

White Paper

Preparing for Contemporary Armed Conflict: Integrating the Latest Lessons Learned into High-Readiness Training



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What are the inputs for developing high-readiness exercises?

Scenario—the regional, political and military situation

Objectives— the outcomes we will achieve through military operations

Doctrine—how we are structured and how we fight

Force structure—the military resources available to accomplish the mission

The adversary—how they are structured and how they fight

The nature of war doesn't change. But its character changes. Training must change to present the most realistic exercises possible.



The 2020s have seen a significant shift in the western focus for training and preparing for armed conflict. The operational approach used by western militaries in Afghanistan, Iraq, West Africa and the Sahel and elsewhere for almost two decades is no longer the assumed operational model. During the decades of counter-insurgency, confrontation with state-based adversaries was less pressing than meeting ongoing operational needs, such as fighting terrorism and conducting stability operations.

The invasion of Ukraine has shifted the focus of western militaries away from counter-insurgency and back to countering state-based adversaries in large-scale, conventional combat. This shift has renewed emphasis on combined arms maneuver, the use of attack aviation, joint deep fires, persistent intelligence/surveillance/reconnaissance (ISR) activities, and sustaining operations with logistics, maintenance, transport, and casualty handling/medical support. Each of the elements, either through their use or absence, has been significant in the war in Ukraine.

Some maneuver elements have had their advances slowed by shortages of fuel and ammunition. Neither side has achieved air superiority and is therefore not using attack aviation as part of integrated approach. Small, mostly commercially sourced ISR assets are operating at the lowest levels, and attacks are being regularly conducted by artillery as neither side has been able to fly deep interdiction sorties against key command and control and logistics nodes. The importance of morale cannot be over-stated in the Ukraine conflict. Formations with high morale are surpassing expectations for battlefield performance and endurance, and formations with low morale are not fighting according their “strength on paper” based on equipment and platforms available.

Rethinking Assumptions

Many assumptions are being challenged by real-world activities on the battlefield. We need to re-think the inputs for high-readiness military training based on the lessons we are learning.

Bringing Lessons Learned into Training Today

The lessons learned from the war in Ukraine shows the need for greater emphasis on exercising aspects of armed conflict that were largely taken for granted during two decades of counter-insurgency, namely: 1) morale and the will to fight, 2) exercising logistics and sustainment, 3) more emphasis on air superiority and air defence, 4) the challenges to targeting and joint fires, 5) the use of small commercially-sourced ISR assets and the impacts on calling for fire, and 6) operations in the information domain.

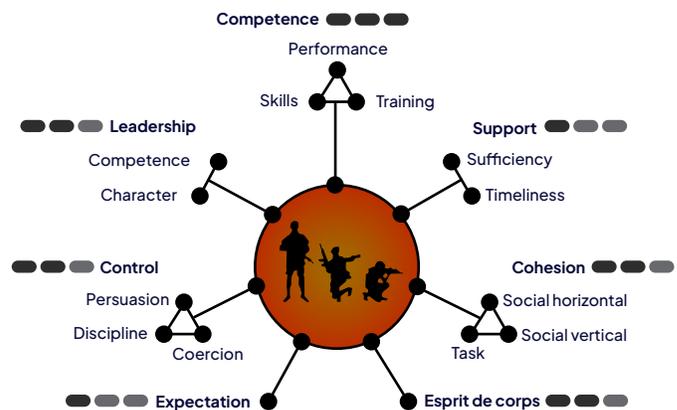
1 Morale and the Will to Fight

The will to fight is a critical factor in assessing potential adversaries. A 2018 RAND study called *Will to Fight* shows that the will to fight is perhaps the single most important factor in armed conflict; however, it is often misunderstood or ignored, and even when it is acknowledged there is little consensus on a definition explanation or model for the will to fight.¹

The will to fight sounds like a simple idea—the willingness of soldiers, units and larger formations to carry out their missions with enthusiasm and vigour. Translating the concept of the will to fight into exercise design is a much more complicated matter. The RAND study points to the importance of leadership, the control that leaders exercise over their units, the skill level and training of a unit, support provided to the unit, unit cohesion, expectations of operations, and esprit de corps for why they are fighting.²

We have seen strong will to fight from the Ukrainian Armed Forces throughout the conflict. In spite of being outnumbered by an adversary with a larger army and a larger population, and with many more aircraft, tanks, armoured fighting vehicles and artillery pieces—both in the field and in war stocks—Ukraine has shown a sustained will to fight.

