



EQUIPPING THE FUTURE FORCE SAPPER

By Captain Michael P. Frank

What makes the Future Force sapper a unique soldier on the battlefield? What capabilities will he bring to the warfight? This article highlights some of the capabilities and systems that will make sappers indispensable and relevant to Future Force operations.

Assured Mobility

Key to the success of the Future Force will be its ability to maintain an unprecedented level of freedom of maneuver. This will be accomplished by using emerging technologies, some on maneuver platforms and some manned by sappers. To provide assured mobility, we must see first, understand first, act first, and finish decisively. The Future Engineer Force (FEF) will add increased mobility and enhance the combined arms force to move across the battlefield with increased survivability. The FEF will be able to quickly locate and neutralize all antitank and antipersonnel mines and other explosive hazards (EH) to enhance mobility and force protection.

Counter Explosive Hazards Capabilities

The FEF will see significant increases in counter EH capabilities through significant technological advances and changes in organizational design. Technological advances include predictive tools, standoff detection, command and control, increased situational awareness, robotics, and enhanced force protection. Organizational design changes are focused to support modularity, and they significantly differ

from any changes throughout our Regimental history. These changes will enable maneuver, maneuver support, or maneuver sustainment operations by allowing our forces freedom to maneuver when and where they want by denying an opponent's ability to use EH against them.

The Future Force brigade combat teams (BCT), equipped with the Future Combat System, will use its embedded technologies to provide assured mobility in support of maneuver. The BCTs are also a significant organizational change as sappers are replaced by embedded capabilities provided by technology. The embedded technologies of the BCT are enhanced situational awareness and prediction tools linked to standoff detection and neutralization capabilities, enabled through robotics. The more effective prediction capabilities will allow the FEF to focus the employment of detection technologies on the high-risk and high-payoff areas of interest required to support maneuver. Enhanced command and control capabilities and real-time situational awareness will enable commanders to make informed decisions on bypass or precision maneuver. Robotics will be used to reduce the workload and to perform dangerous and hazardous tasks.

Technological advances and organizational design changes will also enable sappers to provide assured mobility for maneuver support and maneuver sustainment operations. The fielding of our objective capabilities changes detection and standoff neutralization, and enhanced individual and platform protection will significantly improve our route and area clearing capabilities. Until these technologies mature and are fielded

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across the force, we will provide the initial capability through commercial off-the-shelf systems and the creation of the engineer clearance company. The future engineer clearance company will consist of a headquarters section, three route clearing platoons, and an area clearing platoon. The route clearing platoon will be equipped with a vehicle-mounted mine detector, a mine-protected interrogation vehicle, and a medium mine-protected vehicle.



RG-31 Medium Mine-Protected Vehicle

Similarly, the future area clearing objective capability is an autonomous or semiautonomous robotic day and night area clearance capability. Until the required technology matures, we will equip the area clearance platoons with medium and mini-mechanical flails, mechanical proofing, enhanced neutralization capability, and mine-protected command and control platforms similar to those in use by sappers supporting current combat operations. Mine detection dog teams will provide additional proofing capability. (See *Engineer*, July-September 2004, page 18.)



MV-4 Medium Mine Flail

This combination of new technologies and future organizational changes will assist in denying an opponent the ability to use EH as antiaccess or area denial capabilities. However, sappers will always be required to counter existing and future EH threats to meet the commander's intent. The FEF will be equipped and organized to provide these critical capabilities.

The FEF has a new piece of robotic countermine equipment, the Mechanical Antipersonnel Mine Clearing System (MAPMCS), which is used in current combat operations. The working principle is based on simultaneous use of two tools, the flail and roller, providing highly reliable mine clearance. The flail rotor has a number of chained hammers to conduct mine clearing. The flail hammers are made of high-quality material that is heat-treated and wear-resistant. The chained hammers and high rotational speed of the flail enables the machine to dig and powder antipersonnel mines until detonated or shattered. The machine is remotely controlled from a safe distance or an armored vehicle. The system is employed remotely to antipersonnel minefields and activates trip wires.

The MATILDA, a small, man-portable robot that includes a manipulator arm, a fiber-optic control kit, and extended-run batteries, is also in the FEF tool bag. The robot is used for military operations in urban terrain (MOUT) and tunnel and cave missions. The MATILDA provides standoff capabilities that keep soldiers out of danger areas for long periods of time while performing hazardous missions.



