Improving Corps Deep Fires:
NATO's Innovations for U.S. Forces

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The defense of NATO's Eastern Flank will be decided in the deep fight. The war in land fires must synchronize, converge, and defeat enemy forces in depth. The war in Ukraine demonstrates that both sides can effectively mass thousands of fires daily, driving NATO to experiment with new ways to shorten the kill chain and seize the initiative. U.S. forces have an opportunity to learn from these NATO-led efforts, drawing on operational experience to adopt alliance innovations that increase lethality, responsiveness, and interoperability in corps deep fires.

Whereas brigades and division once served as the principal operational units during the peace support and counterinsurgency era, tailored operational habits formed that still linger today. That strategic environment was defined by a low tolerance for risk, deliberate decision cycles, air supremacy, and a relatively slow operational tempo. As a result, missions were often designed to be nearly risk free, at the cost of speed, adaptability, and overall effectiveness. [1]

As we pivot toward Large-Scale Combat Operations (LSCO), however, that legacy mindset presents real challenges. Preparing for LSCO requires more than updated tactics – it demands a fundamental rethinking of how we plan, synchronize, and execute operations. The modern battlespace introduces exponentially more airspace users, extended system ranges, and compressed decision timelines. These dynamics call for an evolved approach to command and control, one that prioritizes agility and operational effectiveness, even amid uncertainty and risk.

To achieve this shift, three NATO concepts stand out: corps-level Joint Air-Ground Integration Centers (JAGIC), the Air Support Operations Center (ASOC) Battle Management Area (ABMA), and the Rear Artillery Tube Line (RATL). The JAGIC is a current operations staff cell combining fires, targeting, intelligence, and airspace experts to enable rapid, integrated targeting decisions. The ABMA is a notional sector of airspace managed by the ASOC to simplify vertical and horizontal deconfliction while integrating air support. The RATL is a procedural line, marking the rearward extent of tube artillery fires to help aircraft manage risk. Developed and refined through NATO experimentation, these concepts illustrate how the alliance is modernizing air-land integration. Together, they shorten the kill chain, reduce risk, and maximize the combat power of allied fires. More importantly, they represent a shift from incremental adjustments to a comprehensive approach, one that should prompt U.S. forces to rethink how corps deep fires are coordinated, controlled, and integrated at scale.

The Challenge of Air-Land Integration

In LSCO, airspace deconfliction and targeting coordination are constant challenges. A major European theater conflict could generate thousands of daily fires deconflictions and hundreds of air support requests. Traditional airspace coordination measures (ACMs) and fire support coordination measures (FSCMs) refined during recent decades of low-intensity conflict are insufficient at this scale.

Current U.S. tools, such as coordinating altitude (CA), coordination level (CL), and special ACMs like restricted operating zones (ROZ), goalposts, and hotwalls, can work in limited contexts, but are poorly suited to LSCO's density and tempo. ROZs and goalposts require deliberate planning and often delay responsive or mobile fires, while hotwalls are highly restrictive and can shut down large volumes of airspace. Unmanned aerial system (UAS) proliferation further complicates the picture, adding persistent demands on airspace management and targeting.

U.S. forces typically employ JAGICs at the division level, but NATO experimentation shows that shifting these functions to the corps echelon, supported by ABMAs and RATLs, creates a permissive fires environment with the flexibility and authority needed to keep pace with an adversary's overwhelming firepower. [2]

Corps-Level JAGICs

Though U.S. doctrine places the JAGIC at the division level to consolidate fires, airspace, and targeting personnel in one integrated node, NATO found greater efficiency by elevating the JAGIC to the corps. The 1 German-Netherlands Corps (1GNC) and the U.K.'s Allied Rapid Reaction Corps (ARRC) tested corps JAGICs, demonstrating their ability to manage deep fires, prosecute suppression of enemy air defense (SEAD) missions more effectively with fixed-wing aircraft, and integrate corps-level artillery, intelligence, and electronic warfare, naval gunfire, and aviation into the deep fight. [3]

In NATO exercises, division JAGICs struggled to maintain a shortened kill chain because most target engagement authorities (TEA), fires rules of engagement (ROE), and collateral damage estimate (CDE) requirements reside at corps or higher. Positioning the JAGIC at corps allows commanders to rapidly approve dynamic targeting decisions without waiting for divisions to elevate requests (*see Figure 1*). Corps are also more consistently equipped with the appropriate digital fires and targeting systems to meet target selection standards and