These qualities that make up the will to fight are not mathematical certainties, where specific inputs deliver specific outputs. It is more practical to acknowledge the importance of a variable for the will to fight than to quantify it specifically: this ensures the concept is captured in the wargaming process.³ For units with a high will to fight, it can be an accelerator to their combat capability, and for units with low will to fight it will suppress their combat capability. The RAND study points out that their framework for measuring and representing the will to fight is a detailed set of guidelines that need to be re-examined and re-configured to suit the conflict or adversaries that are being studied.⁴ Wargame designers and leaders can make these judgement calls on a case-by-case basis to provide maximum realism for adversary behaviour in wargames.



RAND RR2341A-2.17

Figure 2.17 from Connable, et al., *Will to Fight*. 83

¹Ben Connable et al, *Will to Fight: Analyzing, Modeling, and Simulating the Will to Fight of Military Units*. RAND Corporation. 2018. xi-xiii

²Ibid. 51

³Ibid. 161-162

⁴Ibid. 39

2 Exercising Logistics and Sustainment

Military logistics is the art and science of delivering the necessary supplies to sustain military operations over time. Modern militaries have a wide range of logistical needs, including pushing materiel forward and moving casualties and damaged equipment to the rear. The need for fuel, ammunition, rations, batteries, and spare parts and key components are immense for sustaining combat operations for a joint mechanized force that uses tanks, armoured vehicles, artillery, and helicopters and other aircraft. This requirement is significantly larger in major combat operations compared to counter-insurgency operations. There is also a need to evacuate wounded personnel for medical treatment, removed damaged vehicles, and provide civilians assistance.

Logistics are vitally important to any side in a conflict. For friendly forces, it means planning to store, package, transport and transfer enough fuel and ammunition to support the plans and objectives for combat operations.⁵ The logistics network is vulnerable to potential attack. If successful, a significant reduction of logistical support will reduce the capability to achieve operational objectives. Striking high-value supply systems—including deep-fire ammunition supplies like rocket artillery depots or transport vehicles—are an attractive target because they are bulky, easier to spot from the air than other

supplies, and limit the ability of an adversary to strike friendly deep targets.⁶

We have seen in the war in Ukraine, that the Ukrainians enjoy some logistical advantages that have been critical to sustaining combat operations. Ukraine has the benefit of interior lines (transporting material shorter distances across terrain they control) which can be adjusted to meet emerging needs and has received significant support from NATO countries providing weapons, supplies and other support. This has given Ukraine the ability to sustain offensive and defensive major combat operations.

Operations plans should be wargamed with specific focus on logistics.

Logistics activity play should be a more prominent part of military training exercises and rehearsals. Major operational plans are contingent on the capability to sustain the units carrying out combat

and combat support operations. Operations plans should be wargamed with specific focus on logistics. This means seeking to identify the strengths and limitations of logistical plans. Determining the specific impacts of major supply lines being cut or disrupted—roadways, rail lines, rail yards, shipping infrastructure, airheads and airfields, etc.—which are friendly critical vulnerabilities and adversary high payoff targets, should be exercised. The importance of sustainment to contemporary warfare means exercising logistical capabilities alongside combat operation. Logistical failures can have devastating consequences for the ability to sustain combat operations, which an adversary will surely capitalize on as soon as they are discovered.



⁵John Gordon IV, et al., Army Fires Capabilities for 2025 and Beyond, RAND Corporation. 2019. 23

⁶Ibid. 71

3 Air Superiority, Air Defence

Western militaries need to achieve and maintain air superiority to successfully conduct joint military operations. Joint operations doctrine clearly states: “Control of the air is a prerequisite to success for modern operations or campaigns because it prevents enemy air and missile threats from effectively interfering with operations thus facilitating freedom of action and movement. Control of the air cannot be assumed.”⁷

Since air and missile threats limit the ambitions of both sides, aggressiveness of air operations has clearly been limited in Ukraine. Multi-layered air defence systems have been a challenge for fixed-wing and rotary-wing aviation, with Ukraine demonstrating a solid capacity to shoot down inbound enemy cruise missiles at a rate approaching 75 per cent. Both sides operate similar mobile, long-range, high-altitude and medium-range missile systems. Ukraine is utilizing a mix of legacy Russian and brand-new western systems. Mobile anti-aircraft gun systems are also in service, targeting lower altitude targets like helicopters and unmanned/

uncrewed aerial vehicles (UAVs). Man-portable, shoulder-launched air defence systems (MANPADs) have also been used effectively, with videos on social media showing helicopters and cruise missiles being shot down by these highly mobile systems.

