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THE ARMY, SMALL COMPANIES, & BIG INNOVATION

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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

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