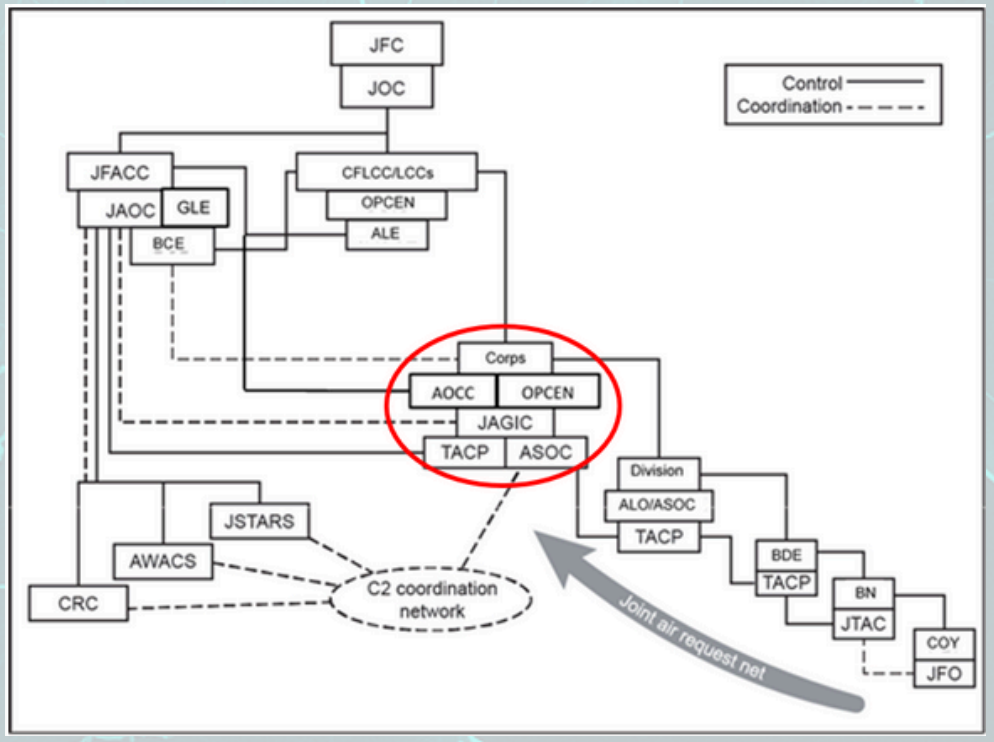

Figure 1. Corps-level JAGIC Conceptual Placement
(Photo Provided by Author)

support faster decisions. NATO found that corps JAGICs can cut joint fires deconfliction timelines to under six minutes. [4]

Challenges remain. Divisions may hesitate to relinquish joint fires integration capability or ACM control, given its traditional home at division level. Manning is also an issue, especially for the ASOC, which requires highly trained personnel, scarce across the alliance. Additionally, supporting every division with a JAGIC is nearly impossible (*see Figure 2*).

Recent allied exercises and NATO's Air-Land Integration Symposium highlighted both the benefits and challenges: ground components welcomed faster approval and more coherent multidomain integration, while some air components raised concerns about standardizing multinational airspace procedures across diverse corps. These concerns emphasize that important doctrinal details must be refined, but both corps and divisions are increasingly receptive.

Notably, III Armored Corps' recent warfighter exercise successfully experimented with the corps JAGIC, concluding that the corps echelon is the proper level for managing airspace as a weapon system. [5]

