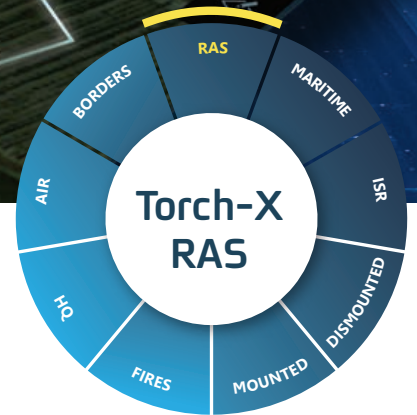


Torch-X™ Robotics and Autonomous System (RAS)

Multi-domain autonomous network combat solution for unmanned heterogeneous swarms





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Integration of autonomous systems is critical for maintaining a tactical edge in multi-domain warfare. Operation and management of an array of AI-driven heterogeneous autonomous swarms provides enhanced capabilities to improve situational awareness, combat effectiveness and mission success against multiple threats.

Elbit Systems has proven technology and real-world operational experience in designing, integrating and deploying effective, reliable and scalable robotic and autonomous systems and command and control solutions.



Solution Overview

Torch-X RAS Robotics and Autonomous System is an innovative, proven solution for planning, operation and management of all types of unmanned platforms and missions. The solution enables tactical superiority at all echelons, enhancing efficiency and transforming capabilities in contemporary warfare by enabling effective use of autonomous heterogeneous swarms. Torch-X RAS is designed to offer an advantage in peer/near peer adversary combat scenarios in multi-domain warfare, enabling coordinated deployment of swarms of connected, heterogeneous autonomous systems.

Designed to support a wide range of manned-unmanned teaming (MUM-T) operations, Torch-X RAS enables connectivity and control of air, sea (surface and sub-surface) and land (terrain and sub terrain) unmanned platforms that extend the range and reach of warfighters and enhance performance in all domains of the modern battlespace. Torch-X RAS is platform agnostic and can be easily integrated with any ROS-compliant platform.



Operational capabilities

Torch-X RAS enables control and coordination of a networked group of heterogeneous autonomous systems that can act as a cohesive unit and individually, as part of an overall combat network system. The advanced control solution enables combat teams and expeditionary units to deploy, operate and manage connected manned-unmanned formations and missions in a multi-domain environment. Torch-X RAS supports various mission types: ISR, maneuvering force protection, robotic vanguard, perimeter protection, logistic support and medical evacuations.

Optimal platform management: Torch-X RAS minimizes human engagement with a single point of mission control for units of autonomous systems. The systems can communicate among themselves as heterogeneous swarms and perform individually, capable of receiving information and instructions remotely.

Battlespace coordination and systems integration: Torch-X RAS enables integration of advanced unmanned platforms with sophisticated tactical radios and data links, providing robust, continuous and fast connectivity on-the-move that is secured and immune, with no single point of failure and no dependence on GPS. The solutions are based on open architecture and a modular approach, capable of seamless integration. The communication is based on private LTE, 5G or any other tactical cloud.

Maximize mission effectiveness: Torch-X RAS supports planning, control and execution of collaborative, synchronized manned-unmanned teaming (MUM-T) missions with varying levels of autonomy from remote control to fully autonomous capabilities. The solution increases survivability, lethality and combat tempo in a multi-domain environment.

Platform-agnostic and open architecture infrastructure

Torch-X RAS is based on Elbit Systems' E-CiX, a fast and efficiently developed modular framework based on commoditized existing building blocks using industry standards, open architecture and offering its capabilities in "as a service" model.

The E-CiX architecture includes a rich adaptor layer that allows Torch-X RAS to be platform-agnostic, including a variety of adaptors for C4I systems. Agile and scalable, the infrastructure easily interfaces with new or legacy C4I systems, can accommodate third-party applications and provides the development environment for future growth and modularity supported by cloud technologies and cost-saving COTS hardware.

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Key Features

- Single operator for one-to-many swarms/platforms
- Suitable for all unmanned platforms
- Control of heterogeneous combat swarms
- Heterogeneous swarm ORBAT planning tools
- Heterogeneous swarms mission planning tools
- Autonomous mission management tool
- On platform autonomous platform control management
- Non-GPS navigation
- Open architecture
- Mature technologies

Key Benefits

- Optimal management in multi-domain environment
- Supports MUM-T formations
- Platform agnostic
- Reduce cognitive load from the warrior
- Robust connectivity on-the-move
- Enhanced survivability and lethality
- Increased combat tempo, efficiency and effectiveness
- Improve decision-making at all levels



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