Mission Capabilities at the Speed of the Fight

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By Mike Roske

Our adversaries are formidable, and the battle for control of the electromagnetic spectrum gets harder every day. The signal environment is dense, and adversaries' electronic warfare (EW) systems are increasingly complex and resilient. They use a broader range of the spectrum, advanced waveforms, and networked capabilities, and they have access to high-performance hardware that can be rapidly reprogrammed.

Gone are the days of years-long development cycles and extended periods of developmental and operational testing. Complex digital threats evolve at a much faster pace than classic EW development.

For the warfighter, speed is life. We all must pull together to get effective EW capabilities into their hands as quickly as possible, and we must continue to deliver advanced capabilities through iterative improvements and continuous mission learning. We need to react faster, often with less information up front. We also need to be able to adapt our work when we get new information and/or requirements change – which is a new way of thinking about traditional defense acquisition.

While we don't know everything on Day 1 of a program (and sometimes not even on Day 1,000), we know enough to get started, and how to work with our partners, customers, and supply network to collaborate across boundaries to deliver flexible capabilities that can evolve at the speed of need.

Effective Capabilities

Operational analysis is a critical component of EW design and development. Each EW capability must earn its way into the arsenal through demonstrated performance. That starts with tactics development where the capability is challenged in model form to achieve mission success against new and postulated threats.

EW models are educated by real-world data captured at the leading edge of the battlespace and analyzed for performance and limitations. By working with the customer community to better understand emerging threats, missions, and tactics, we are better prepared to fully utilize effective modeling and simulation and data-driven development, creating a continuous development and continuous improvement flow as shown below.

Open Architecture – Fieldable Mission Software Suites

Open architecture is critical to EW development because it enables agile software-defined radio (SDR) capabilities that can rapidly evolve to meet the changing threat. The push for open architectures is about standardizing requirements and interfaces to drive faster development timelines and enable rapid capability sharing across multiple platforms with minimal effort. Ported capabilities will operate within platform constraints, increasing operational effectiveness without reinvention.

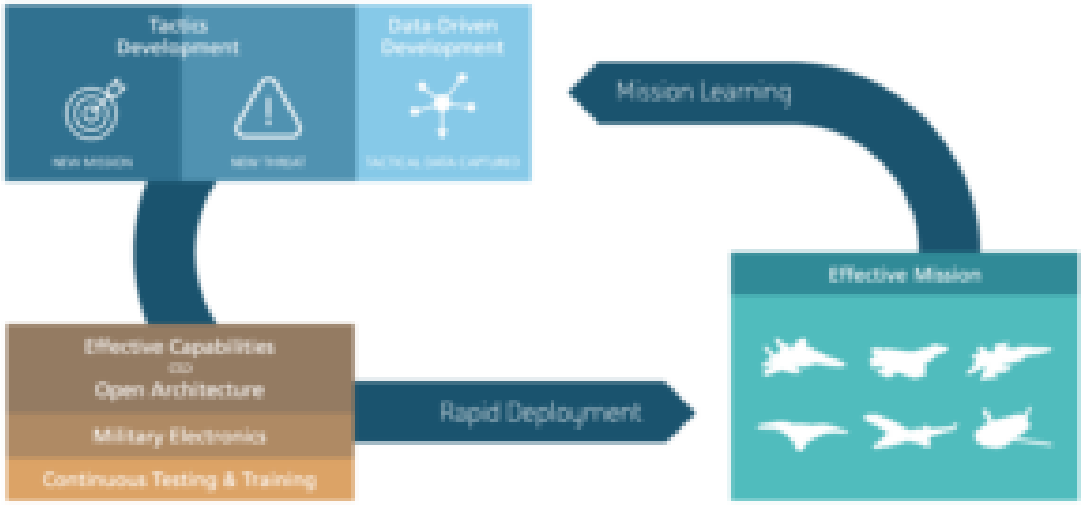
BAE Systems has been building SDRs for years, and the focus now is making them more open, more modular, and more configurable. We have a significant amount of fielded hardware today. With minor firmware/software updates, we can unlock the potential of that hardware.

Open architecture, like the core design of our Storm EW™ spectrum warfare suite, opens the aperture for software developers to run applications on open mission equipment. Today, a growing number of companies and research labs (including our own FAST Labs™ research, development, and

production organization) are building apps and mission capabilities that are highly effective and highly portable thanks to open architecture. Broadening the pool of available developers enables and encourages competition and speeds the delivery of innovative new capabilities to the fleet.

Creation of EW applications by independent industry developers (or the Department of Defense) amplifies a need for a capability integrator whose role is to ensure harmonious operation, cyber resiliency, and resource management to meet overall mission objectives.

While open EW architectures evolve and become outdated, the core tenets of capability against threats and flexibility do not. The use of open architectures drives the DoD and industry to continuously adapt throughout the life cycle of an enduring fleet. At BAE Systems, we are actively developing modern open architecture standards in collaboration with industry and defense partners.



Leveraging Military Electronics – Hardware for Operational Overmatch

The reuse of common core EW hardware will also be critical for accelerating capabilities to the field. BAE Systems is working on a common suite of highly capable, highly produceable multifunction mission systems and software. These common

hardware building blocks can be customized for specific platforms and missions, leveraging years of engineering and manufacturing expertise and cutting costs. Leveraging existing hardware blocks provides customizable, platform-agnostic EW systems for existing fleets – including those of our allies – and provides access to a growing library of software capabilities.

Custom and COTS Hardware

It's not just about embracing open architecture and SDRs and leveraging existing hardware elements. Highly capable EW suites will require a blend of custom, high-performance military hardware with commercial-off-the-shelf (COTS) hardware. Commercial microelectronics have their place, but are also accessible to adversaries. They are good for some applications, but custom military hardware can provide true overmatch capabilities.

Commercial computing power continues to improve at a tremendous rate, though it is not always the best solution for EW systems – especially because of the intense processing demands of the highly congested electromagnetic signal environment and the need for ultra-low latency and response times when lives are on the line. Performance and latency both matter in electronic warfare. There is a time and place for COTS hardware, and there are absolutely cases where highly specialized hardware is critical to mission success.

Custom military electronics make sure that our warfighters have overmatch capabilities against the adversary across the spectrum – faster response, higher power, and embedded functions unmatched by COTS capabilities.

Adaptable EW

Not every system in the strike package needs to be able to defeat advanced adversaries on its own. As tactics and networked EW capabilities evolve, swarms of platforms of

varying sizes will collectively deliver EW effects on the battlefield. Transceivers and EW hardware in the future will come in all shapes and sizes. These EW systems will not only need to deliver capabilities on tight timelines, in many cases they also must fit into tight spaces – on large and small platforms. Those systems will help the government do more with what's already been developed and will have the flexibility to empower the platforms of the future.

Continuous Testing & Training

Capability integration, validation, and testing will also be critical for delivering effective mission capabilities at the speed of the fight. Continuous testing and training readies warfighters for effective mission operation, exploring every corner of performance via high-fidelity simulations and real-world operations to ensure the equipment, capabilities, and most importantly – the people – are ready for the fight.

Speed is life. Learn more about how BAE Systems is accelerating the delivery of overmatch EW capabilities to warfighters at the speed of need: www.baesystems.com/ew.

Outpacing our Adversaries through Continuous Collaborative Development – from Concept to Combat

Mike Roske is technology director at Electronic Combat Solutions at BAE Systems, where he has worked for 35 years.