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Rethinking Survivability

By Captain Jonathan Taylor

When U.S. Army engineers think of survivability for vehicles and artillery, they likely picture vehicle fighting positions, vehicle protective positions, and artillery positions constructed with earthmoving equipment. The proliferation of unmanned aerial vehicles (UAVs) on the battlefield in the Russia-Ukraine War changes the calculus of survivability operations. UAVs bring increased aerial reconnaissance and aerial-precision strike capability to the battlefield. In this context, traditional survivability is inadequate and sometimes even counterproductive. In response, engineers must adapt by implementing anti-UAV overhead cover and weighing concealment versus cover based on the operational context. These observations from Ukraine should inform us, but not lead us to reject traditional survivability because the next fight will likely not exactly mirror the current fight in Ukraine. Engineers must apply critical thinking to tailor survivability measures to each operational context.

The UAV Threat

Whether UAVs will have a revolutionary impact on warfare is an ongoing debate, but they clearly have at least made a profound impact on the battlefield in Ukraine and Russia. The

U.K. Royal United Services Institute reported in February 2025 that “tactical UAVs currently account for 60–70% of damaged and destroyed Russian systems.”¹ U.K. Defense Intelligence assessed that the Lancet UAV was likely the most effective new capability that Russia fielded in 2023.² The quantity of UAVs used on the battlefield in Ukraine is orders of magnitude higher than past conflicts and shows no signs of decreasing with both Russia and Ukraine aiming to manufacture three to four million drones in 2025.³

Compared to past large-scale combat, today’s battlefield sees significantly more aerial reconnaissance and aerial precision strikes. Current reconnaissance UAVs are effective and cost efficient. They increase the chance of detection from the air compared to detection from ground reconnaissance. Side concealment alone is inadequate, and overhead concealment is more important than ever. Two types of attack UAVs increasingly common in the current fight are munition-dropping UAVs and one-way attack UAVs. Munition-dropping UAVs can loiter directly above a position and drop munitions such as grenades, mortar rounds, or improvised explosives directly downward onto a target. One-way attack UAVs can fly directly onto the target from a high angle. Side cover is



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inadequate against both, and their proliferation necessitates increased use of overhead cover.

Traditional Survivability

Traditional survivability offers inadequate protection from attack UAVs. Here, “traditional survivability” refers not necessarily to doctrine but to the habitual ways engineers traditionally apply it in practice. Traditional survivability positions consist of vehicle fighting positions, vehicle protective positions, artillery positions, or protective berms constructed with earthmoving equipment. These positions shield against fragmentation and blast pressure from nearby explosive impacts. They primarily provide side cover but usually not overhead cover. Traditional survivability positions provide side cover for two reasons. First, there is a relatively low chance of unguided artillery achieving a direct hit on a dug-in position. Second, constructing overhead cover, sufficient to protect against a direct hit from artillery, requires significant time and resources. U.S. Army ATP 3-21.90 states that field fortifications built without concrete or steel cannot withstand a direct hit from a 122-mm rocket or 152-mm high-explosive round and that “even dud 152-mm rounds will penetrate about 4 feet of solid earth.”⁴ Ultimately, while effective against nearby artillery impacts, traditional positions offer inadequate protection from attack UAVs.

Traditional positions also offer inadequate concealment from reconnaissance UAVs. A doctrinal, fully developed vehicle-fighting position does include a hide site with overhead concealment. Despite doctrinal guidance, there is a tendency to consider “survivability” complete with the establishment of the hull or turret defilade position. Even following doctrinal guidance, the defilade position itself lacks

a strict requirement for overhead concealment, and only the separate hide site has this requirement. This traditional approach inadequately addresses the critical need for overhead concealment.

Not only are these traditional positions inadequate, but in some cases they may be counterproductive to survivability. The Center for Army Lessons Learned references a Ukrainian Territorial Defense Forces manual that advised against using heavy engineer equipment for survivability because it “unmasks positions with the audible and visual signatures and the residual track marks it leaves behind.”⁵ Disturbing earth and vegetation with earthmoving equipment can make a dug-in vehicle more visible than one left in place, counter-intuitively reducing survivability. Marks from dozer tracks and blades disturb natural vegetation on the ground, making the position more conspicuous from the air. This consideration is heightened due to the proliferation of reconnaissance UAVs.

On Survivability

Rethinking survivability is considering the prevalent threat and deciding how best to enhance survivability rather than simply defaulting to traditional survivability. This includes incorporating overhead-UAV protection and weighing concealment versus cover.

