RASP: Robotic Augmented Soldier Protection

Dan Baechle, daniel.m.baechle.civ@mail.mil, 410-306-0721

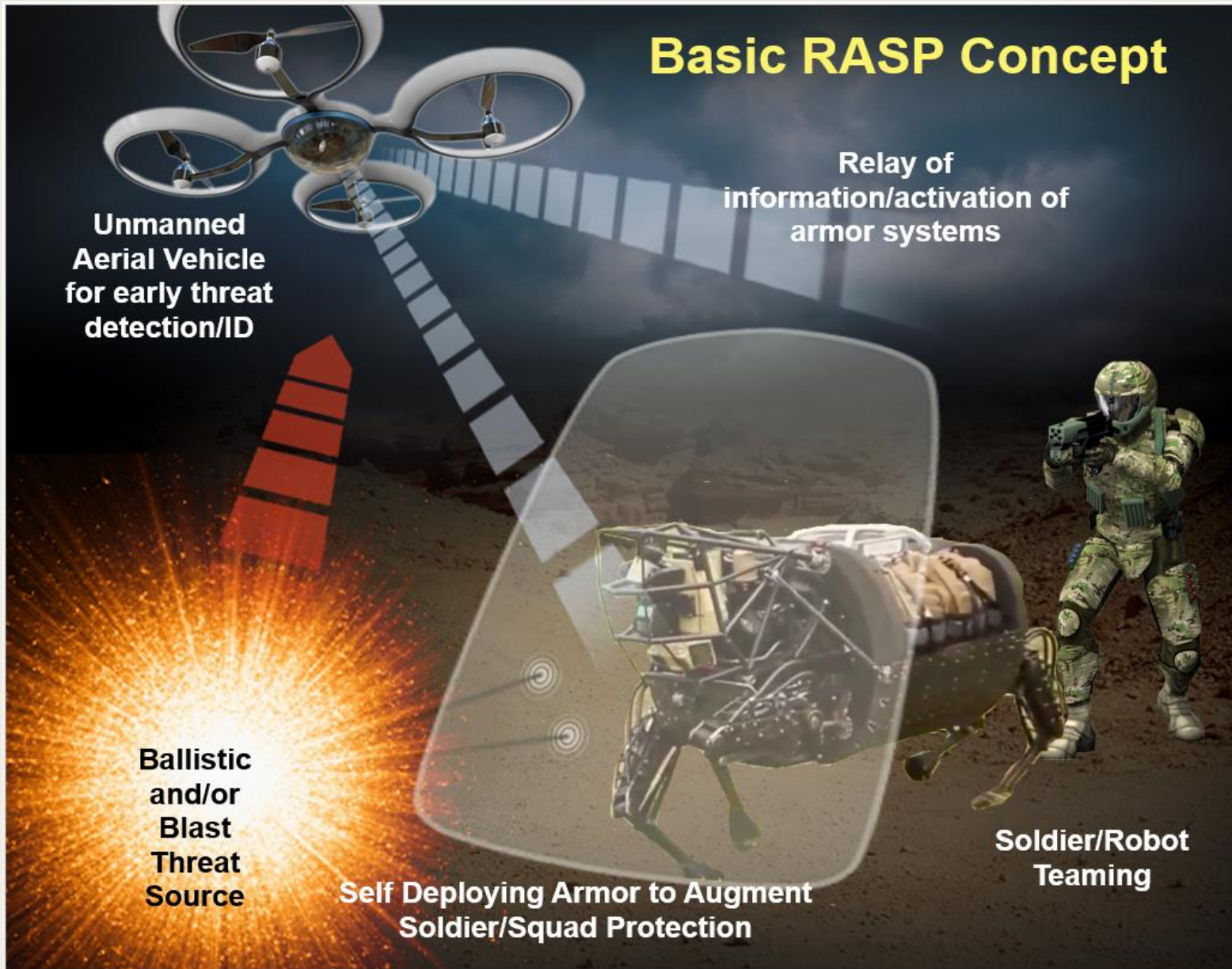**Shawn Walsh**

Shane Bartus

Weapons & Materials Research Directorate

The Nation's Premier Laboratory for Land Forces

Concept: added protection for Soldiers

Basic RASP Concept

Unmanned Aerial Vehicle for early threat detection/ID

Relay of information/activation of armor systems

Ballistic and/or Blast Threat Source

Self Deploying Armor to Augment Soldier/Squad Protection

Soldier/Robot Teaming

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Hypotheses:

(1) **Materials can Drive Robotics in New Directions**
(2) **Robotics can Drive Materials in New Directions**

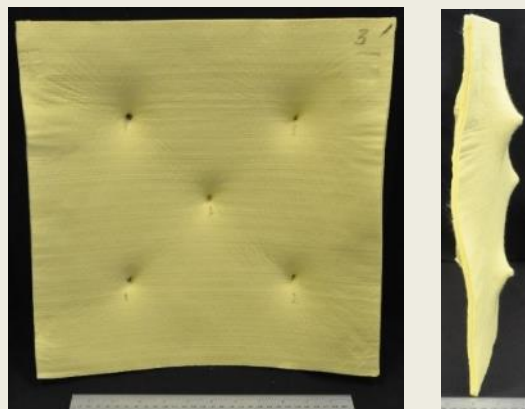**Materials & Manufacturing Science** **+** **Robotics/ Autonomous Systems/Unmanned Platforms** **=** **New, Disruptive Army Capabilities**

- Can robots protect humans?
  - Current issues: autonomy, mobility, sensing

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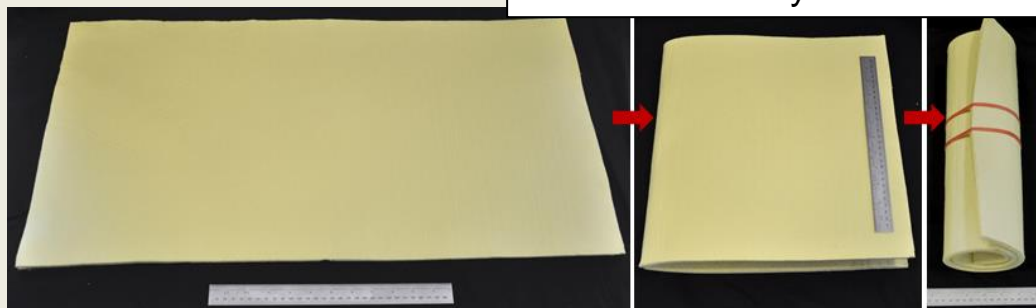# Material deployment mechanisms

Ground deployment mechanism

- Demonstrated mechanism to remotely unfurl & detach Kevlar fabric from UAV

- Demonstrated Kevlar felt shot simply supported: stopped .22 FSP at 40% lighter weight than woven Kevlar package

DJI S800 w/Kevlar fabric

Kevlar felt: easily rolled/folded

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Remote deployment of armor materials

- ARL armored lid of trailer for optionally-manned ATV

- Dual-purpose cargo & protection

- Remotely operated
  - Could be paired with shot sensor to automatically deploy
  - Could be autonomously deployed in danger area for bounding