MATILDA Robot

Demolitions Capabilities

Demolitions, another area where sappers bring a critical capability to the warfight, will be used in a variety of roles, from assuring mobility in MOUT, to destroying improvised explosive devices (IEDs). An assessment of demolitions capabilities for sappers determined that current capabilities are spread across many different systems and require improved handling characteristics like portability, rapid emplacement and

execution times, ease of operation, and reduced minimum safe distances (MSD). The Tactical Explosives System (TES), a “system of systems,” is the future of Army explosives. The TES consists of two primary subsystems, a family of initiators, and a modular charge capability. The initiators will be controlled via a man-in-the-loop, the Tactical Internet using battle command capabilities, or programmed smart algorithms. The TES will follow a spiral development approach to maximize the availability of current and future technologies while providing incremental but satisfactory capabilities that support the sapper.

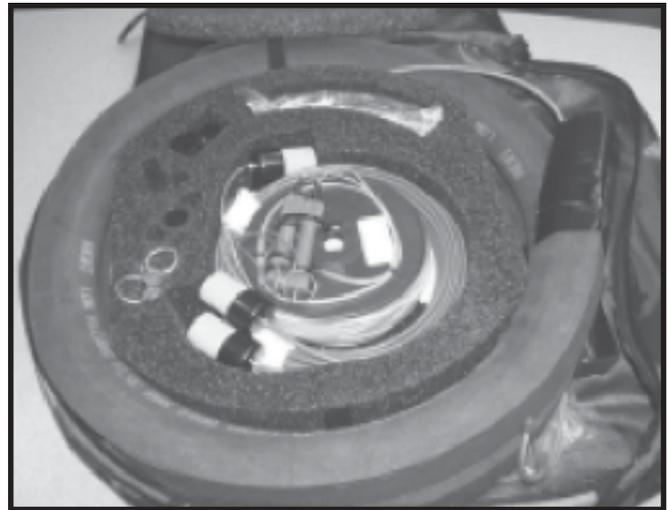
The FEF requires a remote command-initiation capability for demolition missions. The TES uses the Remote Activation Munitions System (RAMS) as a springboard to develop the TES remote initiation capabilities for the family of initiators. RAMS provides the sapper the capability to remotely initiate munitions and propagate an untethered line-of-sight (LOS) and non-line-of-sight (NLOS) signal to deliver the desired effect through an asymmetric battlespace. Through technology improvements, RAMS integrates several technologies to provide an untethered remote LOS and NLOS initiation capability. RAMS uses one modular system for demolition initiation tasks, which improves portability and decreases the soldier’s vulnerability to threat fires by lessening exposure time. Furthermore, RAMS significantly lightens the load the soldier has to carry to employ demolitions and reduces breaching times during urban operations. This retains the element of surprise from the forced-entry technique and allows the soldier to engage hostile targets with a greater tactical advantage. RAMS can be emplaced by hand and by unmanned ground vehicles (UGVs) and unmanned aerial vehicles (UAVs).

The TES incorporates the capabilities of a special operations forces demolition kit (SDK) and an urban operations set (UOS) as the first modular charge capability. The SDK-UOS provides the capability to tailor charges to the target and eliminates the various ad hoc charges currently being constructed for various missions. The SDK-UOS allows the sapper to construct the smallest, lightest charge feasible that allows tailored standoff distances suitable for specific missions and maximum precision for numerous types of targets and mission scenarios. Additionally, the SDK-UOS provides state-of-the-art methods to attach charges to targets. The SDK-UOS modular charges can be emplaced by hand and by UGV and UAV, providing the sapper the first capability to neutralize targets from a standoff.

The SDK-UOS also provides stand-alone capabilities to the sapper that will ultimately reduce MSDs in Army doctrine to safely perform breaching operations through hearing, blast, and fragmentation protection devices. Furthermore, the SDK-UOS provides a capability to nonexplosively cut through material when explosive breaching is not permitted.

Finally, the rapid wall breaching kit (RWBK) is a man-portable, rapidly deployable system that provides an organic capability to gain forced entry into buildings to maintain freedom of maneuver and to shape the battlespace for friendly forces in an asymmetric battlespace. The RWBK provides a

capability that is preformed, prepackaged, easily and rapidly employed, lightweight, and safe.



Rapid Wall Breaching Kit

Conclusion

This combination of new technologies and future organizational changes will assist in denying an opponent the ability to use EH as antiaccess or area denial capabilities. The technologies provide an increased level of safety by using unmanned vehicles (robots), giving Future Force sappers a standoff capability, enhancing their ability to breach obstacles, and continuing to provide assured mobility for maneuver. The FEF will be equipped and organized to provide these critical capabilities.

These are just a few of the capabilities and systems sappers will bring to the future battlefield. These capabilities are not generally transferable to a maneuver platform, and even if they were, infantry and armor soldiers will not have the time to train to proficiency on executing these missions and operating these systems to achieve the desired effect. So it is safe to say that the Future Force sapper will be a critical enabler of assured mobility and mission success in Future Force operations.



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