Photo: Milrem Robotics

*The Milrem Robotics THeMIS at the Autonomous Warrior Exercise 2018*

deployment includes unarmed platforms, the goal is to equip the unit with robotic weapons platforms; weapons carrying stations, guided or unguided rockets, and the use of loitering munitions are just a few of the available options.

Medium-size load carriers proved particularly useful in these demonstrations. Among these was the TITAN, a modular UGV based on the hybrid-powered THeMIS platform. This vehicle, developed by the Estonian Milrem company, provides a tracked platform able to be reconfigured in the field as a load carrier, operate with reconnaissance equipment, evacuate casualties, and operate weapons, including lightweight guided missiles (e.g, JAVELIN) or machine guns.

## Load Carrying Mules

Following a long evaluation of different squad multipurpose equipment transport (S-MET) UGVs, the US Army selected the General Dynamics Land Systems (GDLS) 8x8 multi-utility tactical transport (MUTT) for the Army's future robotic mule. A contract worth $249M was awarded to GDLS in July 2020. S-MET provides the capability to carry most of the squad's excess equipment, and generate and offload power for charging batteries and powering additional mission equipment, while operating as a dispersed and decentralised force in challenging and diverse environments for extended periods. The 8x8 MUTT variant weighs about 3,500 lbs and carries up to 1,200 lbs of payload. The US Army plans to develop modular mission payloads and integrate them with the S-MET Increment I platforms to increase system capability. The Army plans to field S-MET in the second quarter of the fiscal year 2021 and complete the deployment of 624 S-METs by the second quarter of fiscal year 2024.

Back in the UK, experimentation and capability development continue following the experience gained during AWE-18. While that exercise utilised systems loaned by industry, the UK has opted to buy a few robotic platforms for further experimentation. In March 2020, the British Defence Science & Technology Laboratory (DSTL) received two THeMIS tracked vehicles. Based on the TITAN design developed in cooperation with QinetiQ, Milrem Robotics is participating in two large-scale UK robotics programmes – JTARR (joint tactical autonomous resupply and replenishment) and RPV (robotic platoon vehicle). Two MUTTs were also delivered from the USA and in July, RB-SL delivered four 'cargo' variant MISSION MASTER UGVs. These vehicles can operate in autonomous or semi-autonomous mode via remote control. They are amphibious, highly mobile across all types of terrain, and integrate with the combat network via digital and audio communications. The vehicle can carry up to half a ton of cargo and can be configured in the field to carry medical equipment, including two stretchers for casualty evacuations.

Photo: Milrem Robotics


*A TYPE-X robotic combat vehicle*

## Battle Tested Robotics

The civil war in Syria has also provided opportunities for the testing of robotic systems concepts. A 12-ton remotely controlled, tracked armoured vehicle known as URAN-9 has been under development by the 3rd Central Research Institute of the Russian Defence Ministry since 2015. Remotely controlled from a follower vehicle, URAN-9 mounts a single barrel 2A72 30mm cannon, four 9M120 ATAKA anti-tank guided missiles and 6-12 SHMEL-M rocket flamethrowers. In 2018, the prototype was deployed to Syria as part of a combat experiment conducted by the Russian MOD. The first experience with the robot tank was poor. Frequent communications failures and performance issues with the stabilisation of the primary weapon and optronics prevented the robot tank from being a useful battlefield asset. Following this combat experience, the robot was returned to Russia, and transferred to the Kalashnikov group, where it is expected to undergo further improvements before its inclusion in the armed forces' inventory.

Russia has not been alone in its quest to field weaponised robots. The US Army began exploring the prospects in the mid-2000s. By 2006, the US Army began testing the BLACK KNIGHT unmanned armed combat vehicle developed by BAE Systems. This turreted robot tank was equipped with a 30mm cannon and an optronic suite comparable with that of main battle tanks. Multiple LIDAR sensors were used to scan the area in front of the tank enabling the robot to move off-road autonomously. Controlled from an M2 Bradley vehicle, BLACK KNIGHT could also execute planned routes, manoeuvre off-road and avoid obstacles – all without operator intervention, thus acting as a cavalry wingman. When dismounted operations are required, soldiers can continue and operate the robotic vehicle through a dismounted control device.





Photo: USMC

*A tracked 4x4 Multi Utility Tactical Transport (MUTT) vehicle*

## Embracing Combat Robotics

Despite an early start, the US has not truly embraced combat robotics until relatively recently. As part of its defence realignment designed to keep pace with its adversaries, the US considers unmanned capabilities a critical element in the Army's ability to deal with a fire-saturated and access-denied battlespace. Having combat robots establish initial contact with the enemy provides its combat formations invaluable intelligence about enemy plans, intentions, and actions; it also enables its forces to direct an actionable response against the enemy's main thrust.

The Army is currently evaluating a cavalry scout platoon comprised of four robotic combat vehicle (RCV) surrogates using modified M-113s fitted with panoramic vision, a remotely controlled electro-optical (EO) payload and a weapon station. These RCVs are controlled by two mission enabling technology demonstrator (MET-D) vehicles using modified M-2 Bradley AFVs. Each MET-D accommodates four operator stations, for two crewmembers controlling each M-113. This experimental unit was formed in 2018 and began testing in 2019. The platoon recently completed a two-week test at Fort Carson, where the unit performed basic techniques including area and route reconnaissance, and screening. The experimentation has provided the Army an insight to some of the benefits and challenges of operating robotics in combat, such as the advantage of deploying vehicles more flexibly, and the challenges of off-road driving, particularly on downslopes, as well as performing remote operations when the MET-D was mobile. Communications also proved