Research Brief

Integrating Multi-Domain Command & Control

Securing the Future of Battlespace Management and Awareness

FORECAST INTERNATIONAL

Introduction

Persistent threats in the Indo-Pacific, European, and Middle East theaters from adversaries growing in capability have created complex and dynamic operational environments in which the United States and allied militaries must be prepared to operate. Moreover, these complex and dynamic operational environments necessitate that joint and allied forces leverage the best tools, technology, and strategy available to ensure victory on the battlefield of tomorrow.

In order to secure dominance in future conflicts, our military must ensure its ability to create a clear picture of the battlefield and disseminate battlespace data across all domains—on the ground, at sea, in the air, and in space. This integration of all-domain data for command and control of airborne aircraft, including unmanned assets, drives fleet-level survivability and mission success.

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Creating Resilient Battlespace Awareness

The ability to observe an enemy from the skies has long been a valuable asset for military operations. In contemporary warfare, a clear picture of the battlefield and enhanced situational awareness are paramount for success. One vital capability that creates this clear picture of the battlefield is moving target indication (MTI)—the use of radar or other technologies to detect, identify, and track targets and distinguish significant contacts from clutter across all domains. MTI can be used for a range of military applications, including intelligence, surveillance, target acquisition, and reconnaissance (ISTAR).[1]

The most advantageous approach for MTI involves a layered strategy combining space-, air-, and ground-based solutions. With more sensors in more locations comes a more complete view of the battlespace that can be shared across forces. Integrating sensors across all domains not only creates a clearer picture of the battlefield but also builds redundancy should one of the layers be jeopardized. Fundamentally, placing MTI sensors across multiple domains creates resilience, meaning that the loss of one would not impede the capability to detect, identify, and track targets.

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Airborne Battle Management in an Evolving Battlespace

As weapons, strategy, and technology evolve, modern conflicts demand faster, wider-ranging, and more resilient decision-making than legacy command and control can deliver. An airborne battle management command and control (BMC2) capability gives the entire fleet a "first to detect, first to engage" advantage by integrating and processing all-domain data faster, enabling more informed decisions at the tactical edge, while reducing the time between identifying a potential threat and initiating a response.[2] What's more, airborne BMC2 enhances the overall ability of a fleet to stay informed, operate effectively, move quickly, and ultimately survive in contested environments.

In addition, as unmanned aerial systems (UAS) and other low-cost, fast-moving threats increase the need for command and control (C2) nodes, airborne BMC2 provides survivable, repositionable relays.[3] Since these airborne nodes are built to maneuver, they can keep communications alive when ground infrastructure or satellites are jammed or hit, maintaining a clear picture under threat.

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Elevating BMC2 with Unmanned Systems

Within airborne BMC2, Manned–Unmanned Teaming (MUM-T)—the coordinated employment of manned platforms alongside uncrewed technologies and systems—can act as a force multiplier to address the challenges of current and future operating environments.[4] In practice, this approach leverages UAS as extended assets via manned BMC2 platforms. As UAS capabilities in electronic warfare, precision strike, and other technologies continue to mature, MUM-T holds the potential to redefine the traditional advantages of BMC2, significantly expanding operational capabilities.

For example, in June 2025, Boeing announced the successful completion of a teaming flight between a Royal Australian Air Force E-7A Wedgetail, two uncrewed MQ-28 Ghost Bat aircraft, and a third digitally-simulated collaborative combat aircraft (CCA).[5] During this first-of-its-kind airborne systems demonstration, all aircraft were controlled by a single operator onboard the E-7A, showcasing the ability to coordinate and control multiple uncrewed assets simultaneously.

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Program Spotlight: E-7 Wedgetail

Background

Built on Boeing's 737-700 series airframe, the E-7 is an Airborne Early Warning and Control (AEW&C) aircraft that provides situational awareness and command and control functions. The E-7 carries a 360-degree Multi-Role Electronically Scanned Array (MESA) radar housed in a distinctive fin on the spine of the aircraft that can simultaneously detect and track multiple airborne and maritime threats.[6] The E-7 AEW&C platform is already operated by Australia, the Republic of Korea, and Türkiye, and three E-7s will soon be operated by the United Kingdom. In April 2022, the U.S. Air Force (USAF) selected the E-7 to replace the E-3 Sentry fleet that was first fielded in the 1970s.[7] In November 2023, NATO also selected the E-7 as its next-generation command and control aircraft.[8]

Benefits

Enhanced Sensing & Surveillance

Exclusively equipped with Northrop Grumman's MESA radar, the E-7 has continuous 360-degree coverage and long-range detection with an Identification Friend or Foe (IFF) Mode 5 responder to allow crews to spot, classify, and track threats earlier.[9] In typical missions, the E-7 AEW&C can survey more than four million square kilometers, providing theater-scale awareness.[10] Onboard mission systems aggregate and share data across air, space, and ground forces. Within the broader MTI ecosystem, the E-7 adds capacity and critical redundancy that preserve coverage and sustain force readiness even when space or ground sensors are degraded.

