Robotics in Homeland Defense

Purpose: To discuss the capability gaps in the mission sets of homeland defenders that would lend themselves to the introduction/enhancement of ground robotics applications

Panelists:

Jim Russell – Air Combat Command (Chair)

Larry Burns – Las Vegas Metropolitan Police Department

John Gnagey – National Tactical Officers Association

Kim Keisling – Joint Task Force North

Darron Lee – Drug Enforcement Administration

Tom Lynch – National Tactical Officers Association

Shan Smith – Immigration and Customs Enforcement

Greg Torres – U.S. Customs and Border Protection

Robotics in Homeland Defense

- **Identified 3 major user communities**
  - **EOD/bomb squad**
  - **Tactical Operations (CT/LE)**
  - **Tunnel Task Force (DEA/ICE/USBP)**

Robotics in Homeland Defense

- **All users have different missions and different robotic requirements**
  - **EOD/Bomb squads**
    - **Need robotic capabilities for dealing with suicide bombers and VBIEDs**
    - **Require the ability to transport a heavy load down range**
  - **Tunnel Task Force**
    - **Need capability to operate below ground**
    - **Must operate in various geological conditions**
  - **Tactical Operations**
    - **Must be untethered, agile, stable, and have ability to deploy various tactical payloads**
    - **Need tactical operations robot vice EOD robot**

Robotics in Homeland Defense

Requirement Documentation Challenges:

- No formal documentation has been developed
- US NORTHCOM is COCOM
- Counter Tunnel is number 4 for US NORTHCOM
- All aspects has not been articulated
- JTFN has drafted a prelim needs doc
- DOD and TSWG are tackling the programming
- Urgent Compelling document from JTF 134 for Counter Tunnel Operations could be basic document
- Threat documentation is being produced by DIA

Robotics in Homeland Defense (Technology Thrust Areas)

Platform

- **Stability and Size – multiple sizes required/must be mission adaptable**
- **Power – batteries and or external power source**
- **Mobility – able to transverse water, mud, clay, steep slopes, dry dusty areas, snow, etc**
- **Advanced Materials – maintenance costs must be low**
- **Terrain and Environments – arid, wet, snow etc**
- **Survivability – capable of withstanding 7.62mm direct fire**

Robotics in Homeland Defense (Technology Thrust Areas)

Communication

- **Frequency Allocation – needs to be determined**
- **Security – needs to be able to operate in a cluttered EMI environment**
- **Range and Bandwidth – needs to be determined**
- **Satellite Systems – needs to be able to data up and down link**
- **Wireless Communications – needs to be able to accept other wireless systems as demanded by mission profile**
- **Tethered vs Radio Frequency Systems – should be able to do both**

Robotics in Homeland Defense (Technology Thrust Areas)

Control

- **Human Factors – systems operated in extreme stress situations, needs to be intuitive**
- **Feedback Systems – platform needs to be semi-aware**
- **Multiple Vehicles – capable of co-operating with other similar and dis-similar systems**
- **Operator Control Stations – prefer stand alone due to keyboard complexity and the KISS principle**
- **Voice Command Recognition – ??**
- **Level of Onboard Intelligence**

Robotics in Homeland Defense (Technology Thrust Areas)

Navigation

- **Tele-operation – to be determined**
- **Semi-Autonomous/Autonomous – some tasks should be semi-autonomous**
- **Path Planning – mission dependent**
- **Object Recognition – yes**
- **Obstacle Detection/Avoidance – yes**
- **Positioning Systems/mapping – yes**

Robotics in Homeland Defense (Technology Thrust Areas)

Payloads

- Chem/Bio/Rad Sensors
- Anti-terrorism Tools
- Defeat Systems
- Sensors
- Intelligence Gathering Systems
- Construction Tools

Robotics in Homeland Defense (Technology Thrust Areas)

Manipulation

- Degrees of Freedom
- Force Feedback
- Operator Control
- Automation/Intelligence
- Precision/Accuracy
- Dexterity/Lift Capacity

Robotics in Homeland Defense (Conclusion / Recommendation)

- **Tactical Ops and Tunnel Task Force robotic requirements not clearly identified**
  - **Need methodology to define needs...may seek to leverage EOD/Bomb squad process for requirements identification and advocacy**

- **Recommend working with JTFN, TSWG, and JGRE for support to help in requirements development**

Robotics in Homeland Defense

My sincere thanks to the members of the Panel....

Questions???