Mine Detection and Alternatives to Antipersonnel Landmines

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DSO

The Programs

- Electronic Dog's Nose

The Programs

- Self-Healing Minefield
- Tags and Minimally Guided Munitions

Antipersonnel Landmine Debate

Challenge is finding creative technology solutions in this highly constrained environment

The DARPA Approach

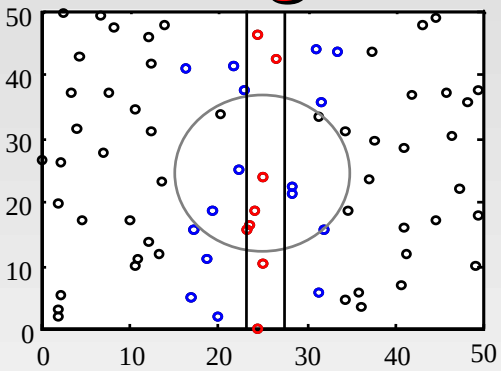
- Innovative maneuver denial approaches
  - Employ advanced technologies
  - Provide increased warfighting capability

Two Innovative Approaches

Mixed Munitions

Protection of AT minefields

Self-Healing Minefield



Tags/MGM

Dismounted Infantry

Korean DMZ

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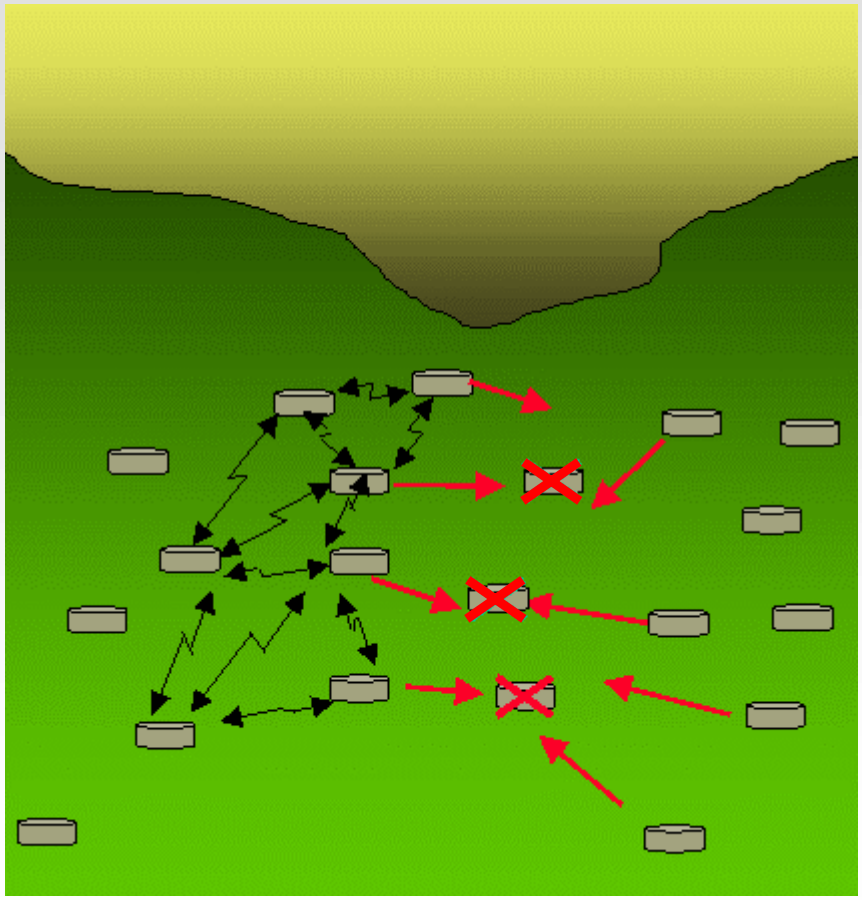
Self-Healing Minefield

Dynamic antitank minefield used to complicate breaching and preserve the obstacle



