Red Sands IEC 25 Advances TF Spartan's Combined C-UAS Operations and Experimentation

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As adversary Unmanned Aircraft System (UAS) threats continue to evolve and proliferate, including One-Way Attack UAS (OWAUAS) and small UAS (sUAS), leveraging Combined Counter UAS (C-UAS) capabilities is critical.[1] U.S. allies and partner nations across all Combatant Commands can contribute to Combined C-UAS of U.S. and friendly assets, equipment, and personnel. Such Combined C-UAS operations improve the likelihood that friendly forces will successfully defend against UAS surveillance and attack, which is especially critical as adversary UAS increase in number, complexity, and scale. At Red Sands Integrated Experimentation Center (IEC) 25.1 in the Kingdom of Saudi Arabia, the 42d Infantry Division—deployed as the Headquarters of Task Force Spartan—proved the true potential of Combined C-UAS operations via a Combined Base Defense Operations Center (BDOC).

A Group1 UAS swarm approaches friendly positions at Red Sands IEC 25.

[1] *See generally* Daniel M. Gettinger, Department of Defense Counter Unmanned Aircraft Systems: Background and Issues for Congress, Congressional Research Service R48477, March 31, 2025, https://www.congress.gov/crs-product/R48477.

The Combined BDOC conducted Engagement Operations (EO) of all weapons systems participating in Red Sands. This included U.S. ground-based Fixed Site (FS)- and Mobile (M)-Low, Slow, Small, Unmanned Aircraft System Integrated Defeat Systems (LIDS), Saudi ground-based Shikra, Skyguard, and Moreeb systems, Saudi fixed-wing F-15SAs and Typhoon multirole fighters, both Saudi and U.S. AH-64E Apache helicopters, and both Saudi and U.S. Soldier-borne C-UAS detector and handheld defeat systems.[2] The complex arrangement and employment of ground- and air-based weapons systems for C-UAS defense required close coordination, BDOC Tactics, Techniques, and Procedures (TTPs), and integration of engagement controllers from each respective weapons system. The Combined BDOC concept and operation resulted in a number of helpful lessons for Combined C-UAS operations in any environment, ultimately proving that Combined C-UAS defense of an area or installation is complex, but rewarding in terms of engagement efficiency and effectiveness.

The Need for Combined C-UAS

The United States is more integrated and operates more closely with allied and partner nation militaries than perhaps ever before.[3] Both in a potential future Large Scale Combat Operation (LSCO) environment and in current steady-state operations in all theaters, the United States conducts military operations with multilateral organizations and bilaterally with individual states. Future conflicts, whether against state or non-state actors (or a hybrid of both), will invariably result in adversaries targeting both U.S. and friendly allies and partner nations with

[2] USCENTCOM, "U.S., Saudis Lead Largest Counter-Drone Exercise in Middle East," September 17, 2025, https://www.centcom.mil/MEDIA/PRESS-RELEASES/Press-Release-View/Article/4306205/us-saudis-lead-largest-counter-drone-exercise-in-middle-east/.
[3] James C. Boozer, *Allies, Partners More Important Than Ever*, National Defense, May 26, 2020, https://www.nationaldefensemagazine.org/articles/2020/5/26/allies-partners-more-important-than-ever.

UAS. The quantity, complexity, and significant threat posed by the ever-expanding UAS threats means that Combined C-UAS is the most effective and efficient means to protect friendly forces and preserve combat power and freedom of maneuver in all phases of conflict.[4]

The RSADF Skyguard system employed 35mm cannons to defeat UAS threats at Red Sands.

U.S. allies and partners, like U.S. forces, have a variety of C-UAS capabilities. Some are older systems originally designed for traditional air defense against fixed-and rotary-wing threats, upgraded to improve performance against UAS threats. At Red Sands 25, the Royal Saudi Air Defense Forces (RSADF) employed the Skyguard 35mm Oerlikon cannon system alongside the Shikra missile system, fired from a HMMWV platform. The U.S. Army also executed a Patriot live fire, showcasing the ability of a legacy Air and Missile Defense (AMD) system to effectively defeat larger Groups 3-5 UAS.