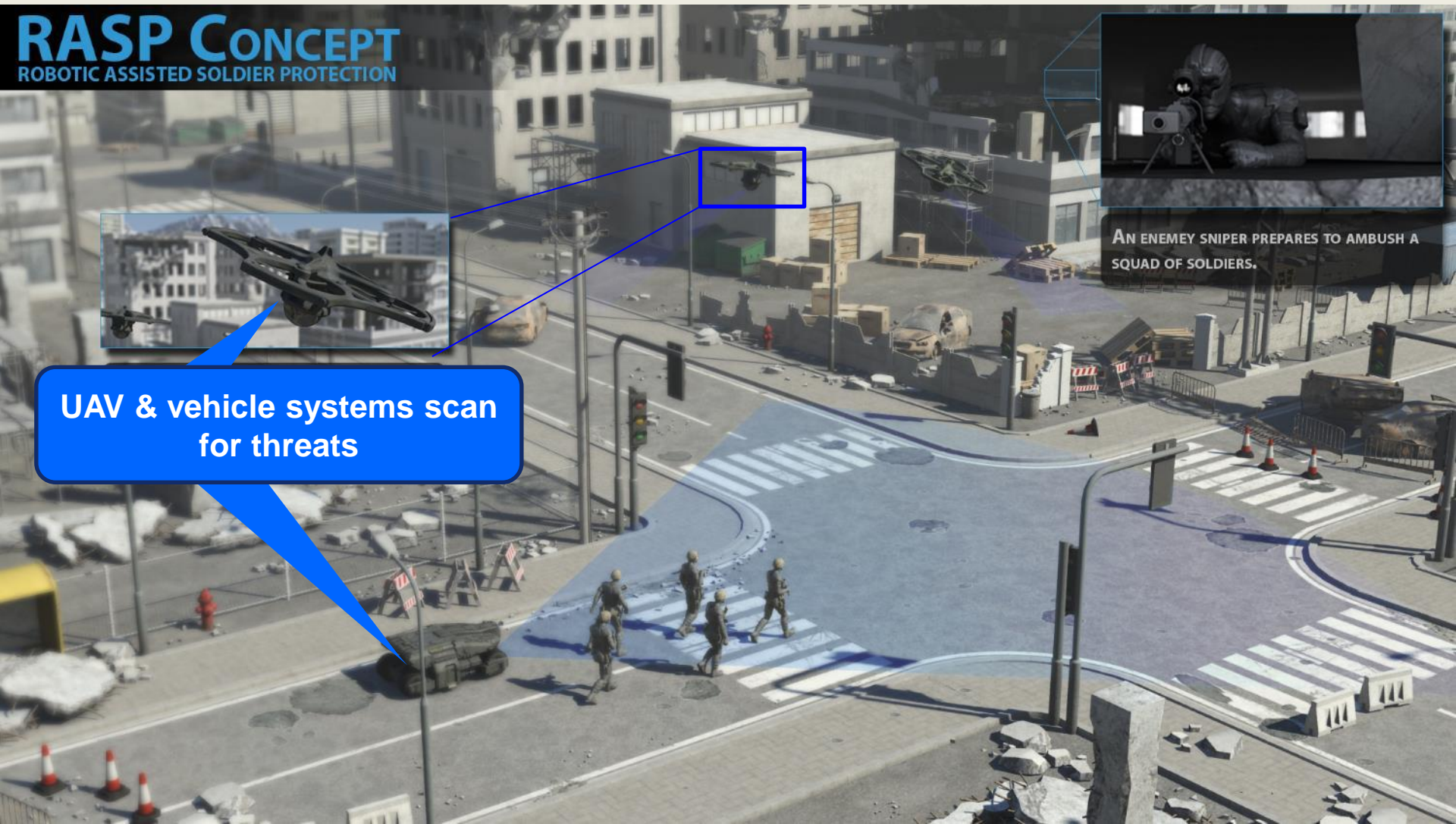Transparent armor & UHMWPE armor

ARL DUST-E Trailer

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Material deployment mechanisms
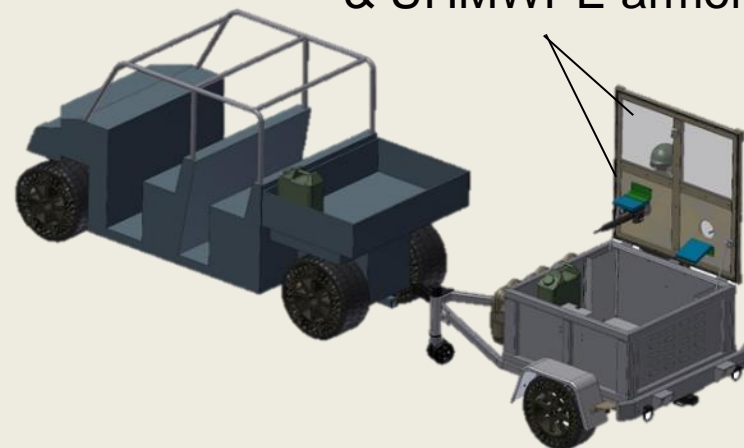
- Collaboration with 3M Ceradyne:
  Packbot with remote-deployable UHMWPE armor
- "PUP-E" : Portable Upgradeable Protection – Expeditionary
- Not currently autonomous

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RASP Experiment with MCoE

- **Simulation result: 35% reduction in casualties**

RASP CONCEPT
ROBOTIC ASSISTED SOLDIER PROTECTION

AN ENEMY SNIPER PREPARES TO AMBUSH A SQUAD OF SOLDIERS.