The presence of so many systems in the Ukrainian theatre—from large, high-altitude systems to those carried by a single soldier—has rightfully made air crews on both sides modify their tactics to mitigate the risk from the opposing air defence. There are many videos on social media showing fixed wing attack aircraft like Su-25 flying at very low altitude to avoid air defence, and others of helicopters flying along highways to mix their radar signature with that of vehicle traffic. These tactics mitigate the risk air crews face from air defence systems, but they also limit their effectiveness as attack platforms other than in fleeting, popup attacks. Many videos show aircraft forced to ingress to a target at a very low altitude due to the air defence threat, then lofting unguided rockets in imprecise volley fire, rather than flying at a higher altitude for a direct dive attack (which increases accuracy and effectiveness).



⁷Joint Publication 3-0, Joint Operation, 17 January 2017 Incorporating Change 1, 22 October 2018. III-33. https://irp.fas.org/doddir/dod/jp3_0.pdf

These tactics stand in contrast to western military reliance on medium- and high-altitude platforms for launching precision-guided munitions for long-range interdiction sorties, and seemingly ubiquitous close air support available to land forces. Western military planning is predicated on rapidly achieving and holding dominance over the air. The war in Ukraine has shown that that cannot be taken for granted in an air-denied or contested environment. This means that military training and exercises should reflect this.

A focus on suppressing or destroying enemy air defence systems, known as SEAD/DEAD, is a critical capability to begin degrading the other side's ability to interdict operations. Neither side was capable of effectively carrying out this mission at the start of the invasion, until the U.S. provided Ukraine with the high-speed anti-radiation missile (HARM) that targets enemy radars. Planning SEAD missions is a unique skill that needs to be practiced. Many nations have abandoned their SEAD systems due to the cost of the missiles and supporting jamming platforms, so their planning skills have atrophied. In addition to SEAD, low-altitude operations

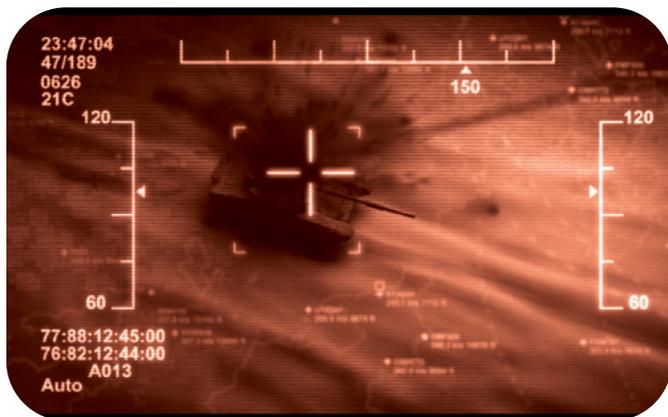
planning and execution need to be practiced. Low-altitude combat flight operations were largely replaced by aircraft operating at a safer, higher altitude after the 1991 Gulf War. Many western aircraft were shot down by Iraqi anti-aircraft gun emplacements and surface-to-air missile batteries, driving the application of different tactics.

Air defence impacts many aspects of military operations, from helicopter transport on the battlefield to calls-for-fire from rotary and fixed-wing aircraft. Airborne ISR platforms provide critical inputs for situational awareness and are vulnerable to air defence systems. Destruction of, or damage to, these capabilities will invalidate some aspects of operational plans, forcing exercise leaders and participants to develop alternative plans. The importance of air superiority is clearly stated in doctrine. Contemporary military training should put more emphasis on air superiority and should exercise how planning is conducted in a training environment where quickly establishing and maintaining air superiority is not granted.



4 Targeting and Joint Fires

Evaluation is important to understanding where training. The targeting process for planning, coordinating and delivering joint fires is difficult to execute in a contested environment. Joint targeting is a process that a force goes through to ensure that they can direct their attacking assets against the right enemy targets in a logical sequence to deliver maximum effects against an enemy. Those effects are aligned with an operational plan that is designed to defeat the enemy as quickly and efficiently as possible. For instance, if an enemy uses a highly centralized means of command and control (such as all orders having to come from the division headquarters instead of the company commander) then the joint targeting process would identify an enemy's headquarters as a high-payoff target because of the impact on command and control such an attack will deliver.