Other weapon systems are purpose-designed for C-UAS operations. The Saudi defense industry employed the Moreeb system, an integrated Electronic Warfare (EW) and kinetic defeat system, employing both jamming capabilities and a 12.8mm machine gun. The Army's LIDS systems, both M-LIDS and FS-LIDS, are the Army's new Program of Record for C-UAS operations. At Red Sands, the U.S. crew employed Coyote kinetic defeat missiles, as well as the

[4] Stacie Pettyjohn and Molly Campbell, *Counter the Swarm: Protecting the Joint Force in the Drone Age*, Center for a New American Security, September 10, 2025, https://www.cnas.org/publications/reports/countering-the-swarm.

M-LIDS 30mm gun to defeat Groups 1-3 UAS. The Vanguard utilizes the Dillon Aero M134D minigun for C-UAS, particularly against Group 1 UAS swarms.

One of the most unique aspects of Red Sands is the employment of air capabilities for C-UAS operations. The Royal Saudi Air Force (RSAF) flew Typhoon fighter jets and F-15SAs, along with air-to-air tanker refueling, while the Royal Saudi Land Force (RSLF) and Ministry of the National Guard (MNG) flew AH-64E Apaches alongside TF Spartan U.S. Apaches. The U.S. Army Apaches employed Hellfire missiles and Advanced Precision Kill Weapons Systems (APKWS) rockets against Group 3 UAS.

The coordination, integration, and Tactical Command and Control (TAC C2) of all these systems, both air and ground from both countries and multiple services, presented a complex C2 problem. TF Spartan led the creation of a Combined BDOC to merge these multiple weapons systems and services in order to effectively execute C-UAS fires and defense against a series of Groups 1-3 UAS attacks.

Combined Air and Ground Controllers in the Combined BDOC

In creating the Combined BDOC, TF Spartan initially modeled operational U.S. BDOCs that execute C-UAS operations in theater.[5] While this provided a basic setup, significant changes were necessary to incorporate all the capabilities and services. TF Spartan broke up C2 into four groups: U.S. ground-based systems, U.S. air systems, Saudi ground, and Saudi air.

For the air systems, U.S. and Saudi Joint Terminal Attack Controllers (JTACs)—normally used for air-to-ground Close Air Support (CAS)—adapted to controlling aircraft for air-to-air C-UAS engagements. To ensure safe air deconfliction and synchronized C-UAS

[5] For the basic makeup of FS- and M-LIDS crews, see TC 3-01.86, C-sUAS Gunnery Program, Department of the Army, May 6, 2025.

defense, the JTACs utilized the same radio control nets and typically one JTAC controlled all aircraft operating in the area, regardless of nationality. This created a truly Combined air-to-air C-UAS capability.

Staff Sgt. Kyle Willoughby from the 9th Air Support Operations Squadron (ASOS) Tactical Air Control Party (TACP) served as the U.S. JTAC. He found the Combined "integration both essential and challenging" from an air control perspective. "Disparities in training standards and C2 structures created challenges when attempting to combine efforts for C-UAS. At the same time, acknowledging them provided valuable opportunities to guide training, refine integration, and build stronger partnerships that benefit both forces."

The Saudi and U.S. JTACs controlled aircraft from within the Combined BDOC and, as needed, from vantage points on the range that allowed for direct visual observation of friendly aircraft. In an operational Combined BDOC, a full TACP may be beneficial to permit controllers simultaneously in the Combined BDOC and out at observation points.

Bravo Battery, 2-55 ADA engages a hostile UAS with a PAC-2 interceptor during Red Sands IEC 25.

For ground systems, the Combined BDOC controlled C-UAS fires centrally. An overall Combined C2 team, with senior personnel from both the U.S. and Saudi side, collaborated across every step of the Detect, Identify, Decide, Engage, and Assess (DIDEA) cycle for potentially threatening UAS. A U.S. BDOC crew-controlled U.S. FS-LIDS and M-LIDS fires, while a Royal Saudi Air Defense Forces (RSADF) Ground-Based Air Defense Officer (GBADO) controlled Shikra, Skyguard, and Moreeb fires. This middle-tier C2 element would then pass tactical commands to the specific weapons system operators, either digitally or verbally, who then executed the tactical mission. The weapons systems operators consistently reported the engagement results, equipment status, and so on, to the Combined BDOC for follow-on tactical decisions and battle tracking.

Staff Sgt. Brian Medley from the 2-130 Infantry Battalion, Illinois Army National Guard, served as the U.S. Battle NCO. As the U.S. representative helping oversee all U.S. LIDS engagements alongside the U.S. Battle Captain, SSG Medley was instrumental in intra-Combined BDOC communication, including with his RSADF counterparts. According to him, "the layout of the BDOC enabled communication to flow really well between the Saudi side and the U.S. side."

