Attack the Network – Defeat the Device – Train the Force

JIEDDO's Robotics Programs

CDR Cedric Richardson
Joint IED Defeat Organization

MILITARY ROBITICS SUMMIT
29 Aug 2012

This briefing is classified UNCLASSIFIED

Discussion Points

- Robotics in the C-IED context
- Mounted Troop Support
- Dismounted Troop Support
- Recon Robots
- Future Considerations

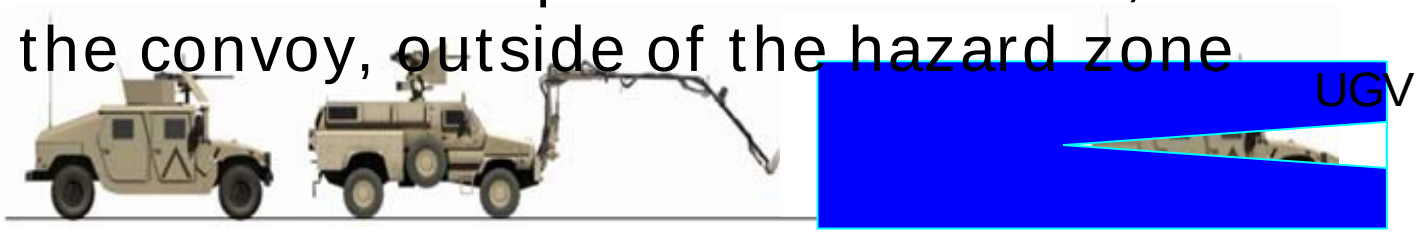
Robotics in the C-IED context

- One of the prevalent IED threats in theater for both mounted and dismounted troops is the Victim-Operated IED (VOIED)
- Very simple, but non-discriminatory
- You can do one of two things to it:
  - You can detect it (go around or neutralize it), or
  - If you can't detect it, you can mitigate damages

    (think rollers, pre-det, etc…)
- In most cases, current approaches require exposing soldiers to risk

Robotics in the C-IED context (cont'd)

- Current detection technologies require relatively close proximity & a slow rate of advance
  - GPR, Metal detectors, Cameras, etc.
- C-IED rollers require actual contact with the trigger
- How can robotics be used to address these shortcomings?
  - E.G. Put these capabilities on a UGV, ahead of the convoy, outside of the hazard zone



Mounted Troop Support

- JIEDDO has opted for a 2 phase approach:

  1. Prove the UGV concept by adding a simple enabler (i.e. rollers, rakes. etc.)

  2. Add sensors

Ghost Ship

- Simple, bare-bones appliqué solution
- HMMVW-based
- Tele-operation only
- Pulls a modified roller

Pros:
- Simple
- Inexpensive
- Lots of HMMVWs around
- Quick install

Cons:
- High operator workload
  (100%driving, simulator sickness, etc.)
- No real sensors
- Recovery post-blast?

Redshirt

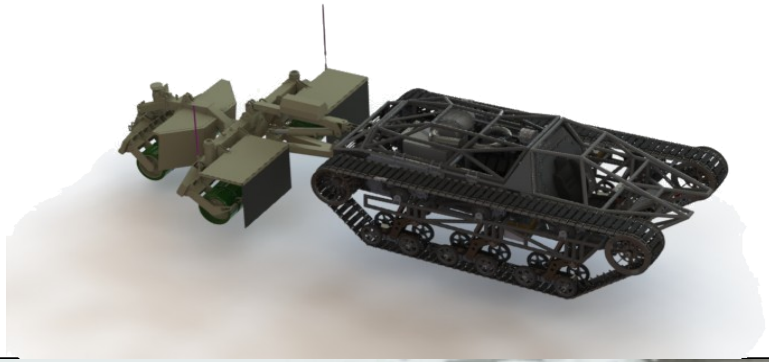
- Custom-built UGV (Howe & Howe MS4 aka RipSaw)
- Tele-operation only
- Pulls or pushes a modified roller

Pros:

- Extremely good mobility
- Has the power to <u>pull or push</u>
- Low vehicle ground pressure

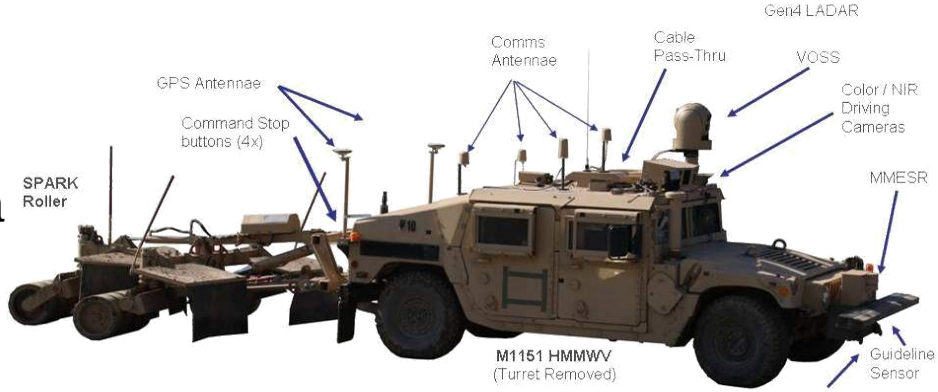
Cons:

- Expensive, unique platform
- High operator workload (100%driving)
- No real sensors (yet!)
- Recovery post-blast?



Supervised Autonomy for Defeat of IEDs (SANDI)

- Medium capability appliqué solution
- HMMVW-based
- Semi-autonomy or Tele-operation
- Pulls a modified roller
- SANDI 2 incorporates
  - High Def stabilized camera
  - Better HMMVW (M1151)



Pros:
- Semi-autonomous
  - Waypoint following
  - Obstacle Stop
  - Lower operator workload
- Lots of HMMVWs around
- Has been OCONUS tested

Cons:
- No real C-IED sensors (yet!)
- Recovery post-blast?

SANDI leading a RCP in OEF

Sentinel Scout

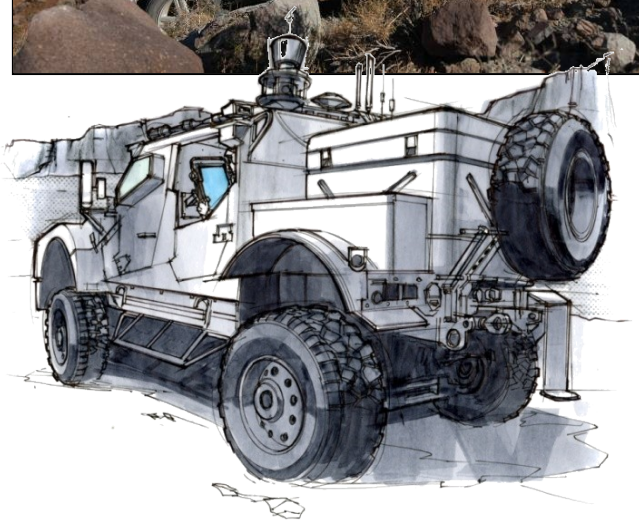
- High performance appliqué solution
- Commercial vehicle (could be integrated to MRAP)
- Full autonomy or Tele-operation

Pros:

- Full autonomy
  - Waypoint following
  - Road detection
  - Obstacle avoidance
  - Low operator workload

Cons:

- Expensive
- Not on an MRAP yet
- Recovery post-blast?