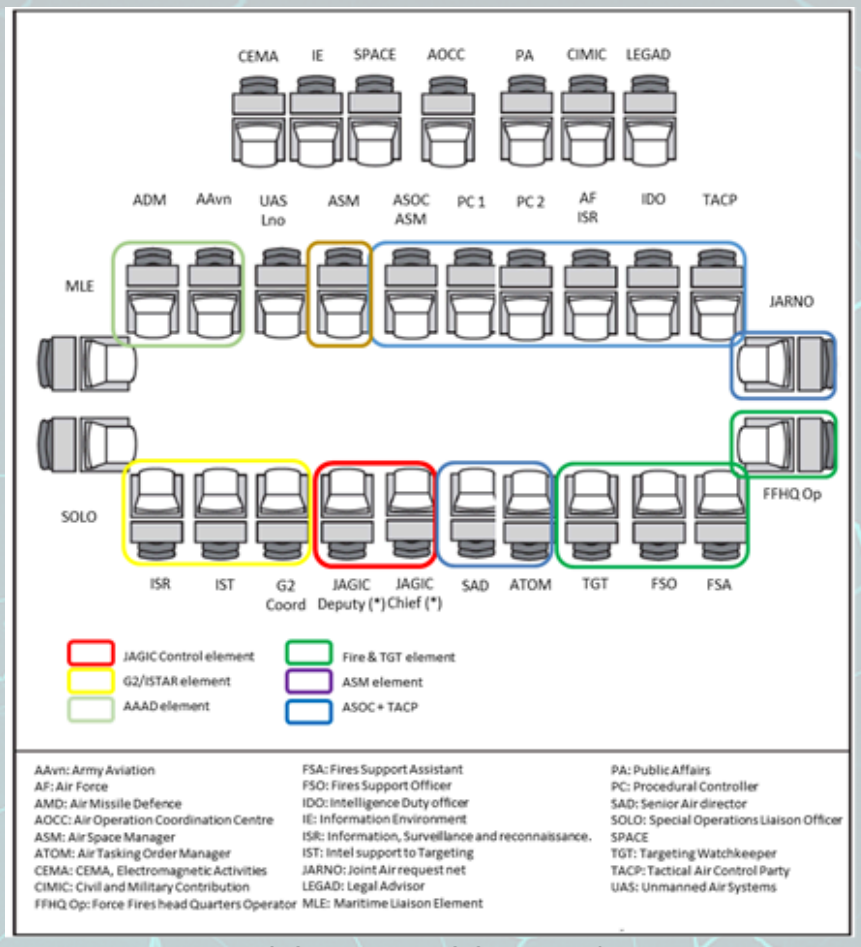

Figure 2. Corps-level JAGIC Positions & Layout
(Photo Provided by Author)

The ASOC ABMA

The ABMA is a new Allied Air Command (AIRCOM) concept under experimentation. Because the ASOC is a mandatory component of the JAGIC, the ABMA aims to simplify and accelerate tactical airspace control.

Traditional deconfliction – using CA, CL, and the fire support coordination line (FSCL) – has proven cumbersome at scale. The ABMA addresses this by delegating airspace to the corps to subdivide into three or four sectors from the close area to the FSCL. This enables flexibility, direct control, and responsiveness for combat engagements and dynamic targeting.

ABMAs also support broader AIRCOM constructs. Air Power Contribution to Counter-Land Operations (APCLO) depends on clear airspace structures. Composite Air Operations (COMAO) requires predictable coordination. The ABMA provides a framework for integrating land fires rapidly into APCLO and COMAO.

Though promising, ABMAs are not yet codified in NATO doctrine. Recent 1GNC and ARRC exercises using ABMA constructs (*see Figure 3)* reduced deconfliction from hours to minutes, demonstrating both potential and challenges, particularly aligning procedures across nations and ensuring common digital airspace visualization tools. [6]

The ABMA's upper limit often aligns with the CA, typically mid-20,000 feet above mean sea level (around FL250) to account for mortar and cannon ordnance. [7] This is insufficient for rocket artillery, whose maximum ordnance heights overlap with manned and unmanned flight corridors. Guided Multiple Launch Rocket System (GMLRS), for example, can reach 71,000 feet, forcing reconsideration of traditional CA settings.

Therefore, ABMA planning must align its upper limit with rocket artillery's maximum ordinate. Mortars and cannon fires are unaffected, but missile fires, such as the Army Tactical Missile System (ATACMS) and Precision Strike Missile (PrSM - exceeding 180,000 feet), can remain excluded due to their rarity and requirement for deliberate deconfliction. [8]

Aligning ABMAs with rocket artillery enables greater freedom of action for land-based fires while allowing a corps JAGIC to coordinate with the air component for fires exceeding the ABMA limit. [9] The growing use of UAS further reinforces the need for this framework.

