

Torch actively supports the Army, Navy, Air Force, and Missile Defense Agency (MDA) in research and development. In addition, we support warfighting applications of new technology concepts through multiple Phases I, II and III Small Business Innovation Research (SBIR), Phases I and II Small Business Technology Transfer (STTR), Broad Agency Announcement (BAA), and Science & Technology programs. Torch's proven process takes technology through concept development, hardware/software design and development, concept validation, and finally, technology transition. Torch advanced technology programs incorporate fundamental research; advanced operational concept and technology formulation, development, analysis, and evaluation; and transition of technology into weapon systems to improve existing warfighting capabilities. Our specific capabilities in this area include the following:

- ✓ Sensor Registration
- ✓ Data Fusion
- ✓ UAS/Weapon/EW Integration
- ✓ Warhead Characterization
- ✓ LPI/LPD Communications
- ✓ Sensor Resource Management (SRM)



## Program Support

Torch provides business, financial, and technical support to major acquisition programs for the Army, Navy, and Missile Defense Agency (MDA). We do this through acquisition management and programmatic and cost analysis requirements. Our technical support consists of technical documentation, technical performance, systems integration, advanced technology demonstrations, test planning, and cost-trade studies. We also provide strategic planning support through a process of portfolio and system level trades to help identify program efficiencies and investment strategies. Our analytical and organizational assessment support functions encompass planning, scheduling, budgeting and financial management activities. Our specific capabilities in this area include the following:

- ✓ Acquisition Management
- ✓ Strategic Planning
- ✓ Budget Planning & Execution
- ✓ Configuration Management



- ✓ High Performance & Classified Computer Systems
- ✓ Animation & Visualization
- ✓ Data Management