Once a force has identified targets, they have to strike them with offensive forces. Joint fires is the action of striking enemy targets with any of the friendly forces' capabilities. Joint fires requires that the target be located, positively identified and within range before it can be hit. In the enemy headquarters example above, friendly forces may have identified that particular headquarters as a high-value or high-payoff target that would seriously and negatively impact the enemy's ability to fight; but if that HQ is 120 kilometers behind enemy lines and you can only hit targets 100 kilometers behind the line, then regardless of the quality of the target, that target cannot be hit.

So what are the main challenges with targeting and joint fires on the modern battlefield?

A. Threat:

- **Air defence:** Strike platforms cannot fly over the enemy without getting shot down, making striking mobile targets almost impossible. Air platforms cannot reliably identify and strike targets without facing risk of shoot-down.
- **Counter-battery fire:** Deep fires platforms cannot reliably deploy, select targets and release munitions without being subject to counter-battery fires from enemy fires. Counter-battery fire targets friendly fires platforms or the sensing equipment that supports them to put them out of action.

B. Range:

Some high-value or high-payoff targets are outside of range from deep fires launch platforms, either in the air or on land. This gives the enemy some security in knowing that things like command and control nodes, cruise missile or short-range ballistic missile platforms are out of range from friendly interdiction.

Over the last 20 years of counter-insurgency operations, joint targeting has evolved into a multilayered systemic process designed to reduce risk (to civilians and friendly forces) instead of reducing the time it takes to hit enemy targets. The joint targeting process is intelligence-driven, much of which comes from unmanned air systems (UAS) that can persistently orbit over areas of interest. Those systems face major survivability challenges in densely layered air defence zones. Therefore, UAS are not capable of providing the same volume of intelligence collection in a contested environment. This makes locating potential targets mobile difficult, especially mobile or opportunity targets.

Without solid location data there is increased pressure to strike a target as soon as it is positively identified. The west has heavily relied on the MQ-9 Reaper armed UAS and similar platforms to positively identify and strike targets using the single platform. UAS like the Reaper shorten the sensor-to-shooter loop by having a single crew positively identify and strike targets. These types of UAS are highly vulnerable to large air defence missile systems like the S-300. For any aircraft to fly inside the S-300 missile engagement zones is almost suicidal.

Modern, long-range fires are an expensive, but critical, offensive capability. The west has long relied on air power to reliably deliver precision munitions well behind enemy lines. This is because western militaries have been able to rapidly achieve air superiority allowing for unfettered use of air power. Western air power has not faced a meaningful threat to those strike packages in a generation. If an enemy has a robust air defence network, eliminating them all becomes difficult and air superiority cannot be established until air defence is destroyed. This results in relying on stand-off missiles to destroy air defence to minimize the risk to air platforms.

This has major implications for training development and delivery. From a process perspective, this means identifying ways to improve the efficiency of the joint targeting process for conventional operations. This requires establishing clear thresholds for different target types within a risk-based construct and rehearsing those judgement calls with the training audience. Delivering relevant joint fires exercises requires time-sensitive injects on target identification to prompt the training audience to take immediate action on confirming targets and coordinating strike assets to hit targets. Practicing the process of identifying and confirming targets and coordinating strike assets is essential to reduce the time from positive identification to strike.

Training should reinforce the concepts of prioritization of targets and allocating assets accordingly.

Additionally, training for intelligence coordination for the targeting process should have renewed focus on developing targeting matrices, including identifying high-value and high-payoff targets as part of prioritization. Positively identifying any target is essential—however, depending on the type of target, it may be a high-value or high-payoff target that will have disproportionate impact on the enemy's ability to conduct operations. The process of developing targeting matrices based on the commander's intent and operational plans is essential to developing a priority framework for classifying targets and allocating

intelligence collection assets. This is, in part, because collection and strike assets are relatively scarce. Training should reinforce the concepts of prioritization of targets and allocating assets accordingly. Doing this well will provide greater clarity on what is available for

striking all targets—including targets of opportunity—to support decision-making.

Focusing on both target identification generally and high-value targets is important because of the resource allocation and coordination decisions that are impacted. Diverting assets away from a high-value targeting operation toward a target of opportunity may not be possible. The balance between these two priorities as part of overall targeting and coordination of fires assets is vitally important for modern military.