Resiliency & Agility

The E-7 can redeploy within hours, refuel in flight, and maneuver on demand. Built on a widely supported commercial 737 airframe and backed by a robust global maintenance network, it can be turned around quickly and returned to service after damage or heavy use.[11] The E-7's air-to-air refueling capability extends endurance and reach, enabling persistent coverage over theaters and rapid shifts in operating location as conditions change.[12] This agility enhances survivability and allows the E-7 to maintain continuous MTI custody and dependable airborne BMC2.

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Open System Design

The E-7's Open Mission Systems (OMS) platform provides modular, non-proprietary interfaces so that operators can push new software updates or integrate new sensors, datalinks, and battle-management applications without major redesigns, keeping capability current as threats evolve.[13] Boeing demonstrated these OMS features in a pair of 2020 test flights, validating rapid integration and upgrade paths on the AEW&C architecture.[14] Together, this open architecture and mission-system modularity give operators the adaptability to evolve tactics and technology on operational timelines.

MUM-T Potential

Advanced capabilities for the E-7 now extend to multi-platform integration and enhanced domain awareness through MUM-T. The addition of CCAs, whether as the MQ-28 or other platforms, can add protective mass, enhance survivability, and extend the Wedgetail's operational reach. These developments not only demonstrate the E-7's current capabilities but also underscore its adaptability to incorporate future advanced systems and transform airborne command and control.

Interoperability

E-7 aircraft are in service with Australia, the Republic of Korea, and Türkiye. Other air forces worldwide, including the UK Royal Air Force, are modernizing airborne early warning capabilities with the E-7. These procurements are fostering opportunities for allied collaboration, interoperability, and real-time intelligence sharing in increasingly complex environments.

"Since having a robust tracking and battle management system is fundamental to projecting air power and winning conflicts, prudence demands we acquire sufficient numbers of E-7s to prevail whenever the next conflict unfolds."[15]
— Retired U.S. Air Force Generals July 7, 2025 Letter to Congress

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Conclusion

In an era of evolving threats and contested domains, U.S. and allied advantage hinges on its ability to achieve resilient, all-domain awareness and rapid, informed decision-making. Integrating MTI across all domains to inform airborne BMC2 ensures redundancy and resiliency in the face of disruption. Platforms like the E-7 exemplify how advanced sensing coupled with robust BMC2, open mission systems architecture for rapid capability evolution, and manned–unmanned teaming can provide a clearer picture of the battlefield, enhance interoperability, and sustain mission effectiveness. As future MTI capabilities continue to evolve, retaining flexible, mobile, and collaborative airborne assets remains essential for maintaining dominance on future battlefields. Victory will belong to the force best informed.

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Industry Perspective

For militaries around the globe, fusing and distributing air, land, maritime, and space sensing into an actionable battlespace picture enables allies to operate as one coherent team across the full spectrum of conflict. Operators depend on seamless interoperability—shared tracks, common datalinks, and open architectures that allow coalition partners to plug in their sensors and weapons without time-consuming translation or stove-piped workarounds. Multi-domain battle management capabilities shorten decision timelines by correlating satellite cues, aerial assets, ground radars, and naval systems into prioritized targets and deconflicted maneuver corridors, enabling distributed commanders to synchronize fires and movement with confidence.

Integrating air and space intelligence, reconnaissance, and surveillance into resilient cross-domain communications strengthens continuity of command in contested environments, while compatibility with terrestrial C2 networks ensures land and sea forces receive timely, precise direction. The effectiveness of allied coalitions depends on synchronized effects across domains to protect populations, preserve access, and execute unified campaigns when stakes are highest. Boeing and industry partners integrate emerging technology to bring advanced capabilities to the future warfighter to secure battle management and awareness for allied nations.

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Endnotes

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