Soldiers deployed to Iraq from Fort Bliss, Texas, Delta Company, 2nd Brigade Engineer Battalion, 3rd Brigade Combat Team, 1st Army Division prepare the RQ-7B Shadow, an unmanned aerial system, for launch, Oct. 20. Corporal Colyn Eure and Specialist Andrew Hopkins perform a preflight inspection before the UAV can provide route reconnaissance, target acquisition and overwatch for ground troops in their area of operation. (Photo By Army Captain Sean Burger)





A U.S. Army Soldier assigned to the 11th Airborne Division maintains security from a camouflaged fighting position during Joint Pacific Multinational Readiness Center (JPMRC) 26-02 at Yukon Training Area, Alaska, Feb. 18, 2026. Arctic camouflage techniques reduce visibility and enhance survivability in snow-covered environments. (Photo by SSG. Arbishua Rojas)



National Guard soldiers conduct stalk training during sniper school at Camp Robinson in Little Rock, Ark., Tuesday, Aug. 6, 2025. The soldiers constructed ghillie suits and practiced long-range marksmanship as part of the sniper training program. As part of the exercise, they crawled with rifles fully camouflaged to avoid detection and worked on concealment techniques to hide from drones overhead. (Photo by Jenna Dorazio)

Incorporate overhead anti-UAV protection

Engineers should incorporate anti-UAV overhead protection into survivability position design. Both Ukrainian and Russian forces are employing improvised overhead cover made from netting, chain-link fencing, or metal cages to counter the UAV threat for vehicle and artillery positions. While ineffective against direct hits from artillery, these measures can be effective against munition-dropping and one-way attack UAVs.⁶ Certainly, stronger overhead cover that protects against artillery is beneficial, but it is often impractical. Anti-UAV overhead cover may be more necessary, given the precision of attack UAVs over artillery, and is less resource-intensive than antiartillery overhead cover. This gives anti-UAV overhead cover a more compelling case to be standard for survivability positions. Engineers should develop and implement rapidly deployable, lightweight, and effective anti-UAV overhead cover.

Weigh concealment and cover

Engineers should advise maneuver and artillery to weigh the need for concealment and cover based on the prevalent threat in their current operational context. Ideally, survivability positions combine maximum cover and maximum concealment, but sometimes they conflict. First, digging can reduce concealment by disturbing the ground and vegetation. Second, areas suitable for digging are often open, as thick vegetation makes maneuvering and digging with a dozer difficult. However, a vehicle placed under thick vegetation, without being dug in, may be more survivable than one fully dug in in open terrain. If the primary threat to an artillery position is attack UAVs cued by reconnaissance UAVs, then optimizing concealment and camouflage, rather than digging in, may be appropriate. Conversely, if the greater threat is counterbattery fire cued by radar, then digging-in may be appropriate. The prevalent threat could even change based on location on the battlefield. Positions further to the rear may be more likely to be targeted by long-range artillery and less likely to be observed and targeted by short-range UAVs, and vice versa. Engineers should conduct this analysis to tailor survivability measures to each context.

Rethinking in Context

It is a mistake to assume that future large-scale combat operations will exactly mirror the current Russia-Ukraine fight or that UAVs will now permanently replace artillery as the dominant indirect fire threat on the battlefield. In *Small Wars Journal*, Lieutenant General Bill Murray argues that “drones will never replicate the overwhelming suppression and deep interdiction effects of artillery.”⁷ Even though UAVs may not permanently be the dominant threat on the battlefield, they bring a different threat that survivability operations must address. UAVs may not have changed the game completely,

but they are certainly now part of the game. Traditional survivability is far from obsolete, but engineers must

constantly re-evaluate it and apply critical thinking to tailor survivability measures to each operational context.

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Endnotes

- ¹ Jack Watling and Nick Reynolds, 2025, "Tactical Developments During the Third Year of the Russo–Ukrainian War," Royal United Services Institute, February 14, 2025, <https://www.rusi.org/explore-our-research/publications/special-resources/tactical-developments-during-third-year-russo-ukrainian-war>.
- ² UK Ministry of Defence (@DefenceHQ), "Latest Defence Intelligence update on the situation in Ukraine," X (formerly Twitter), November 1, 2023, <https://x.com/defencehq/status/1719621502121775113>.
- ³ Michael Schwartz and Lynsey Addario, "A Drone Attack Kills Dozens at a Ukrainian Training Base," *The New York Times*, March 3, 2025, <https://www.nytimes.com/interactive/2025/03/03/world/europe/ukraine-russia-war-drones-deaths.html>.
- ⁴ Department of the Army, *ATP 3-21.90: Tactical Employment of Mortars*, para. 5-24, p. 5-8, October 9, 2019.
- ⁵ S. Ullrich and S. Moriarty, 2024, "Lessons Learned from the Ukrainian Territorial Defense Forces: Command Post Survivability," U.S. Army, February 6, 2024, https://www.army.mil/article/273510/lessons_learned_from_the_ukrainian_territorial_defense_forces_command_post_survivability.
- ⁶ Jack Watling and Nick Reynolds, 2025, "Tactical Developments During the Third Year of the Russo–Ukrainian War," Royal United Services Institute, February 14, 2025, <https://www.rusi.org/explore-our-research/publications/special-resources/tactical-developments-during-third-year-russo-ukrainian-war>.
- ⁷ Bill Murray, 2025, "Beyond the Hype: Why Drones Cannot Replace Artillery," *Small Wars Journal*, May 5, 2025, <https://smallwarsjournal.com/2025/05/05/beyond-the-hype-why-drones-cannot-replace-artillery/>.