5 Commercially Sourced ISR

Commercially sourced—or civilian-off-the-shelf (COTS)—UAVs are not new to the contemporary battlefield. Many different do-it-yourself versions were seen in Syria and Iraq, operated by armed non-state groups. These were often used to drop munitions or spot movements to inform planning. In the Ukraine conflict, the use of COTS UAVs has been expanded as semi-precision localized fires platforms, and more importantly to identify targets, call for fire, and correct fire during attack.

COTS UAVs are small, short-range platforms, and have been employed at the company level and below. Using COTS UAVs gives small units the ability to detect and target enemy positions and formations much faster than they could expect relying on brigade or division-level echelon support. Pushing COTS UAVs to the lowest practical level shortens the sensor-to-shooter loop, allowing the crews using them to quickly identify targets and bring them under effective fire.

Likewise, defending against COTS UAVs and small military UAVs is a growing priority. Units on both sides of the war in Ukraine are making more effort to spot UAVs and either attempt to shoot them down ('hard kill') or use

electronic weapons to neutralize ('soft kill') the data links, flight controls or both.

Commercially sourced satellite imagery has also been significant in the war in Ukraine. With a 400 per cent growth in subscription-based satellite imagery products since 2014, accessing satellite imagery is no longer reserved for states and militaries. The availability of satellite imagery has made camouflage and concealment more important for large units. Armoured vehicles, soft-skinned vehicles, towed artillery and other systems can be more easily spotted and counted in satellite images if they are not adequately camouflaged.

The availability of satellite imagery has made camouflage and concealment more important for large units.

Military training exercises should include a shorter timeline for detection of units. With a growing number of COTS UAVs in the battlespace, units are much less likely to move around the battlefield without detection.

Shorter detection timelines and shorter timelines to come under effective enemy artillery or rocket fire should be integrated into military training. Likewise, greater effort spent on camouflage and concealment should result in units being detected more slowly because detection of adequately camouflaged targets takes longer. Re-emphasizing these skills is important in an environment where COTS UAVs are ubiquitous and a key part of the sensor-to-shooter loop.



