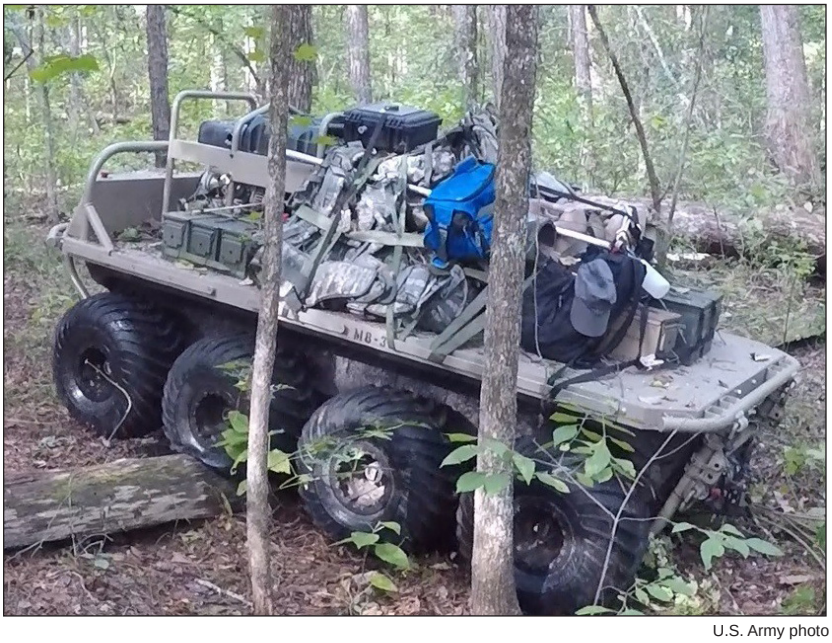
Opinion: Create a Maneuver Robotics Master Trainer Course

JOHN DUDAS

As the Army moves toward building a multi-domain operation (MDO)-ready force, new and exciting capabilities are being fielded to brigade combat teams (BCTs). These technologies will enable tactical units (battalion and below) to achieve overmatch and facilitate the conduct of cross-domain maneuver against peer or near-peer threats. Some of these capabilities include small unmanned aircraft systems (SUAS) and ground robotics such as the Squad Multi-purpose Equipment Transport (SMET).

Fielded SUAS capabilities will provide maneuver units an organic reconnaissance and surveillance tool that aids Soldiers and leaders in developing situational understanding and decision making, resulting in tactical advantages. Ground robotic systems, such as the SMET, will provide small units at battalion level and below with an unmanned cargo transport capability which assists in reducing the dismounted Soldier load.

With the current and projected fielding of various air and ground robotic systems to maneuver units, there are potential training and leader integration challenges. Although these new capabilities are purposely designed to be simple and intuitive to employ, a thoughtful training strategy will be necessary to create proficient operators as well as confident leaders to employ these systems effectively. Part of this training strategy should include a consolidated training course that produces maneuver robotic systems master trainers.



U.S. Army photo

The Squad Multi-purpose Equipment Transport program aims at lightening Soldiers' loads by providing infantry battalions a robotic "mule" capability.

Challenges

An unwelcome result of integrating new capabilities into maneuver units is the overburden of Soldiers due to competing roles with critical branch-specific individual and collective tasks. Commanders and leaders at the tactical level already have a difficult challenge in managing limited time, resources, and personnel to train and maintain their unit core tasks. The addition of robotic systems (complex or not) only adds to this challenge.

After air and ground robotic systems are fielded, commanders will need subject matter experts and trainers to help instruct, qualify, maintain, and manage unit operators and systems. A unit robotics master trainer would fill that role. Until future robotic systems are fielded with an inherent artificial intelligence allowing them to operate with full or near-full autonomy, Soldiers will need training to operate these systems.

Purpose

The purpose of establishing a maneuver robotics master trainer course is to support commanders in the field by providing instruction to selected leaders whose additional duty is to train Soldiers to operate and employ air and ground robotic systems.