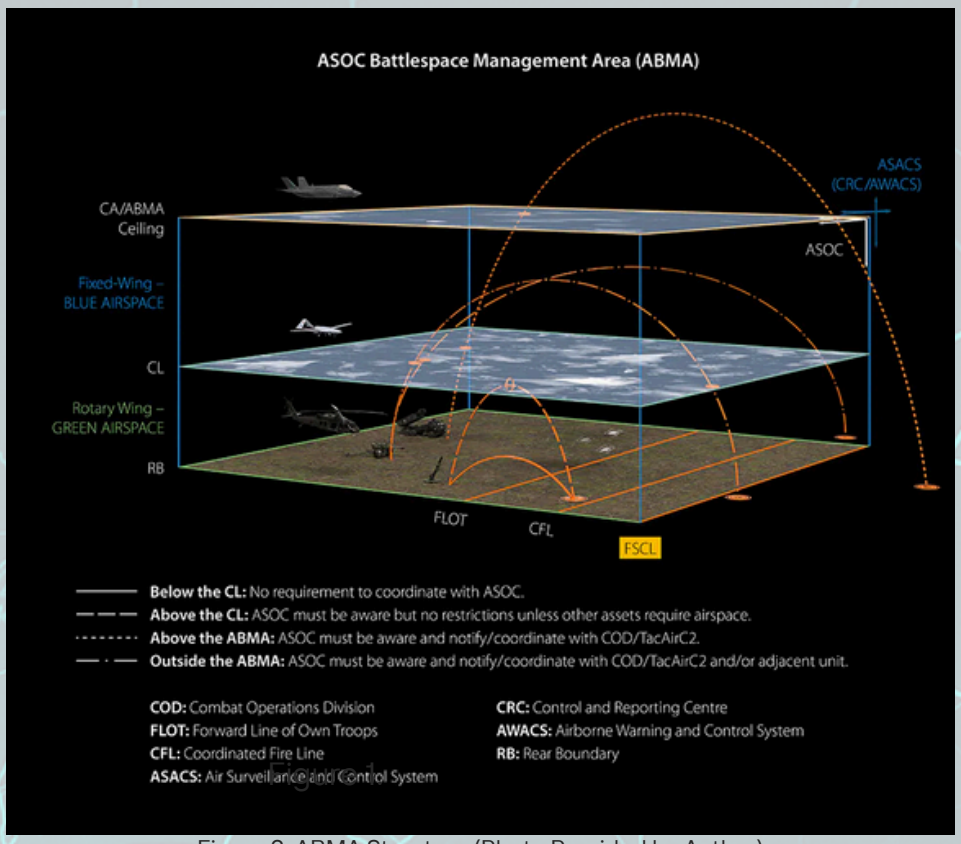

Figure 3. ABMA Structure (Photo Provided by Author)

The RATL

The RATL is another AIRCOM concept providing a procedural control measure identifying the most rearward position from which tube artillery fires are expected. It informs friendly aircraft where tube artillery is firing, helping manage risk with minimal restriction on land-based fires.

During the 2025 Joint Project Optic Windmill (JPOW) , 1GNC validated the RATL as part of integrated air and missile defense. AIRCOM proposed refinements at its annual Weapons and Tactics (WEPTAC) seminar. The RATL allowed corps along NATO's Eastern Flank to maintain responsive counterfire without pausing for aircraft clearance. Aircraft could cross the RATL by assuming calculated risk, coordinated through a corps JAGIC.

It is worth noting that the airspace is not owned by just friendly fires. NATO analysis found the statistical risk of artillery fratricide against aircraft to be negligible – fewer than one in one million flight hours when firing 1,000 rounds per hour. With allied artillery already outnumbered by

Russia (five-to-one) [10], who also fire into the same contested airspace allied aircraft transit, commanders should accept this risk rather than restrict land fires.

Challenges remain; air components require improved digital visualization and standardized procedures for crossing the RATL. JPOW reinforced the need for multinational exercises to reconcile procedural differences and build confidence.

RATLs also help air components understand ground battlespace measures by aggregating Artillery Maneuver Areas (AMA) across multiple corps. While AMAs designate artillery employment areas, the RATL provides a simpler procedural reference for where fires originate across a broad battlespace.

The original RATL excluded rockets and short range ballistic missiles (SRBM). Given the expected volume of rocket fire in LSCO, this article proposes adapting the RATL to include rockets, but continue excluding SRBMs, PrSM, ATACMS, Korea's KTSSM and the Predator Hawk. It is important to highlight this because allies are rapidly procuring diverse sophisticated long-range precision fires that requires a reevaluation of traditional battlespace management techniques.

