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The modular EW payload for CCAs

With the best mix of capability, size & cost.

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Photo: Courtesy of SRC Inc.

When Collaborative Combat Aircraft (CCAs) are thrust into combat operations with manned aircraft, they'll need to be able to produce key effects. Among them is the ability to create confusion within an adversary's sensors, degrading its situational awareness and in turn exposing vulnerabilities U.S. forces can exploit. *Ghost Mantis®* multi-function RF technologies are designed to plug-in to CCAs to do just that.

Ghost Mantis systems are conceived, designed and built by SRC Inc., a global not-for-profit research and development company that has provided advanced electronic systems and threat analysis to the U.S. military since the 1950s.

That breadth of experience led SRC to develop Ghost Mantis technologies as small, lightweight modular electronic warfare (EW) payloads that can be quickly integrated into CCAs with capabilities that span electronic attack, support, and protection. To illustrate the technology's purpose and potential, SRC created a video which helps visualize a fictitious Ghost Mantis system in action within mixed manned fighter/CCA teams.

The video depicts a scenario wherein a Red Force airborne early warning and control (AEW&C) aircraft surveilling the battlespace detects approaching U.S. aircraft and directs

Red fighter escort to intercept. As Red Force fighters advance to cut off the mixed American formation, a U.S. F-35 directs a Ghost Mantis-equipped CCA toward the adversary fighters to deploy EW effects.

Using integrated passive RF detection to sense, characterize and identify the Red Force aircraft, the CCA employs electronic deception, making it appear as an F-35 to adversary sensors, forcing a Red air interceptor away from the fight. The same CCA pivots to disrupt other adversary targeting systems using Ghost Mantis' electronic attack capabilities and, directed by the real F-35, fires an air-air missile at a Red aircraft, downing it.

As the engagement evolves, Ghost Mantis-enabled CCAs continue to disrupt Red Air targeting, ultimately allowing the U.S. formation to successfully intercept the AEW&C aircraft. Following the interception, Ghost Mantis systems on the CCAs dynamically reprogram themselves and immediately send valuable Intelligence Mission Data (IMD) to other U.S. forces.

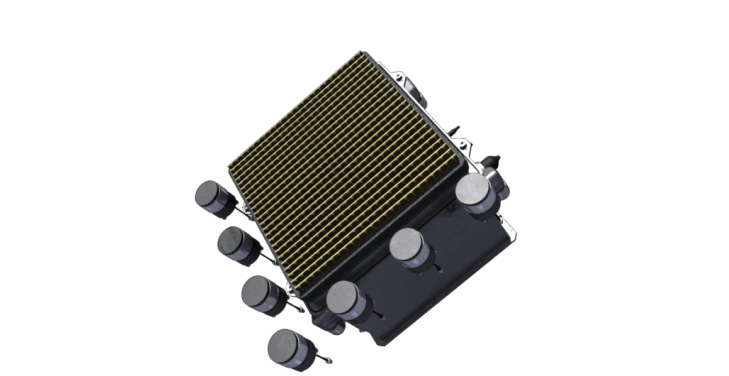
The combination of Ghost Mantis-enabled deception, electronic attack, reprogramming and timely signals intelligence (SIGINT) distribution denies the adversary vital battlespace awareness and allows U.S. forces to further exploit that blindness. It's the kind of capability that the U.S. Air Force sees as critical to realizing the tactical and cost advantages that CCAs promise.

Ghost Mantis technologies bring this capability to new unmanned aircraft in an entirely platform-agnostic way with attritability and affordability in mind. The technologies can be configured and designed for platform-specific constraints as a single-package multi-functional integrated payload that offers 80% of the capability of the most sophisticated EW systems at 20% of the cost.

Big Capability In a Small Package

Ghost Mantis systems are built to a compact SWaP (Size Weight & Power), allowing them to fit within the outer mold-lines of CCAs or Group 3 UAS, preserving both stealth signatures and aerodynamic efficiency.

The modular open systems architecture (MOSA) design approach offers a basic hardware and software backbone that specific EW, radar, and SIGINT sub-modules can plug into. Third parties can insert their own capabilities into Ghost Mantis systems – in fact, third party software skills have already been flown and demonstrated. The integration of these new capabilities lowers the cost and time necessary to tailor or adapt the system for new applications while breaking the cycle of proprietary solutions that often handcuff the customer.



Example of a Ghost Mantis system that would install in the nosecone of a CCA

"Our commitment to designing Ghost Mantis systems with open architecture standards will allow us to rapidly add capabilities to respond to adversarial advances," Nick Reppard, SRC's director for collaborative sensors and effectors affirms. "We expect Ghost Mantis systems will go through rapid capability iteration."

In addition to the modular architecture, Ghost Mantis systems come with a set of relevant integrated capabilities ready to deploy, obviating the need for platform integrators to buy different components from different suppliers to form a full basic capability set. A Ghost Mantis system can be a one-stop, single-package acquisition.

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Developed with SRC's decades of SIGINT, radar and EW design experience, Ghost Mantis technologies can operate in multiple modes from completely passive surveillance to active radar/RF emulation and electronic attack either in isolation or in simultaneous combination. Its Active Electronically Scanned Array (AESA) allows it to discriminate spatially and to target advanced threats with power and precision.

SRC has also demonstrated quick integration of Ghost Mantis systems into CCAs. Thanks to the engineering team's use of digital twins and development work with platform designers, the company is able to insert the systems into new platforms in just a short period of time. This includes its availability in an external podded configuration (standard wing pod or agile pod) for manned/unmanned aircraft. Indeed, Ghost Mantis technologies are already undergoing flight tests and evaluations today.