The RSADF GBADO cell was also able to effectively control fires for Saudi systems. Close coordination with the Combined C2 element allowed for effective relay of tactical commands and consistent feedback on engagement and equipment status. The Combined BDOC's Common Operating Picture (COP) integrated multiple radar feeds, as well as Electro-Optical (EO) and Infrared (IR) camera feeds that aided in identification and assessment of

friendly effects against UAS. Use of these systems allowed the GBADO to effectively correlate tracks with the weapons systems operators.

Combined TTPs and C-UAS Planning

The successful integration and execution of the Red Sands IEC 25 LFX highlighted the importance of up-front academics and planning. Prior to deployment to the range, the Combined BDOC planners and operators conducted a BDOC Academics Week, bringing together the same Joint and Combined members that would execute Combined BDOC C-UAS operations.

Establishing a shared understanding of the threat and friendly C-UAS weapons systems' capabilities and limitations was essential in preparing for live operations. Without knowledge of the various systems—and their usual employment TTPs—the controllers of the Combined BDOC would not be able to effectively integrate the various systems. That could result in unnecessary over-engagement—or, worse, no effective engagement whatsoever.

As U.S. LIDS operators in the Combined BDOC, Specialists Daniel Fank and Christian Hamblen, 2-130 IN Battalion, found immense value in the Combined Academics: "working side by side with the Saudi personnel, we noticed that they were very curious and asked plenty of questions about our systems. We even had pilots from their forces actively involved and interested with our systems, such as the FAAD." This knowledge exchange was critical for establishing engagement procedures, Combined BDOC communications, setting engagement sectors, and creating a priority of engagement list based on capability and threat. SSG Medley was able to explain the variations of the U.S. Coyote interceptors, including the differences between Coyote Block-2 and Block-3 interceptors.[6]

[6] *See* "RTX's Raytheon Demos KuRFS and Coyote Performance Against Complex UAS Threats," *RTX*, October 14, 2024, https://www.rtx.com/news/news-center/2024/10/14/rtxs-raytheon-demos-kurfs-and-coyote-performance-against-complex-uas-threats.

RSAF and RSADF subject matter experts, along with representatives from Saudi national companies and research agencies developing new C-UAS technologies, also built competence and understanding for the U.S. operators and controllers. A thorough understanding of the capabilities and procedures of the Saudi systems was essential to effective planning and C2. For example, the RSADF forces, namely Shikra and Skyguard, relied upon traditional ADA procedures, including Weapons Control Status (WCS) and Air Defense Warning (ADW), to facilitate their engagement authorities and procedures. Knowledge of how each WCS and ADW affected their TTPs allowed the TF Spartan U.S. Combined C2 planners to set proper statuses and warnings that enabled their effective operation.

The RSADF Shikra system utilizes a HMMWV-mounted missile for C-UAS defeat.

SSgt. Willoughby, the U.S. JTAC, also saw value in establishing standardized templates and procedures for all Combined BDOC participants. “A familiar, platform-agnostic format—such as the CAS 9-line—provides common language and expectations that all players understand, regardless of national affiliation.” Future BDOC Academics, as well as Combined

training generally, future C-UAS integration, and establishment of common training requirements, can also enhance the C-UAS killchain for Combined operations.

Conclusion

Red Sands IEC 25 proved that Combined C-UAS, including in a Combined BDOC, is difficult, but absolutely necessary. Adversary UAS threats will likely target U.S. and friendly forces alike, utilizing the same UAS platforms, launched and controlled from the same or similar areas, and targeting installations and areas of operation where more than one nation's forces are operating. The myriad of C-UAS systems—legacy AMD systems, emerging C-UAS systems, and air-to-air capabilities—means that Combined C-UAS, including a thorough understanding of partner nation capabilities and procedures, is essential to negating adversary UAS.

The Red Sands Combined BDOC proved the importance of the task and that bilateral C-UAS can be extremely effective. It also established opportunities for future Combined C-UAS growth, including in terms of system integration, procedural planning, and knowledge-sharing. These lessons will help build future Red Sands IEC iterations, as well as other efforts across the theater to improve Combined C-UAS against shared adversaries. The complexity and quantity of the UAS threat environment mandates Combined C-UAS to be effective, and Red Sands continues to build both nations' capabilities.

Author Biography

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