UAV & vehicle systems scan for threats

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Future: autonomous building

- Now: Soldiers assemble modular armor barriers
- Future: UAVs/UGVs autonomously assemble structures

ETH Zurich

DDM McCurdy's Armor

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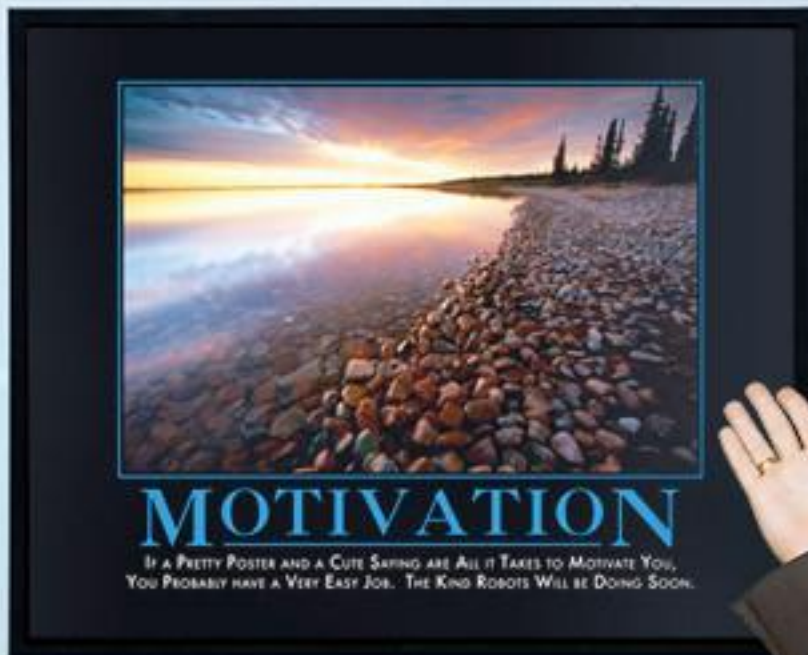
U.S. ARMY RDECOM
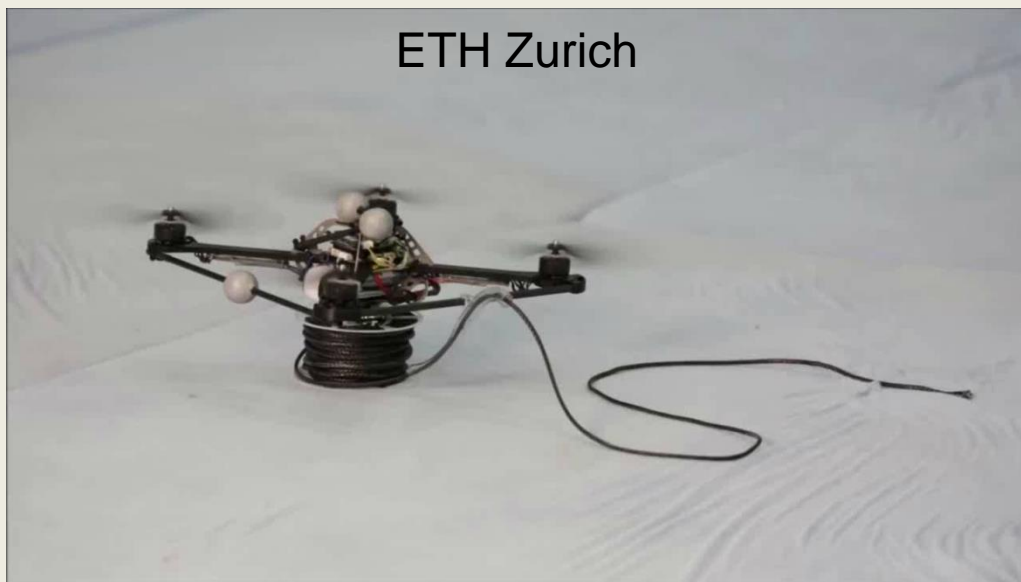
Future: building with indigenous materials

ARL

- Now: BigDelta WASP 3D prints structures using local mud

- Future: "Spot" by Boston Dynamics digs, extrudes materials

- Nearer future: autonomous bots deploy & fill barriers (eg. Hesco)

Boston Dynamics

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Questions?

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ARL demo: UAV obscurants dispersal

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Notional RASP robot

Shield stowed

Shield deployed

Ghost Recon Warhound

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