Recommended outcomes for a master trainer course are to produce graduates who have the ability to:

1. Train and evaluate maneuver robotic operators, resulting in a strong bench of qualified Soldiers;
2. Advise commanders on the capabilities and limitations of unit assigned air and ground robotic systems; and
3. Assist commanders in developing and managing unit robotic training plans in accordance with applicable policies and regulations.

The ideal location for this course is at the Maneuver Center of Excellence (MCOE) at Fort Benning, GA. This would be logical since many of the future air and ground robotic systems being fielded fall under the proponent of the MCOE. Fort Benning is also the home of the SUAS Master Trainer Course, which could be expanded to train both air and ground robotic systems.

Capabilities to be Trained

Although the instructional goals of a master trainer course are to focus on developing unit training plans, instructing and qualifying new operators, and providing subject matter expert advice to commanders, system-specific training is also necessary to enable and enhance this instruction. In September 2020, the Robotics Requirements Division (RRD) from the Maneuver Capabilities Development and Integration Directorate (MCDID) at Fort Benning published the U.S. Army SUAS Strategy. Discussed and outlined in this strategy are five robotic systems that are projected for fielding to the BCTs. In order to fully provide training support to the SUAS Strategy, it is recommended that these five systems be covered during the master trainer course. See Table 1 for a brief outline and summary of the five robotic systems.

Future Systems

As maneuver concepts and materiel capabilities advance and push future air and ground robotic systems into the field, the course must adapt. Updated instruction could potentially train Soldiers in counter-unmanned aircraft system (C-UAS) equipment and employment techniques, SUAS swarm employment, and even the use of autonomous targets for unit range operations.

Summary

A Maneuver Robotics Master Trainer Course (MR-MTC) should be planned and programmed as soon as possible. New materiel system fielding takes time, and the robotic capabilities forecasted for the BCTs are no different. There is now a window of opportunity to develop and establish a master

Table 1 — Robotic Systems

Robotic System	Description	Characteristics
Soldier Borne Sensor (SBS)	The SBS is a nano-UAS that provides a squad with an organic “quick-look” capability. The system allows squads to conduct reconnaissance and observe targeted areas of interest while remaining out of enemy contact. Units first received the SBS in 2019, and fielding is continuing.	Aircraft Weight: < 6 ounces Total system weight: < 3 lbs. Range: 1 km Endurance: 15 min
Short Range Reconnaissance (SRR)	The SRR is a platoon-level SUAS that provides advanced situational awareness and a stand-off capability enabling reconnaissance, target detection, and acquisition. The SRR has vertical take-off and landing (VTOL), hover, perch, and stare capabilities.	Weight: 3 lbs. Range: 3 km Endurance: 30 min Perch & Stare: 60 min
Medium Range Reconnaissance (MRR)	The current fielded MRR platform is the RQ-11B Raven and serves as a company-level SUAS. The Raven has been in service for several years and is undergoing an upgrade. The new RQ-11C will be modernized with a new hand controller, sensor gimbal, and longer battery life.	Weight: 4.5 lbs. Range: 10 km Endurance: 1.5 hr
Long Range Reconnaissance (LRR)	The currently fielded LRR is the Puma SUAS. This hand-launched SUAS is used as a battalion-level surveillance and intelligence gathering tool that uses an electro-optical camera and infrared camera. A new LRR SUAS is in development.	(Future LRR platform TBD) Weight: 15 lbs. Range: 10 km Endurance: 2 hr
Small Multi-Purpose Equipment Transport (SMET)	The eight-wheel SMET will provide small dismounted units at battalion level and below with an unmanned cargo transport (up to 2,500 pounds). The SMET also features a Universal Battery Charger with the capability to recharge unit equipment batteries.	Unmanned/optionally manned system Range: 60 miles or > in 72 hrs Generates power for charging batteries and equipment

