6 months after the TF's establishment, pre-system development and demonstration (SDD) contracts were awarded to LMMFC-D and Raytheon to facilitate the transition and mitigate risk associated with the SDD contract award planned for early FY04. A project manager for NLOS-LS has been approved for FY05 and the TF will continue to manage the effort until then.

In May 2003, Lockheed Martin Corp. and the Raytheon Corp. formed Netfires Limited Liability Company (LLC) to develop the NLOS-LS. On Aug. 6, 2003, the U.S. Army Aviation and Missile Command issued a request for proposal to Netfires LLC for the NLOS-LS SDD contract. Contract award is planned for the second quarter of FY04.

ROD SUMMERS is the NLOS-LS TF Director. He has a B.S.M.E. from Auburn University and an M.S.E. from the University of Alabama, Huntsville. He is a graduate of the Advanced Program Management Course and is Level III certified in systems planning, research, development and engineering and in program management.

Ummanned Ground Vehicles

COL Terry Griffin (USMC)

FUTURE COMBAT SYSTEMS
FCS
One Team-The Army/Defense/Industry

There are three unmanned ground vehicles (UGVs) in the Future Combat Systems (FCS) program. Each UGV program is managed by an integrated process team consisting of the Lead Systems Integrator and government personnel located in Huntsville, AL. A description of each program follows.

Small Unmanned Ground Vehicle (SUGV)

The SUGV is a small, lightweight, manportable UGV capable of conducting military operations in urban terrain tunnels, sewers and caves. The SUGV could be used for reconnaissance, surveillance and application of effects, including door breach, smoke generation and delivery of concussion grenades. The SUGV's modular design allows multiple payloads to be integrated in a plug-and-play fashion. Weighing less than 30 pounds, it is capable of carrying up to 6 pounds of payload weight. Three payloads will be developed in the FCS System Development and Demonstration (SDD) phase. They include a manipulator arm, fiber-optic tether and unattended ground sensor dispenser.

The SUGV will be controlled with video feedback through an Operator Control Interface (OCI) that is being developed in cooperation with the Land Warrior Program. The FCS SUGV contractor is iRobot, located in Burlington, MA.

Multirole Utility Logistics Equipment Vehicle (MULE)

The MULE is a 2.5-ton UGV that will support dismounted operations. It consists of four major components:

- Mobility platform.
- Autonomous Navigation System (ANS). The ANS is the mission payload package that will be integrated on both the MULE and Armed Robotic Vehicle (ARV) to provide a robotic semiautonomous capability and also on the family of manned ground vehicles (MGVs) to provide a leader-follower capability.
- OCI.
- Mission equipment packages.

The MULE is sling-loadable under military rotorcraft. The MULE has three variants: transport, countermine and the ARV-Assault-Light (ARV-A-L).

The transport MULE will carry 1,900-2,400 pounds of equipment and rucksacks for dismounted infantry squads with the mobility needed to follow squads in complex terrain. The countermine MULE will provide the capability to detect, mark and neutralize anti-tank mines by integrating a mine detection mission equipment package from the Ground Standoff Mine Detection System FCS program. The ARV-A-L MULE is a mobility platform with an integrated weapons and reconnaissance, surveillance and target acquisition (RSTA) package to support the dismounted infantry's efforts to locate and destroy enemy platforms

and positions. The MULE platform's centerpiece is superior mobility built around an articulated suspension system to negotiate tough obstacles and gaps that a dismounted squad might encounter. The MULE contractor is Lockheed Martin Missiles and Fire Control, located in Grand Prairie, TX.

Don Nimblett, Lockheed Business Development, stands on a mock-up of the ARV-A-L MULE.

ARV

The ARV is a 5-ton unmanned combat vehicle consisting of four major components: the mobility platform, ANS, OCI and RSTA sensors and weapons. There are two ARV variants: ARV-RSTA and ARV-Assault. The ARV-RSTA will maximize capabilities to detect and target the enemy, and the ARV-Assault will focus on increased lethality to destroy the enemy. The ARV platforms must have the speed and mobility to support mounted forces. The ARV program will enter a 2-year systems engineering phase. During this phase, FCS will explore ways to improve the ARV's effectiveness while maintaining the vehicle's weight at 5 tons. The program will evaluate technologies that include:

- Hybrid electric drive to provide a limited silent watch capability while increasing mobility for complex obstacles.
- Active suspension and steering system that will perform well on both hard-surface roads and cross-country terrain.
- Advanced lightweight materials and construction to increase survivability.

The FCS team will work with the Defense Advanced Research Projects Agency (DARPA) initiative — the ARV Demonstrator — to take advantage of the lessons learned to integrate weapons systems and their prototype ANS developed under DARPA's PerceptOR program on the ARV Demonstrator. Upon phase completion, a decision will be made whether to spiral the ARV into SDD. The ARV contractor is United Defense Ground Systems located in Santa Clara, CA.

The SUGV is a small, lightweight, man-portable UGV that could be used for reconnaissance, surveillance and application of effects, including door breach, smoke generation and delivery of concussion grenades.

ANS

The ANS consists of core navigation sensors, perception sensors, autonomous navigation algorithms and software. The ANS will be integrated on the MULE and ARV platforms to allow them to be either teleoperated or autonomously controlled. The ANS will be integrated on MGVs to provide a leader-follower capability. The ANS program will take advantage of several past and current programs that have worked diligently to advance semiautonomous capability for unmanned platforms: DARPA's PerceptOR program, the U.S. Army Tank-automotive and Armaments Command's Robotic Follower Advanced Technology Demonstration and the Army Research Laboratory's DEMO III program. The ARV, MULE and MGV contractors will work with the ANS contractor to ensure that the ANS is properly integrated to its platform. The ANS contractor is General Dynamics Robotic Systems in Westminster, MD.

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