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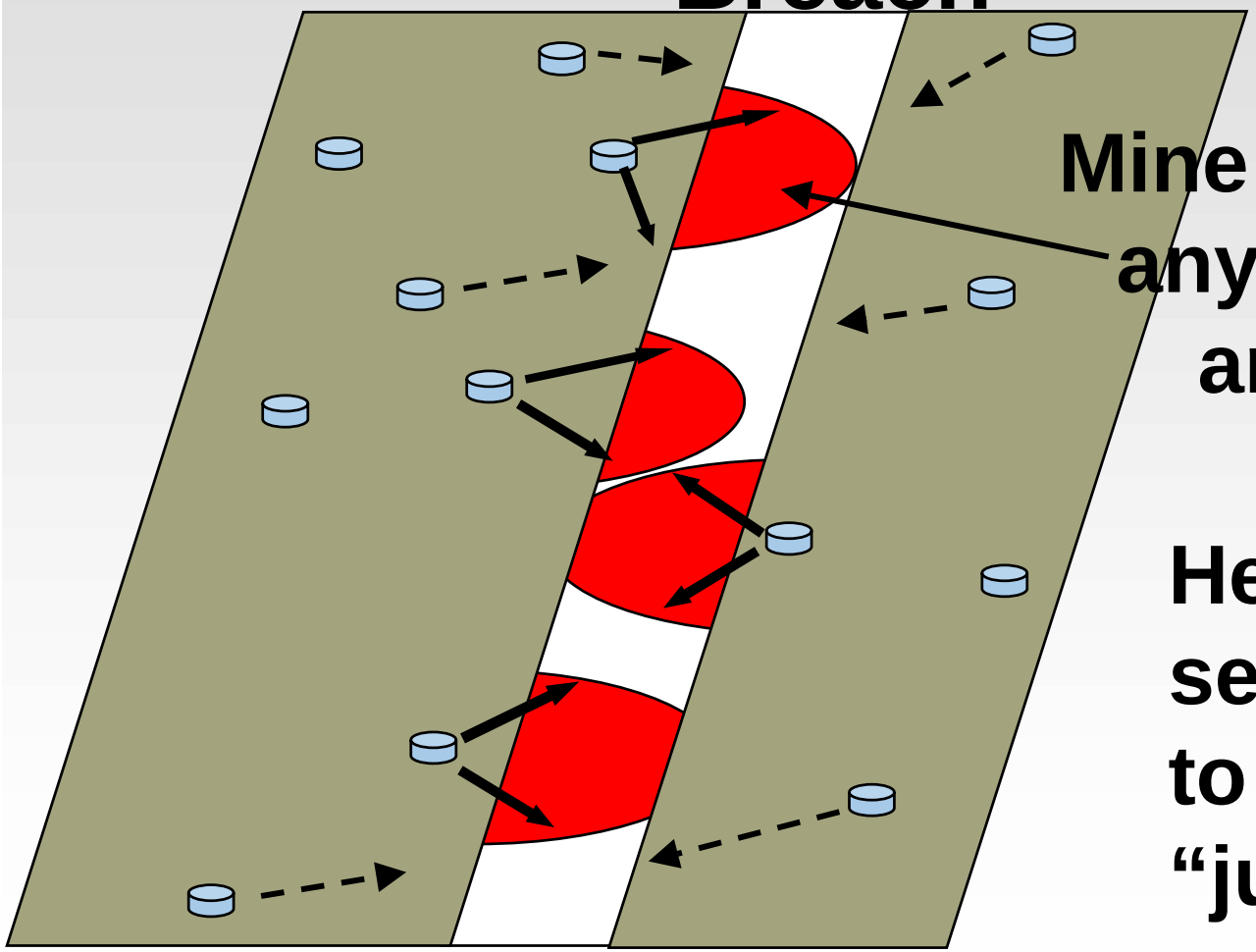
Operational Concept

- Scatterable surface antitank mines
- Minefield detects breach
- Individual mines reorganize to defeat breach

Response to Breach



Mine can move anywhere in annulus

Healing not sensitive to details of "jump"