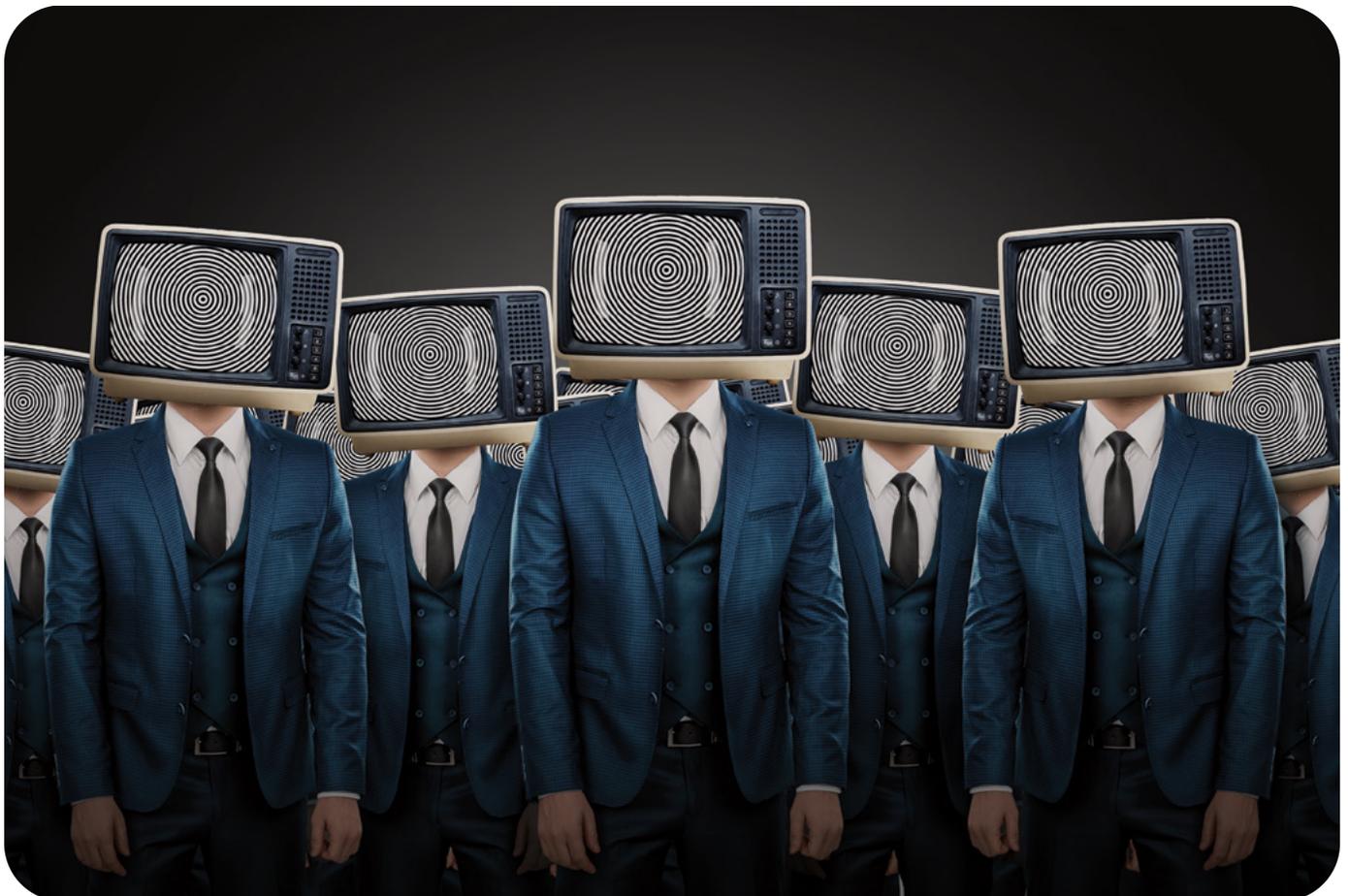
Operations in the Information Domain

Contemporary warfare provides information to the public in ways that would have been unimaginable a generation ago. Battlefield footage can be uploaded shortly after combat concludes. Footage from ATGM missile launch teams, COTS UAVs observing targets and artillery rounds impacting, armoured fighting vehicle weapons stations and infantry teams moving through trench-lines are uploaded daily in social media spaces. These images are shared to show off battlefield successes by providing the raw footage as evidence.

In an information environment with virtually no barriers to publishing video content, there is also ample opportunity to publish disinformation. Disinformation is the deliberate and organized activity of presenting manipulated or altered media to shape perceptions of those consuming information. This is not necessarily a

body of lies. It can be, but more often it is the selective presentation of information to create the impression in the audience that the sender wants to create. With people rapidly consuming information from all sources—including digital—it is not always easy to spot the difference between facts and disinformation.

The information domain is an essential component to modern military training, and one that is often under-developed. Exercise participants do not expect EXCON to present material that intends to deceive them, mislead them or manipulate their perceptions. However, that is exactly what adversaries will attempt. Training for this is important because on operations military leaders and organizations will be presented with disinformation. For exercise designers and developers, this means intentionally developing misleading material to attempt to shift perception and therefore decision-making, and observing the response from the training audience. Exercising the ability to detect information operations cannot be ignored for contemporary conflict.



Overview of the Lessons Learned

The lessons learned described above should be integrated into existing exercise development. Integrating the most recent lessons learned will provide the most realistic training experience possible for military leaders.

- 1. Morale and the Will to Fight:** Modelling morale and the will to fight cannot be done in a mathematically repeatable way. Exercise controllers can modify the combat capability of units based on their will to fight—either for highly motivated, trained and resourced units, or for those with low morale.
- 2. Exercising Logistics and Sustainment:** Putting the same rigour and detail into logistics and sustainment as traditional maneuver and fires will add detail and complexity to planning for logistics management. Recent lessons show the need to model and train the logistics function, and especially the impacts on operational plans of reduced sustainment capability.
- 3. Air Superiority and Air Defence:** Air superiority is a requirement for western operational art. The effective use of air defence assets is making air

superiority harder to achieve. Exercising air power and air defence systems is necessary to better understand and address this challenge.

- 4. Targeting and Joint Fires:** The targeting process is essential to connecting intelligence to strike platforms. This process needs to be rehearsed more rigorously, with specific focus on defining high-value and high-payoff targets and accelerating the sensor-to-shooter loop for all targets. This requires a risk-based approach for all targets that prioritizes efficiency of decision-making throughout the process.
- 5. Commercially Sourced ISR:** Small UAVs and commercially available satellite imagery provides a shorter sensor-to-shooter loop and makes it harder to move large formations without detection. Accelerating the pace of units being detected and the pace of incoming fires being directed against them is important to replicate the impacts of commercially sourced ISR.
- 6. Operations in the Information Domain:** The progress of military operations is being reported in near-real time—and not always in a truthful way. Exercising the information domain is essential to replicating adversary disinformation operations and the impacts on public perception battlefield wins and losses being shown online.



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