



LET'S MAKE INNOVATIVE IDEAS

UGVs Resupplying the Front Line

■ *By CPT Connor James*



As militaries worldwide study the evolving conflict in Ukraine, many are racing to integrate battlefield innovations into their formations. While the use of first-person-view drones has gained the most attention, one of the most transformative changes — particularly for infantry operations — is the growing role of unmanned ground vehicles (UGVs) in tactical resupply.

Ukraine has taken the lead in this field, using large numbers of low-cost UGVs to support infantry near the front line. These systems are helping to reduce casualties while ensuring

that frontline troops remain supplied during sustained combat.

For the U.S. Army, adopting similar systems could revolutionize sustainment for infantry brigade combat teams, particularly in contested environments where manned resupply puts paratroopers at risk.

Infantry Problem Set

Currently, most U.S. Army tactical resupply is conducted by manned vehicles. While these convoys are protected by convoy protection platforms, they still expose troops to ambushes, improvised explosive devices, and aerial drone threats.

In a future high-intensity fight — especially in an attritional environment like Ukraine — this model is not sustainable.

Moreover, current U.S. Army UGV programs are expensive and unsuited for disposable or high-turnover logistics tasks. Without cost-effective, adaptable alternatives, infantry units may face critical resupply gaps when the risk to human drivers is too great.

UGVs in Action

Ukraine's widespread use of UGVs offers a compelling model. Some Ukrainian brigades conduct

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most of their tactical resupply with unmanned systems, using them to push food, ammunition, and water directly to the front. In doing so, they reduce exposure to enemy fire and preserve manpower.

The most direct benefit for U.S. infantry formations would be risk reduction. A UGV can navigate to a forward position without requiring a crew or an escort. If destroyed or immobilized, the vehicle becomes a relatively inexpensive loss — and its location could be used as a target reference point for follow-on fires, especially with drone overwatch.

UGVs could also support disaggregated infantry teams, such as the hunter-killer teams tested by the 173rd Airborne Brigade during Exercise Saber Junction 24 in Germany. These six to 12 paratrooper teams operated independently for up to 72 hours, often beyond traditional supply lines. A small, camouflaged UGV could quietly move to a predetermined cache site, remaining concealed until the team linked up for resupply.

During the same exercise, Darkhorse Forward Support Company of 1-91 Cavalry Regiment developed new tactics to support the deep fight and resupply dispersed elements near the front line. Conventional convoys were too large and too exposed to operate freely. In such cases, small-profile UGVs were able to move from brigade rear elements to dispersed logistics nodes or directly to combat elements, minimizing detection.

If a unit engaged in a firefight urgently needed resupply, UGVs could push forward without waiting for an entire distribution platoon to assemble a convoy. This flexibility could be a game-changer for light infantry companies operating under contact or in austere terrain.

Fratricide and Force Protection

Manned resupply missions require detailed coordination to avoid fratricide, especially when delivering supplies to troops in contact. The use of UGVs reduces this burden, since no crew is onboard. Infantry can remain focused on fighting without worrying about friendly vehicles or recovering damaged crewed assets. If a UGV is disabled, it does not endanger paratroopers or require immediate recovery.

U.S. Efforts and Cost Constraints

The Army is testing UGV capabilities, such as autonomy kits for Heavy Expanded Mobility Tactical Trucks. These kits allow a crewed vehicle to lead up to seven autonomous ones. While this innovation enhances efficiency, it is still crew dependent and expensive.

Another program, the Small Multipurpose Equipment Transport, is designed to follow dismounted infantry and carry 2,000 pounds of gear. However, early models cost around \$100,000 each. For context, Ukrainian UGVs like the Vepr cost roughly \$8,000 to \$20,000 and can carry up to 600 pounds, sufficient for basic infantry resupply.

Ukraine's latest UGV, the Gimli, has not had its specs released but is expected to match or exceed the Vepr's capabilities at a similar cost. These price points allow Ukrainian forces to treat UGVs as expendable, an approach that is crucial in high-risk logistics roles. In contrast, the U.S. acquisition system is slower and geared toward durable, multi-year platforms rather than low-cost, disposable assets.

Army Chief of Staff GEN Randy George has acknowledged the challenge, saying the concept of a program of record may not fit rapidly evolving autonomous systems. Instead, the Army needs faster procurement pathways to stay relevant.

Capacity and Limitations

UGVs are not a perfect solution. Their payload is limited compared to manned vehicles. A Vepr might carry enough 7.62 mm linked ammunition to support a machine gun squad, but for larger items like water or fuel cans, the volume and weight constraints become a factor. For example, a 600-pound-capacity UGV could deliver roughly 66 gallons of water or 28 cases of MREs. For an airborne infantry company, it would be about one day's supply of food, but only about half a day's supply for water.

Still, when paired with pre-staging or multiple UGVs, this can be sufficient for short-term or emergency needs. While not a replacement for traditional trucks, UGVs offer a valuable complement in dangerous or hard-to-reach areas.

Complementary Systems: UAS vs. UGV

The 173rd Airborne Brigade has also begun testing aerial delivery systems like the Flying Basket 3 and 4, which can deliver 220 to 440 pounds via unmanned aircraft systems (UAS). These systems were used during Swift Response 25 to cache food, ammo, and batteries for infantry training in Lithuania.

However, aerial systems are even more expensive than UGVs — ranging from \$82,000 to \$110,000 per unit — and are more vulnerable in denied airspace. They also consume significant battery power, requiring robust charging infrastructure. In contrast, ground-based UGVs are simpler to maintain and undetectable by enemy air defense.

A balanced approach is necessary. In relatively secure rear areas, manned resupply remains the most efficient method. For contested or high-risk zones, UGVs offer a way to maintain logistics without endangering Soldiers. In emergencies or permissive environments, UAS platforms provide speed and flexibility. The key is matching the method to the mission.

Infantry Implications

For infantry companies operating at the front, especially airborne and light units, resupply has always been a challenge. Small UGVs offer a lifeline in high-threat areas where traditional methods may be impossible. Whether delivering a basic load of ammo, water, or communications gear, a single UGV could extend the fight or sustain an

isolated team just long enough for it to succeed or survive.

In dispersed operations, UGVs could enable new tactics and formations. Infantry leaders could commit smaller elements farther forward, confident they can be resupplied without pulling back or exposing a larger force. This would open the door to more agile and lethal infantry maneuvers.

Conclusion

The Russia-Ukraine War has shown how low-cost, expendable UGVs can enhance frontline logistics and reduce Soldier exposure. For the U.S. Army, especially light infantry units, the time to adapt is now. Investing in inexpensive, rapidly fielded unmanned systems will increase survivability and operational tempo in future conflicts.

UGVs will not replace every manned vehicle, but they can fill the deadly gap between the front line and the logistics train. If the Army wants to win the next fight, it must start building those bridges today.

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Featured Photo
Soldiers assigned to 1st Engineer Battalion, 1st Armored Brigade Combat Team, 1st Infantry Division, advance toward their objective at Joint Multinational Readiness Center's Hohenfels Training Area, Germany, Oct. 21, 2025. (Photo by SGT Kammen Taylor)