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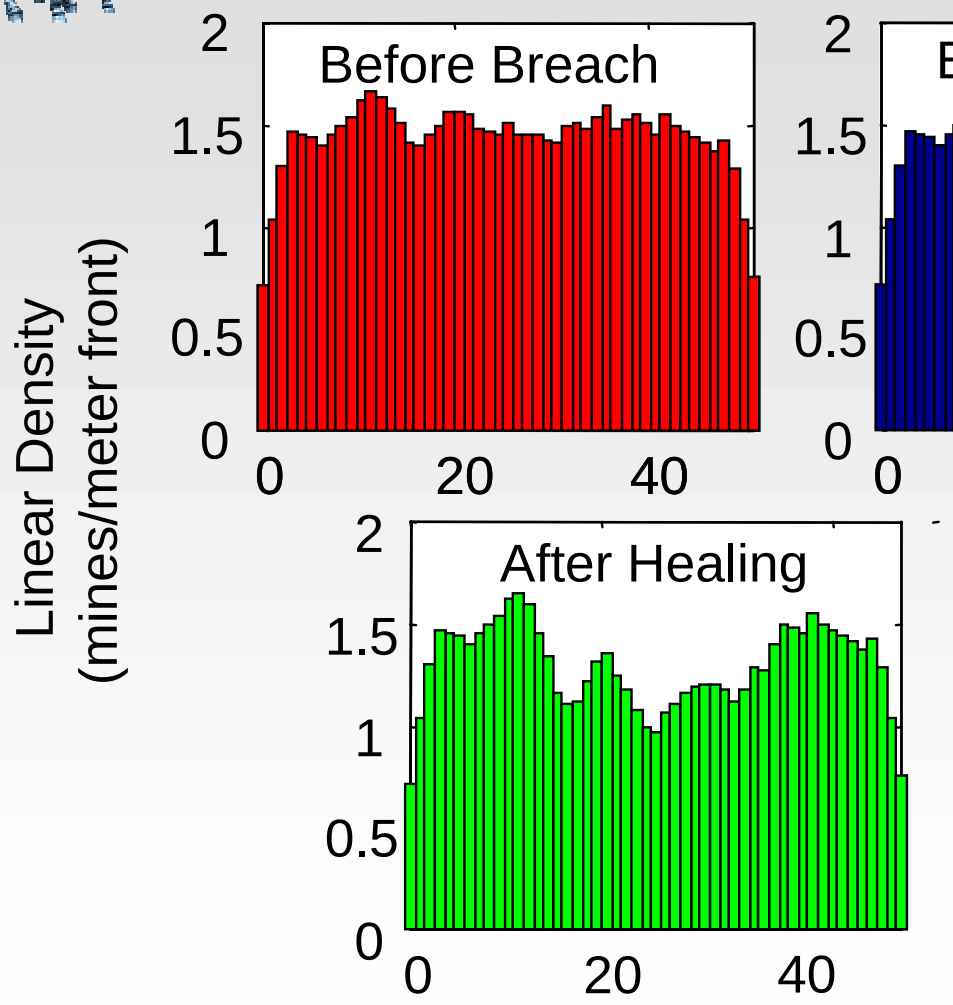
Healing Algorithms