Terms	
Artificial Intelligence	The capability of computer systems to perform tasks that normally require human intelligence such as perception, conversation, and decision-making.
Autonomy	The level of independence that humans grant a system to execute a given task in a given environment. The condition or quality of being self-governing to achieve an assigned mission based on the system's own situational awareness (integrated sensing, perceiving, analyzing) planning and decision-making. This independence is a point on a spectrum that can be tailored to the specific mission, level of acceptable risk, and degree of human-machine teaming.
Cross-Domain Maneuver	The employment of mutually supporting lethal and nonlethal capabilities of multiple domains to create conditions designed to generate overmatch, present multiple dilemmas to the enemy, and enable joint force freedom of movement and action.
Small Unmanned Aircraft System (SUAS)	These small systems generally have a maximum gross takeoff weight of 0-20 pounds. System airspeeds are 100 knots or less and have a normal operating altitude of 1,200 feet above ground level (AGL) or below.
Multi-Domain Operations	Operations conducted across multiple domains and contested spaces to overcome an adversary's (or enemy's) strengths by presenting them with several operational and/or tactical dilemmas through the combined application of calibrated force posture; employment of multi-domain formations; and convergence of capabilities across domains, environments, and functions in time and spaces to achieve operational and tactical objectives.

Table 2 — Terms

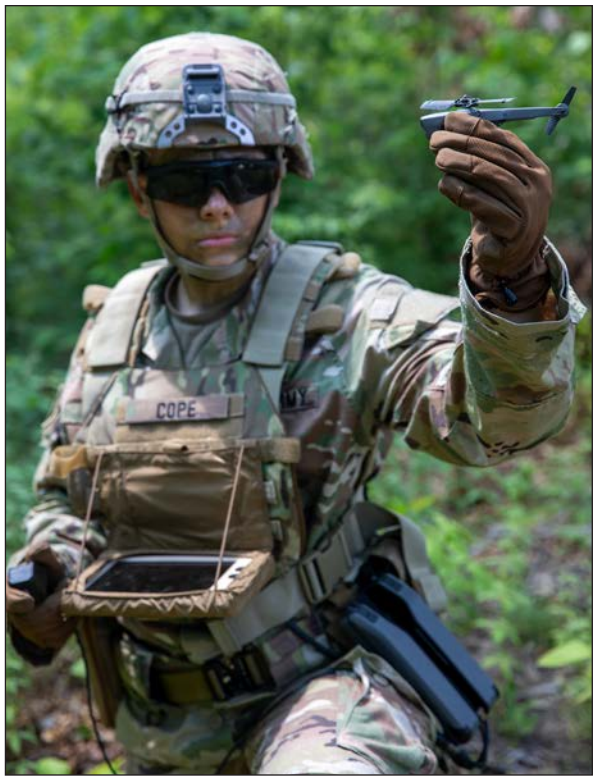


Photo by Justin Sweet

A cadet demonstrates the Soldier Borne Sensor during training at the U.S. Military Academy in July 2021.

trainer course that is ready to support commanders in the field with trained and ready operators who can effectively operate maneuver robotic systems and leaders who can confidently employ them.

Maneuver Robotics Master Trainer Course Recommended Outcomes

1. Train and evaluate unit maneuver robotic operators resulting in a strong bench of qualified Soldiers.
2. Advise commanders on the capabilities and limitations of unit assigned air and ground robotic systems.
3. Assist commanders in developing and managing unit robotic training plans in accordance with applicable policies and regulations.

References

U.S. Army Small Unmanned Aircraft System Strategy, Robotics Requirements Division, Maneuver Capabilities Development and Integration Directorate, 2020

John Dudas retired from the U.S. Army in 2018 as a command sergeant major. He currently serves as a training developer at the Maneuver Center of Excellence, Fort Benning, GA.

A Soldier launches a Raven RQ-11B during training at Bemowo Piskie Training Area, Poland, on 5 August 2021.
Photo by SFC Adrian Patoka