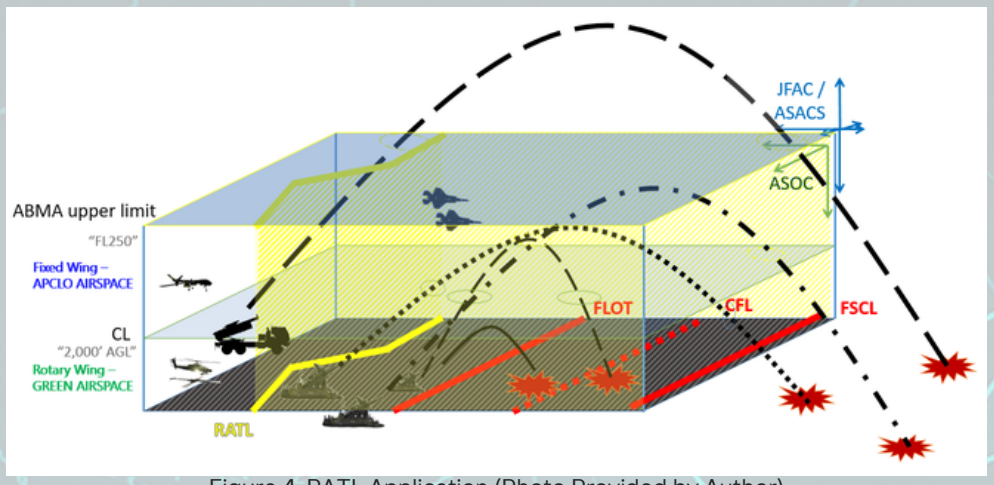

Figure 4. RATL Application (Photo Provided by Author)

Remember, rocket maximum ordinates create natural intersections with aircraft flight paths, so the RATL offers a clear procedural reference to manage this risk (*see Figure 4*).

Recommendations

To maintain tempo and initiative in LSCO, U.S. and NATO military leaders must translate these concepts into lasting improvements:

1.Doctrine & Terminology – Update NATO and U.S. joint fires doctrine to reflect corps-level JAGICs, the ABMA concept, and the adapted RATL. Clarify that the RATL should include rockets but exclude short-range ballistic missiles, ensuring terminology reflects the evolving long-range precision fires mix.

2. Training & Education – Incorporate these allied concepts into joint professional military education, as well as U.S. Army and NATO schools. NATO training centers for Joint Operational Fires and JAGICs/ASOCs would standardize practices across allies [11]

3.Exercises & Experimentation – Continue refining these procedures in multinational exercises like JPOW or the artillery-centric Dynamic Front, validating interoperability under realistic LSCO conditions. These NATO concepts should reinforce emerging, high-priority U.S. initiatives like the Eastern Flank Deterrence Line (EFDL) to achieve a more cohesive, multi-domain deterrent. [12]

4.Technology & Tools – Develop digital tools and shared networks to speed deconfliction decisions and visualize ABMAs and RATLs on the common operating picture. NATO's integration of the Maven Smart System adds unprecedented versatility for air-land integration to delegate authorities and control down to the tactical fight led by NATO corps.

5. Permanent Proponent – Establish a NATO Joint Fires Centre of Excellence as the enduring proponent for these initiatives, providing sustained advocacy, doctrine development, and knowledge management across the Alliance. [13]

The LSCO shift requires a deliberate recalibration…

of the balance between safety and effectiveness. We must move beyond the legacy, risk-averse frameworks of the past to embrace a mindset that is adaptive, resilient, and fit for the high-tempo realities of modern conflict. [14]

Both the ABMA and RATL are promising concepts that would benefit from U.S. expertise and experimentation. However, their adoption will depend on synchronized codification in NATO and U.S. doctrine. By embracing these concepts early, U.S. forces can shape their development, ensure compatibility with future doctrine, and accelerate transformation once formalized. With doctrinal, educational, and institutional reforms, U.S. forces can adapt faster than adversaries and ensure fires remain decisive in future battles.

NATO's efforts offer U.S. forces a blueprint to improve the speed, lethality, and effectiveness of corps deep fires. Corps-level JAGICs provide the authority, scale, and resources needed to integrate multidomain deep fires. ABMAs represent a new approach to airspace control, refining vertical deconfliction beyond traditional ACMs that lacked flexibility across the theater. The RATL ensures artillery and rockets remain free to fight in contested airspace, while missiles can be managed as mission-specific targeting. Altogether, corps-level JAGICs, ABMAs, and the RATL should not be viewed as stand-alone fixes but as complementary solutions to address different aspects of the deep fires problem, creating a much-needed permissive fires environment. When implemented, these innovations shorten the kill chain and strengthen NATO's deep fires capability to win decisively in LSCO.

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