Operational Issues / Challenges

Breakout Panel
Questions

• What capabilities can unmanned ground systems bring to operational mission areas?

• What technologies must be developed to enable the development of these capabilities?

• What tactical and doctrinal issues need to be addressed to allow for a smooth transition of these capabilities to the Warfighters?

• What actions need to be taken as part of the path forward to overcome the technological, tactical and doctrinal issues identified?
What mission sets do we want Unmanned Ground Systems for?

**Force Protection**
- EOD / UXO
- Route clearance / mobility / demining / area clearance
- Firefighting
- Decontamination

**Logistics**
- Transportation / haul
- Battlefield medical applications
- Refuel / resupply
- Humanitarian Assistance / Aid

**Reconnaissance**
- Perimeter / Site Security & Early Warning
- Short range – “around the corner”
- Long range – “outside weapons range”
- CBRNE sensing / ID

**Direct Contact**
- Lethal effects
- Less than lethal effects
Q1 – Capabilities / Requirements

- Sensory Feedback to the operator – SIGHT, touch, sound
- Virtual environment – with seamless man-machine interface
- Environmental Hazards Detection and Identification – Hazardous military and industrial chemicals, explosives, radioactive materials
- Suite of systems – Recon, Action (movement / manipulation) – one size does not fit all – vehicle-delivered vs map packable system
- Add 3D Dimension – GMAV – but without requiring airspace coordination
- Plug and Play architecture – adding / removing capabilities – needs to enable the user to add sensors / tools to the system easily – from different manufacturers
- Strongly prefer Wireless devices
- Must be night capable
- Must be compatible with Counter-IED Remote Control Electronic Warfare (or CREW)
- Must improve ranges in urban environments
Q1 – Capabilities / Requirements

• Must be able to fix forward – transportation on the non-linear battlefield is at a premium – Soldiers trained to repair with repair parts inventories on-hand
  • Must reduce cost
  • Material Reliability
  • Appropriately weight classed – small, medium and large. Weight reduction / portable within its weight class
  • Commonality of controllers / user interfaces
  • Long duration; power supply sufficient for sustained operations
  • All-weather capable
  • Highly mobile – undeterred by mud, shallow water, rubble, etc
  • Self geo-referencing; mapping
  • Creating 360 degree visual and aural environment
  • Autonomous movement and autonomous task operations
Q2 – Technologies

- Intelligent actuators
- Advanced materials – composites, plastics, alloys?
- Energy storage – increasing energy and power density
- Virtual displays that recreate human senses
- Precise navigation in GPS-denied environment
- Reliable, long-range, non-LOS communications; programmable frequencies
- Advanced sensors and sensor integration
Q3 – Tactical & Doctrinal Issues

N/A
Q4 – Future Actions…

• Combat Developers; increased feedback / input from end users.

• Integrated, full life-cycle support.

• Establish specific cost targets / ceilings.

• Supply chain analysis to determine necessary infrastructure required to support robotics industry.