Emerging Staff Roles: Robotics NCO Task Analysis

Elizabeth K. Bowman
Regina Pomranky
Jeffrey A. Thomas
12th ICCRTS
20 June 2007
ebowman@arl.army.mil
Army Research Laboratory
Presentation Outline

• Experiment Setting
• Methodology
• Results
• Conclusions
Experiment Setting

• PM C4ISR On The Move Campaign of Experimentation, Ft. Dix NJ July 2006
• Platoon force on force experiment with unmanned technologies in a networked architecture
• RNCO supervised several technologies:
  – Packbot SUGV
  – ARL Unattended Ground Sensors
  – Night Hawk UAV
Methodology

- Document Review
- Observation
- Interviews
- Surveys
- Review of text chat and voice messages
Results

• Demographics
  – Of 39 Soldiers (New Jersey Army National Guard (NJ ARNG)), two were selected to act as RNCO on alternating days
  – RNCO players were E-5 and E-4 Corporal

• Main tasks:
  – Planning
  – Emplacement
  – Building Situational Awareness
Planning Tasks

- OPORD
- Mission Planning
- How sensors deployed
- Brief sensor Operators

- Convoy
- Monitor FBCB2 for changes

- Unload and emplace
- Load sensors And OCUs

- Camouflage and Operate
Emplacement Tasks

• Selecting sensor locations for Unmanned Ground Sensors and Unmanned Ground Vehicles
• Camouflaging
• Set up UAV site (remote from sensors)
• Supervise UAV operations
• Troubleshoot problems with vehicles and OCU
Building Situational Awareness

• Monitor status of unmanned assets through FBCB2 and radio comms

• FBCB2 cues:
  – Messages
  – Spot reports
  – Image

• RNCO acted as an information filter for unmanned assets for higher HQ
Building SA (cont)

• RNCO continually cycled through an OODA loop (Observe, Orient, Decide, Act)
• Battlefield information obtained by fusing information from sensors and Soldiers
• Advice provided to Platoon Leader on issues with systems (UAV down, Packbot out of batteries)
• Feedback obtained through sensor images and text messages from operators
RNCO Situation Awareness Scores

- SA measured on a 3 point scale during each mission
- RNCO had moderate to high scores
- Lower scores reflect RNCO’s forced attention on the UAV OCU to feed FBCB2, taking his concentration away from the overall mission

![Daily Average SA scores for RNCO](chart.png)
Platoon Sergeant Interviews

- Additional platoon members needed to provide security
- “Packbot is not an extra man”
- Mastery of robotic systems should develop in a progressive manner, beginning with sensors, moving to UGVs, to UAVs, and finally to RNCO
Conclusions

• RNCO must be knowledgeable of unmanned systems and terrain
• Must be of sufficient rank to make decisions
• Network architecture can complicate systems and use
• Emplacement is not difficult, but critical
• Comms and building SA was a consuming task
• In actual conditions, the RNCO task can be expected to be cognitively demanding
• Developmental assignments are recommended for expertise