No clear path through minefield after breach attempt

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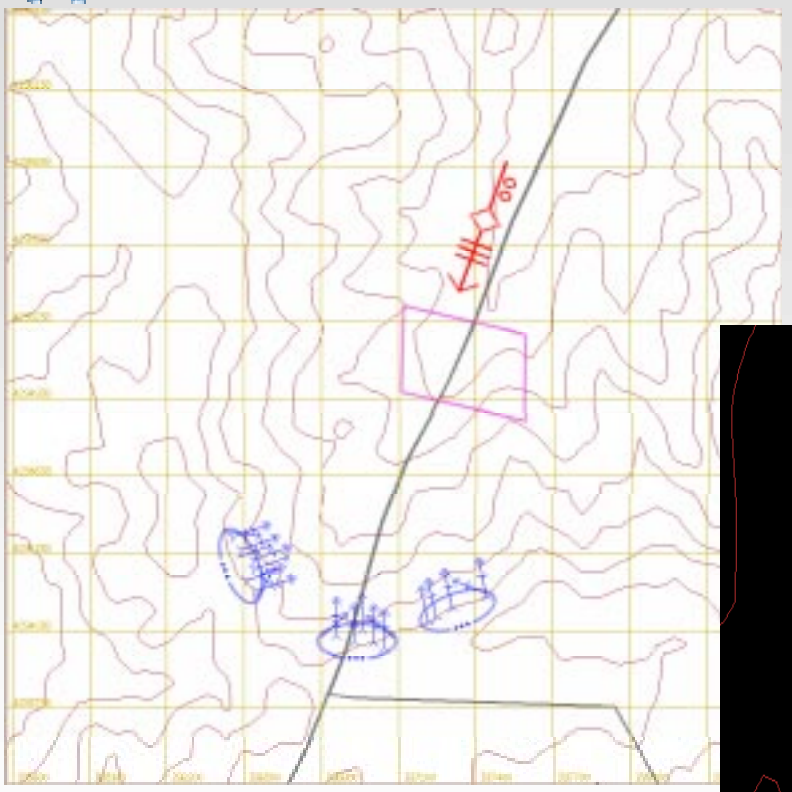
Mine Mobility

- Healing is a statistical process
- Simple mobility needed
- Will be fault tolerant
- NO COMPLEX ROBOTICS

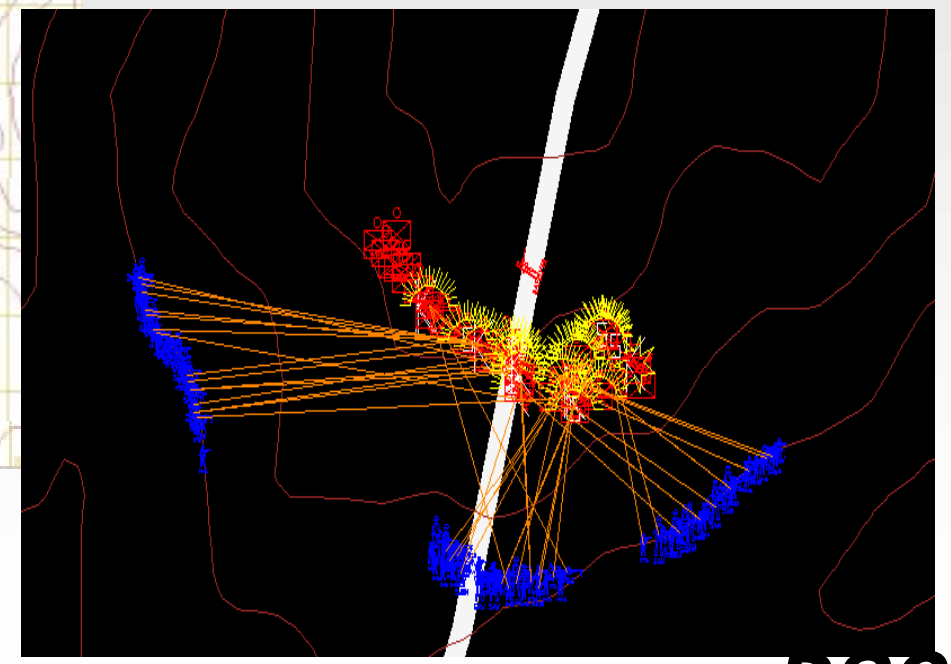
System Benefits

- Prevents/impedes breach without antipersonnel landmines
- Opportunity for control of minefield
- Enemy must clear minefield