Rapid Reprogrammability Drives Survivability Up & Cost Down

Providing warfighters with continuously updated Intelligence Mission Data (IMD) is crucial to keeping them safe and effective. This applies particularly to data stored in the Electronic Warfare Integrated Reprogramming Database (EWIRDB) which is leveraged by manned and unmanned aircraft.

But updating Mission Data Files and EW threat libraries is a time-consuming and expensive manual process, often tying-down expert teams for days and weeks, limiting timely updates to the field. Ghost Mantis technology shortens the timeline by automating the process of ingesting and using intelligence data, bypassing the manual reprogramming and analysis that typically takes place.

"What we've heard from our customers is that 4th and 5th generation systems like F-22 and F-35 are too difficult to rapidly reprogram," Nick Reppard relates. "The automation we've implemented for Ghost Mantis technology solves the manual programming and testing challenges of mission data."

Ghost Mantis systems leverage AI and machine learning features to actively learn from what they see in the environment, almost immediately updating IMD. When returning from a mission the systems can pass data on that they have learned about threats to an outgoing sortie package and to other elements of a Joint All-Domain Command and Control system.

Photo: Courtesy of SRC Inc.

Such rapid reprogramming ensures that platforms (CCAs, manned aircraft, ships, etc.) have the most up-to-date data available allowing them to respond to rapidly changing threats, increasing their lethality across the battlespace.

Though attrition is part of the CCA concept, the automated reprogrammability of Ghost Mantis systems effectively increases survivability by allowing CCAs to integrate and share new threat information.

Significant numbers of Ghost Mantis-equipped CCAs present distributed sensing opportunities, taking the knowledge of the collective CCA environment and improving the strength of each platform after each mission and in real time. CCAs that can survive to fight a second, fifth or 10^{th} day not only generate more combat power, they amortize their cost with each additional sortie.

The automation that Ghost Mantis technologies offers likewise reduces cost by lowering the reprogramming, test and evaluation burden for key units like the USAF's 350th Spectrum Warfare Wing, allowing fewer personnel to complete reprogramming tasks and

to focus where most needed. The reduction in human error that automated reprogramming yields represents further savings.

While CCAs will often make "first contact" with adversaries, Ghost Mantis technology significantly enhances their ability to get to the fight and stay in the fight beyond a single engagement.

SRC Builds State of The Art EW Solutions

SRC has developed, produced and supplied state-of-the-art EW systems to the U.S. military for decades. Built with both flexibility and modularity in mind, they have evolved to meet mission needs and provide warfighters with effective multi-function EW in a variety of SWaP-constrained applications.

A prime example is SRC's AN/VLQ-12 CREW Duke system which began life in the mid-2000s as a low power, short-range jammer to keep radio-controlled roadside bombs from destroying U.S. tactical vehicles. CREW Duke evolved into a far more sophisticated system capable of detecting and disrupting a wide range of signals, from cellphones to the control links for enemy drones, becoming the centerpiece of the Army's Electronic Warfare Tactical Vehicle in 2018.

The Duke system was selected as one of the U.S. Army's Top 10 Greatest Inventions in both 2005 and 2009. Around 40,000 systems have been deployed on Army and Marine Corps vehicle platforms and SRC engineers have continually enhanced fielded Duke systems with programming upgrades.

Other SRC EW systems include its *Protean*® multi-mission EW (currently being used in the U.S. Army's LIDS), Crypsis NAVWAR and *Silent Cyclone*® counter-drone jammers, its *Silent Impact*® munition-delivered long-range jammer and its *Silent Swarm*® covertly dispersed cyber electromagnetic attack system. The company has an extensive portfolio of in-service mobile tactical radars, counter-UAS radar sensors, advanced fire-control, airborne, air surveillance, and multi-mission radars.

The diversity of the electronic systems which SRC designs and develops is complimented by its in-house manufacturing capability. The company's Syracuse-based SRCTec, LLC manufacturing subsidiary operates a flexible, 200,000 square foot facility, with more than 90,000 square feet dedicated to manufacturing.

Its advanced manufacturing operation can handle the most aggressive delivery schedules, while maintaining the highest quality standards -- capability it has proven with rapid production expansion to meet urgent warfighting demand for systems like CREW Duke.

SRC has a hot production line ready to deliver Ghost Mantis systems on short timelines. With the production of as many as 200 CCAs expected to be underway by 2028 and fleet introduction slated for 2029 or earlier, SRC is a rare supplier ready to fill the need for integrated EW payloads by producing systems in-volume in the U.S.

Moreover, the company's not-for-profit status fosters reinvestment of its earnings back into the enterprise, enabling it to aggressively resource new facilities, state-of-the-art equipment, internal R&D projects, business-diversification, and professional development for its 1,400-strong workforce. Free from shareholder concerns, SRC doesn't cut corners to maximize quarterly returns.

Choosing Ghost Mantis technology and SRC also maintains diversification of the defense-industrial base in similar fashion to the embrace of emerging defense technology providers for CCAs and other platforms.

"If you asked observers whether the traditional airborne radar/AESA providers would compete for CCA integration, most would have said they were shoe-ins. Yet we're here," SRC's director of business development for the U.S. Navy, Andrew Tormey, points out. "We're one of the first to fly and one of the first to show passive and active capabilities in one system. We are excited to continue to build on that momentum."

Topics: Air Force, airborne early warning aircraft, collaborative combat aircraft, cyber security, early warning capabilities, electronic warfare (EW), MOSA, networks, Presented by SRC, radar, radio frequency, SIGINT, Sponsored Content, SRC, SRC Ghost Mantis, technology

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