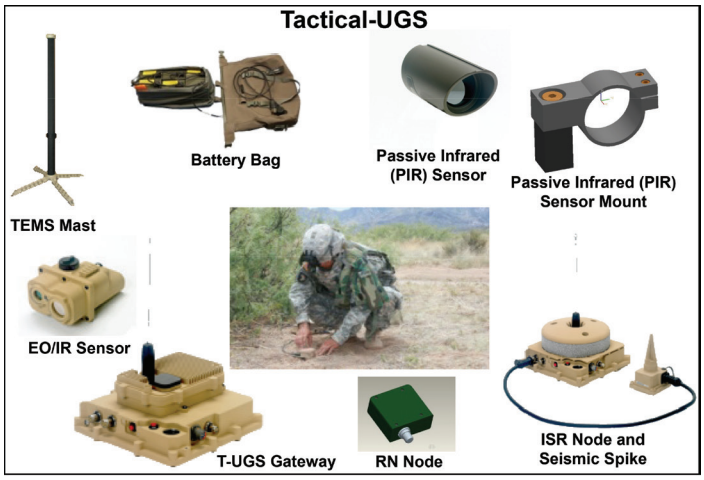
Early Infantry Brigade Combat Team (E-IBCT) Unattended Ground Sensors (UGS)

Executive Summary
- Based on lessons learned from the LUT 09, the contractor made several improvements to tactical and urban Unattended Ground Sensors (UGS).
- In 2010, the Army conducted developmental testing and a Limited User Test (LUT) of the UGS at White Sands Missile Range, New Mexico.
- During LUT 10, the UGS demonstrated little tactical utility, providing little useful tactical intelligence to the test unit.

System
- Early Infantry Brigade Combat Team (E-IBCT) Increment 1 has two unattended ground sensors employed at the platoon and company level, Tactical-UGS (T-UGS) and Urban-UGS (U-UGS). These are designed to be capable of target detection, location, and classification. UGS include acoustic, seismic, magnetic, electro-optical/infrared, and radiological/nuclear sensors.
- T-UGS systems are self-organizing networks of remotely-deployed, long-range sensors designed to enhance perimeter defenses of forward operating bases and other tactical locations. They are meant to provide a gateway for transmission of information to the tactical network and fusion of data from its various sensors.
- T-UGS include intelligence, surveillance, and reconnaissance sensors, radiological and nuclear sensors, and electro-optical/infrared sensors. T-UGS are hand-emplaced and hand-retrieved at the end of missions.
- T-UGS improvements for LUT 10 include improved cable connectors, a swivel mount for the Passive Infrared (PIR) sensor, improved Soldier transport, and an additional seismic spike strap.
- U-UGS are small, leave-behind imaging and intrusion detection sensors (similar to commercial burglar alarms) that are used in buildings, caves, or tunnels. Information is transmitted to the tactical network via a gateway.
- U-UGS improvements for LUT 10 include a higher-resolution camera, improved multipurpose adhesive pads, better message completion rate, improved Soldier transport, and a new form factor gateway.



EO/IR - Electro-optic/Infrared
ISR - Intelligence, Surveillance, and Reconnaissance
RN- Radiological Nuclear
TEMS - Tactical Employment Mast System

Mission
Infantry companies and platoons use UGS to enhance remote perimeter defense, surveillance, target acquisition, situational awareness, and detection of radiological and nuclear contamination.

Major Contractor
Textron Defense Systems – Wilmington, Massachusetts

Activity
- The Under Secretary of Defense for Acquisition Technology and Logistics approved a Milestone C decision for E-IBCT Increment 1, including T-UGS and U-UGS, on December 24, 2009.
- The Army conducted Technical Test 1 (TT-1), a developmental test conducted at White Sands Missile Range, New Mexico, in July 2010 to assess improvements in UGS 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 UGS systems, and was intended to assess progress in UGS operational effectiveness and suitability. During LUT 10, an infantry battalion consisting of two infantry companies equipped with the UGS 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 UGS systems in the low-rate initial production (LRIP) phase or not.

Assessment

- Reliability test results from TT-1 indicate that both T-UGS and U-UGS showed notable improvements. During TT-1, the T-UGS exceeded system requirements for Mean Time Between System Aborts (MTBSA), achieving a point estimate of 595 hours compared to a requirement of 127 hours. The T-UGS also met reliability requirements regarding Mean Time Between Effective Function Failures (MTBEFF), achieving a point estimate of 46 hours compared to a requirement of 32 hours.
- The U-UGS also exceeded system requirements for MTBSA, achieving a point estimate of 503 hours compared to a requirement of 105 hours. U-UGS did not meet MTBEFF reliability requirements, achieving a point estimate of 21 hours compared to a requirement of 26 hours. Effective Function Failures (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 operating environment than that found in developmental testing.
- During LUT 10, the T-UGS and U-UGS demonstrated little tactical utility, providing little useful tactical intelligence to the test unit.
- T-UGS and U-UGS imposed a significant burden on the test unit to emplace, operate, and retrieve the systems. Both systems are heavy, limited to line-of-sight, have difficulty connecting to the E-IBCT Network Integration Kit, and provide limited tactical utility in most operations.
- Images from T-UGS and U-UGS were often dark, blurry, and unusable.
- T-UGS and U-UGS were difficult to conceal in realistic tactical settings.
- During LUT 10, the T-UGS and the U-UGS met reliability requirements:
  - T-UGS demonstrated a MTBSA of 308 hours against a requirement of 127 hours, and a MTBEFF of 308 hours against a requirement of 32 hours.
  - U-UGS demonstrated a MTBSA of 157 hours against a requirement of 105 hours, and a MTBEFF of 79 hours against a requirement of 26 hours.
- The effectiveness of the UGS systems is dependent upon the availability of production-representative Joint Tactical Radio System (JTRS) radios, corresponding waveforms, and network management tools (to be provided by the JTRS program).

Recommendations

- Status of Previous Recommendations. The Army satisfactorily addressed the previous recommendations.
- FY10 Recommendations. None.