Battlefield Utility



- North Korean mechanized battalion
- 3 rifle platoons



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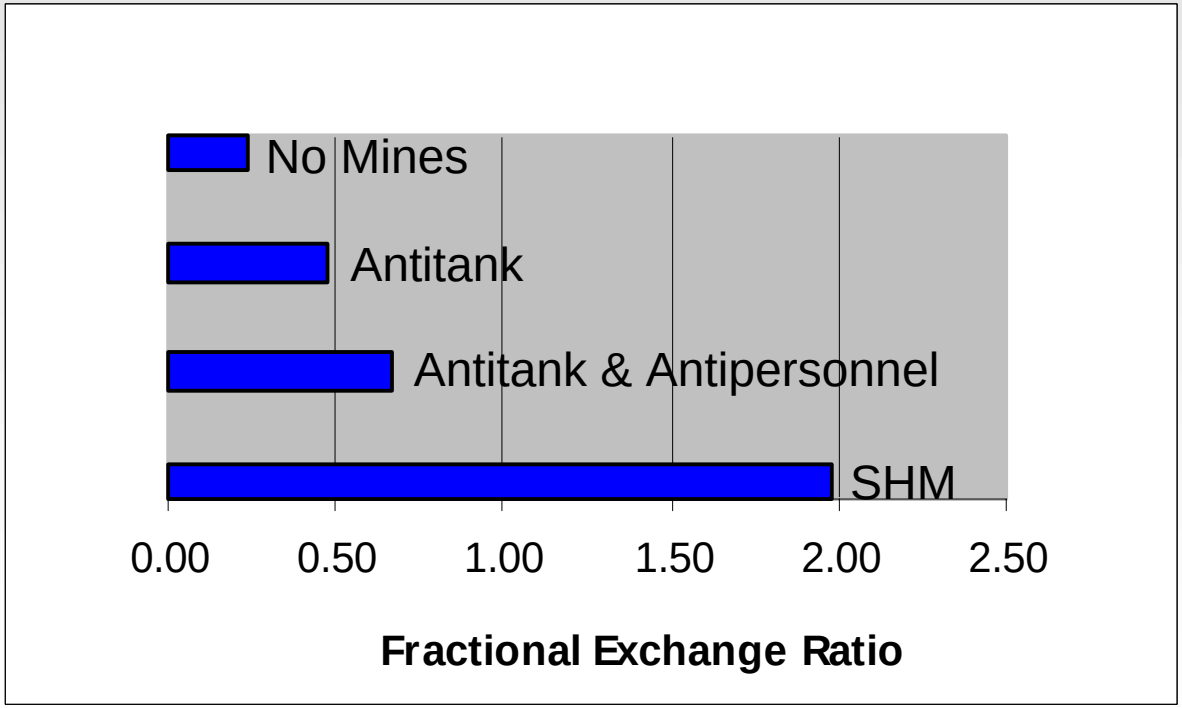
Battlefield Utility

The Self-Healing Minefield significantly increases Blue battle performance



Development Issues

- Distributed network comm.
  - Low power
  - Jam resistant
- Mine mobility
  - Multi-hop reorganization
- Healing behaviors
  - Provides battlefield capability

Tags/Minimally Guided Munitions

- Attack enemy dismounted maneuver by:
  - affixing tags to the individual soldier
  - employing rapid response, dedicated, guided, indirect fire

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Tags/MGM Concept

- Tags are burr-like transmitters picked up as enemy moves through engagement area
- Munitions are simple course correction, cueing on tag to keep dismounted soldier in kill box

Study Issues

- Tags
  - –Development of millimeter-size transmitters
    - ➢Relay information to munition launch point and during flight
  - –Power
  - –Packaging, adhesion, cueing, delivery of tags, etc.

Study Issues

- Minimally Guided Munitions
  - C2 - man-in-loop
  - Low cost/high sensitivity receiver
  - Indirect fire - group dynamics and individual feedback
  - Time-of-flight, flight control, logistics, overall efficiency, etc.

Program Status

- Electronic Dog's Nose
  - www.darpa.mil/dso/rd/applied/uxo
- Self-Healing Minefield
  - BAA 99-21 currently open
  - baa99-21@darpa.mil
- Tags/Minimally Guided Munitions
  - FY99 study phase
  - BAA anticipated fall, 1999