

We Design Torch possesses prototyping capabilities in electromechanical, mechanical, optical, and software systems. We perform state-of-the-art research, development, 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 final test articles. Our delivered systems include multipurpose miniaturized airborne data logger, specialized airborne underwing video pods, multi-band optical flight hardware, sensor registration algorithms, and UAS/weapons control software. These programs involve an extensive use of inexpensive commercial-off-the-shelf (COTS) hardware and software components.

Optical Systems

Torch performs research, development, maintenance, and calibration of highly specialized ground-based and airborne optical equipment using our in-house optics laboratory. Lab resources include optics tables, work benches, design tools, blackbody sources, and design suites such as FRED and Zemax.

Electronics & Avionics

Torch provides design and prototyping of electronic and avionics systems using our in-house electronics laboratory. The lab is fully stocked with electronic test equipment, specialized equipment for MIL-STD-1553 and ARINC communications protocols, PCB design suites such as Mentor Graphics PADS, embedded FPGA design suites such as Altera Quartus Prime, prototype fabrication and assembly equipment such as reflow ovens and rework stations.

Mechanical Systems

Torch's mechanical solutions team is equipped with design and simulation tools such as SolidWorks, SolidWorks Simulation, and AutoCAD. These resources enable Torch to perform structural analysis on new and existing mechanical designs using finite element analysis. The mechanical team uses in-house additive manufacturing and machining capabilities to produce high-quality articles.

Communication Systems

Torch performs research, development, and maintenance to test logical integration of small munitions, aircraft avionics, and ground control station software. The configurable lab consists of avionics hardware, data link emulators, GPS navigation, ground station software, and tactical weapons emulators used for system verifications. These lab resources provide reusable tools for weapon life cycle maintenance, off site testing, and procurement support.

SYSTEMS ENGINEERING We Engineer Systems 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 team to be innovative in our approach to fulfilling technical requirements and engineering solutions. We excel at experimentation and acceleration of technology in lab environments fully using high-level prototyping possible to reduce risk, but always with a focus on field application.

Requirement Flow-Down & Allocation

Maintenance of the program technical baseline including allocation of requirements to build capabilities, requirements flow down, and requirements traceability.

Risk Assessment

Identification, assessment, and tracking risks at the program and system and sub-system levels, including the development and maintenance of knowledge points and risk management plans.

System Interoperability

Assessing interaction of systems and systems of systems using all-digital and Hardware-in-the-Loop (HWIL) simulations to include complex representations of weapons and tactical communications systems, including a wide range of tactical data links and protocols.

System Verification

System performance test and verification to verify Prime Development Specification (PIDS) and technical compliance criteria. We also engage in identification of Critical Engagement Conditions (CEC) and Empirical Measurement Events (EME) that define the test data required to support verification.

We Engineer Products Our engineers are experienced in designing electronic, mechanical, and optical systems. Through our Technology Integration and Prototyping Center (TIPC), we can rapidly produce, integrate, and test complex product prototypes. For turnkey solutions, our engineering teams create detailed project schedules to mitigate risk and conducts regular in-progress reviews to ensure the final design will meet expectations.

Electronic Design

Our electronics team specializes in the development of both analog and digital systems, printed circuit board design and layout, and embedded firmware development. We provide both FPGA and embedded microcontroller design capabilities.

Mechanical Design

Our mechanical team is equipped with state-of-the-art design and simulation tools such as SolidWorks and Siemens STAR-CCM+. When developing complex designs, we perform Multiphysics simulations to ensure products are capable of meeting specifications prior to fabrication.

Optical Sensors

Our optics team specializes in design and development of multi-band optical sensors, with nationally renowned expertise in high-speed data acquisition systems and radiometers. The team's capabilities include lens design, electro-optical interface design, and data acquisition design.

Reverse Engineering

Our electrical team specializes in reverse engineering of electronic components, as well as analog and digital interfaces. Our mechanical team specializes in reverse engineering and integration with complex geometries, materials, surface coatings.

Fabrication

Our prototyping and manufacturing team consists of industry-certified electronic technicians, machinists, and welders to fabricate prototypes and provide low-volume manufacturing of end-items.

Fully Integrated Turnkey Solutions Applications We assign multi-disciplinary engineering teams to develop solutions and equip them with design tools, configuration management systems, and in-house fabrication resources needed to ensure success. These teams are also paired with specialists who understand the operational and logistical needs to make a solution successful in the field. This work environment has enabled our team to successfully fabricate large-scale prototypes at rapid pace. One such program received limited airworthiness certification in only six months after fabrication began. Other applications include: Automotive Systems Autonomous and Robotic Systems Avionic Components Obsolete Electronic Replacements Power Management Systems Proof of Concept Hardware Range Instrumentation Telemetry Systems Test & Support Equipment Unmanned Aerial Systems **RESEARCH PARTNERSHIPS** Rapid Innovation and Prototyping Relationships Torch maintains memberships in multiple DoD and industry consortia. As a member of the Defense Ordnance Technology Consortium (DOTC), our goal is to collaborate among Government, industry partners, and Academia for purposes of ordnance technology development and prototyping. As an active member of the National Advanced Mobility Consortium (NAMC), Torch's goal is to provide advanced research in a broad range of ground vehicle, autonomous, and system technologies.

TIPC MANUFACTURING FACILITY TIPC Facility Torch provides end-to-end product design and development services, bringing ideas from an initial concept all the way through production and sustainment. Our engineering teams possess decades of experience designing electronic, mechanical, and optical systems. Through our Technology Integration and Prototyping Center (TIPC), we can rapidly produce, integrate, and test complex product prototypes. **TIPC Solutions** Our offerings include both design consultation services as well as turnkey product development. For turnkey solutions, our engineering teams create detailed project schedules to mitigate risk and conducts regular in-progress reviews to ensure the final design will meet expectations.