Dismounted Troop Support

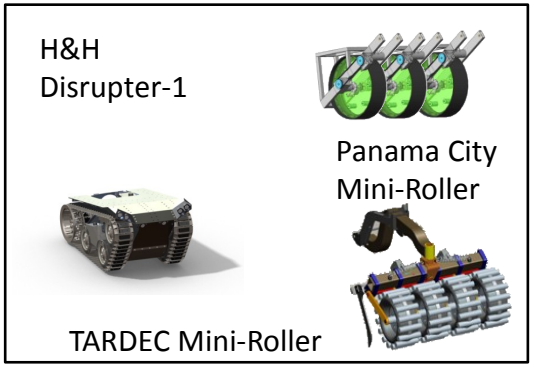
- Robotic Pointman
- Tele-operation only
- Rollers (or Flail)
- 2 Prime Movers / 3 Payloads / 2 Controllers
- OCONUS testing ~SEP 12

Pros:

- Small form factor
- Good for paths

Cons:

- Still heavy (450 lbs+)
- Walls, Qalats, Streams, etc.



Dismounted Troop Support

- US Army Rapid Equipping Force
- Tele-operation only
- Rollers
- Modified COTS with Tele-operation appliqué
- OCONUS testing on-going for Minotaur

Pros:

- COTS – easy to maintain
- Can also carry loads

Cons:

- Has to be trailered to area
- Walls, Qalats, Streams, etc.

Dismounted Troop Support

- UGV Mules
  - Carriage – Offload weight from soldier
  - Recon using camera
  - Ride-along or Follow-the-leader
- US Army – Squad Mission Support System
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Pros:

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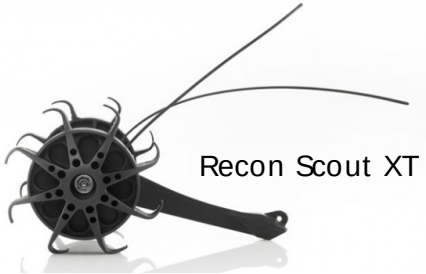
Ultralight Recon Robot



- Small, throwable robot for dismounted recon
- ~< 10 lbs, including controller

- Following a test of 12+ candidates at NIST, 3 finalists chosen to provide 100 ea. to OEF for field testing (APR-JUL 12)
- Results will form the basis of a requirement to provide a final capability (2000+ items)
- Extra Recon Scout XTs procured to increase interim capacity using already-fielded item

iRobot FirstLook

MacroUSA Armadillo

Qinetiq Dragon Runner

Future Considerations

- Tether/repeater considerations
- Sacrificial Vehicle vs. Tactical Platform (cost vs. utility)
- Sensor Package and/or Neutralization Capability
- Employment (transportation to area of operation)
- Recovery
- Mission Support (rate of advance, duration, mobility, etc)
- Combat Power (reduction) & Operator Workload
- Change to Threat (RCIED/CWIED, Offset, PSI)
- OPSEC (conspicuous)

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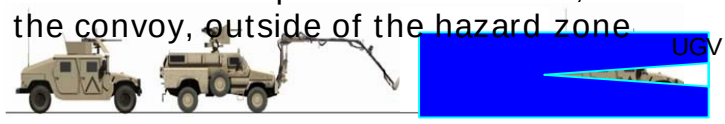

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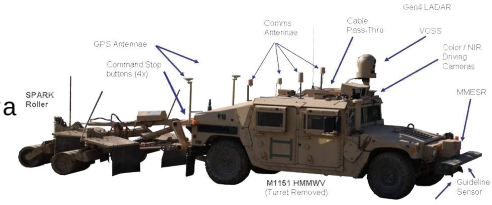

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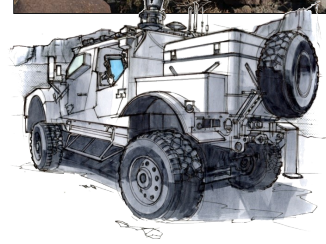

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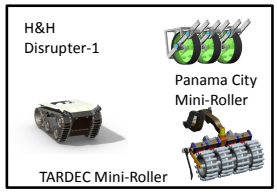

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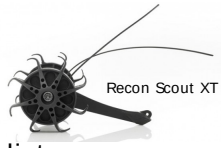

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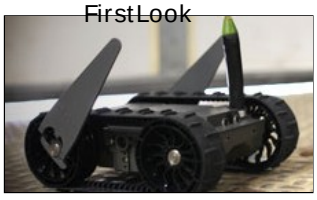

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