

Early Infantry Brigade Combat Team (E-IBCT) Small Unmanned Ground Vehicles (SUGV)

Executive Summary

- Based on lessons learned from the Limited User Test (LUT) 09, the contractor made several improvements to the SUGV.
- In 2010, the Army conducted developmental testing and a LUT of the Small Unmanned Ground Vehicles (SUGV) at White Sands Missile Range, New Mexico.
- The test unit successfully employed the SUGV in support of a range of tactical missions.

System

- The Army intends the Early Infantry Brigade Combat Team (E-IBCT) SUGV Block 1 to provide an organic reconnaissance capability in urban terrain and subterranean battle space.
- The SUGV Block 1 consists of a SUGV Block 1 vehicle, an Operator Control Unit (OCU) with a hardened handheld controller and Ruggedized Personal Digital Assistant (RPDA), a goggle- or glasses-mounted display, a Local Display and Control unit (LDAC), and an integrated vest housing the processor, battery, and radio.
- The SUGV Block 1 will be employed by the IBCT at the platoon level. In urban operations, the operator will transport the SUGV Block 1 by organic wheeled, tracked, trailer, air assault, or airborne means, or dismounted with a Modular Lightweight Load-carrying Equipment (MOLLE) pack. After mission accomplishment, the operator will recover the SUGV Block 1.



Mission

Dismounted Soldiers are meant to use the SUGV to gain situational awareness/situational understanding without being exposed directly to the threat or hazard.

Major Contractor

iRobot – Burlington, Massachusetts

Activity

- Based upon LUT 09 performance, the Army upgraded the SUGV prior to E-IBCT LUT 10. Design improvements include:
 - Software upgrades to the controller and robot
 - Greater rigidity in the flippers
 - Improved circuit board design
 - New laser range finder
 - A new camera
- The Under Secretary of Defense for Acquisition Technology and Logistics (USD (AT&L)) approved a Milestone C decision for E-IBCT Increment 1, including SUGV, on December 24, 2009. As part of this decision, a low-rate initial production (LRIP) for one E-IBCT was approved.
- The Army conducted the contractor/government developmental test (TT-1) in July 2010 at White Sands Missile Range, New Mexico, to assess improvements in SUGV performance and reliability.
- The Army conducted LUT 10 in accordance with a DOT&E-approved Test and Evaluation Master Plan at White Sands Missile Range, New Mexico, in September 2010.
- LUT 10 was the second operational test of the SUGV and was intended to assess progress in SUGV operational effectiveness and suitability. During LUT 10, an infantry battalion consisting of two infantry companies equipped with the SUGV executed a series of offensive, defensive, and stability missions during three 96-hour scenarios.
- The results of LUT 10 will be used to inform a Defense Acquisition Board (DAB) decision whether to purchase additional SUGVs in LRIP or not.

ARMY PROGRAMS

Assessment

- Reliability test results from contractor/government developmental test (TT-1) indicate that the SUGV showed notable improvements in reliability. During TT-1, the SUGV exceeded system requirements for Mean Time Between System Aborts (MTBSA), with a point estimate of 339 hours compared to a requirement of 42 hours.
- The SUGV also met reliability requirements regarding Mean Time Between Effective Function Failures (MTBEFF), with a point estimate of 117 hours compared to a requirement of 21 hours. EFFs are less severe failures than system aborts, representing a degradation in system performance as opposed to rendering the system unusable.
- Developmental testing reliability results tend to be better than operational testing results. Generally, operational testing is conducted in a more complex and demanding environment than that found in developmental testing.
- The test unit successfully employed the SUGV in support of a range of tactical missions.
- In LUT 10, the SUGV exceeded its reliability requirements, with a MTBSA of 178 hours against a requirement of

42 hours, and a MTBEFF of 178 hours against a requirement of 21 hours.

- The test unit did not send tactical images over the network. Setting up the gateway and Network Integration Kit (NIK) was time-consuming and impractical in most operations. During LUT 10, the test unit set up the gateway during 4 of 35 taskings, and sent only one image to a NIK throughout the test.

Recommendations

- Status of Previous Recommendations. The FY09 recommendation for the E-IBCT program to improve the line-of-sight communications range between the SUGV operator and the robotic vehicle remains valid. The SUGV communications range requirement of 1,000 meters, if met, would be satisfactory for effective SUGV employment.
- FY10 Recommendation.
 1. The Army should continue to improve the SUGV based on lessons learned in LUT 10. Improvements should include a tether to extend SUGV range and to retrieve SUGV in confined spaces.