THE ARMY, SMALL COMPANIES, & BIG INNOVATION

Jerrold Prothero, Ph.D.

NDIA Army Science & Technology Symposium & Showcase

August 21, 2018

Astrapi Corporation
Dallas, TX
The Army & Transformative Technologies

Benefit: Transformative Technologies Give Our Warfighters the Edge
• Big innovation leads to big advantage
• Lack of innovation erodes advantage
• To lead in anything is to lead in innovation

How
• Commercial industry innovations can become transformative tools on the battlefield (smartphones, WiFi, drones)
• Tap into rapid industry innovation cycles (versus long DoD development cycles)

Difficulty: Transformation is Hard to Nurture & Integrate
• Not compatible with long Army purchasing cycles
• The Army prioritizes rapid battlefield deployment. As a result, there is limited funding for R&D below TRL 6, which is where disruptive innovations come from
Onboarding Transformative Technologies

The Army Challenge for Small Companies
• Transformative innovation is most likely to come from small companies
  • How to find them?
  • How to validate them?
  • How to develop and integrate them?

The Small Company Challenge for the Army
• How does a small company engage with the Army?

What is the Right Path for Mutual Success?
• Create an innovation framework
• The Red Queen Problem – Innovation in the DoD and Intelligence Community
  • Steve Blank, innovation expert
  • Continuous innovation pipeline, not separate activities
  • Different horizons with different levels of risk
  • Application of scientific method to innovation
Some Ways the DoD Has Encouraged Small Innovative Firms

• Increasing use of Other Transaction Authority (OTA). Less onerous contracts for non-traditional contractors.

• Increasing use of OTA-based Industry Consortia. Incentive for small, non-traditional contractors to bring disruptive innovations to DoD. Examples:
  • System of Systems Security Consortium (SOSSEC)
  • Consortium for Command, Control, Communications... (C5T)
  • National Spectrum Consortium (NSC)

• SBIR programs, including new formats aimed at rapid innovation

• Encouragement of matchmaking between large contractors and small businesses (in a consortia environment) to help bring small company innovations to production

• Increasingly modular approach to systems development permits small company innovations at the component, rather than system level (JCAUS)
Astrapi: A Case Study

Innovation: “Spiral Modulation”
- Potential for dramatically higher spectral efficiency
- Currently TRL-4
- More data throughput, lower signal power requirements, less bandwidth usage, longer battery life, lower latency

Potential Types of Benefits
- Higher data throughput
- Better Size, Weight & Power (SWaP)
- Less spectrum required
- Lower latency

Support
- National Science Foundation (NSF) SBIR Phase I (#1621082)
- NSF SBIR Phase II (#1738453)
- Air Force Special Topics SBIR Phase I (UAS communications)
- Army xTechSearch Phase I
- $2.2m in private investment
Types of Use Cases

Very Broad Potential Applicability
- Increase capacity of field satellite links and resistance to rain fade
- Increase capacity of High Capacity Line of Site (HCLOS), point to point radios
- Reduced SWaP requirements for hand-held radios
- Reduced SWaP requirements for UAS radios
- Increase resistance to noise for radios in urban warfare environments

Specific Application: UAS
- UAS communications a key issue for the DoD
- Army Roadmap for UAS 2010-2035
  - Five levels of interoperability
  - All critically dependent on communication
- UAS only as good as their data link
- Spectral efficiency affects UAS control, security, data throughput
- Astrapi technology potentially applicable across Wasp, SRR, MRR, LRR systems
Contacts

Technical Information
Jerrold Prothero  Ph.D.  jprothero@astrapi-corp.com

General Information
David M. Shaw  dshaw@astrapi-corp.com

Technical resources
http://www.astrapi-corp.com/technology/white-papers/

Website
http://www.astrapi-corp.com/