Innovation and Commercialization in AFRL

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June 2017
Outline

• What is an Intrapreneur?

• “A person or persons within a larger organization who are given freedom and support to create new products, services and systems that can be disruptive to the current corporate routines and protocols.”
AFRL’s Commercialization and Innovation Toolbox

Defense Technology Accelerator Group

AFRL Commercialization and Innovation Toolbox

MakerHub

Start-Up
## Area of Focus

### Military Unique Systems - Constrained Competition
- Low production quantities
- High barriers to market entry
- Significant capital intensity requirements

*Existing acquisition is appropriate but could be improved.*

**Supplier**
- Government Arsenal, Shipyard, or FFRDC
- Defense Specialists

### Military Unique Systems - Viable Competition
- Built to specific military needs
- Purchased in larger volumes than military unique systems with constrained competition

*Existing acquisition is appropriate but could be improved.*

**Supplier**
- Defense Specialists

### Military Adapted Commercial Technology
- Leverages emerging commercial technologies
- Developed and deployed on a rapid and routine basis

*There is no existing acquisition structure; new processes and leadership support are required to develop and deploy these capabilities.*

**Supplier**
- Opportunity for New Entrants

### Pure Commercial Technology
- Purchased directly off the shelf from commercial supplier

*The DoD insufficiently uses the existing acquisition structure that includes authorities for the purchase of purely commercial capabilities.*

**Supplier**
- Commercial Businesses
AFRL Human Capital Strategy

• Recognizes AFRL is a knowledge workforce, motivated intrinsically

• Identifies workforce values:
  • Innovation
  • Continuous Learning
  • Smart Risk Taking
  • Continual Pursuit of Excellence
  • Diversity of Thought

• Identifies workforce goals:
  • Autonomy, Mastery, Purpose
SHIFT AFRL

Shaping Holistic Innovative Future Technologies

Mission: Grassroots Network Creating a Sustainable Innovative Active Culture within AFRL

Vision: SHIFTing AFRL into the Future

Bottom-line: Making Ideas into a Reality

“Adapt or perish, now as ever is nature’s inexorable imperative”
AFRL’s Entrepreneurial Opportunities Program

AFRLs Entrepreneurial Opportunities Program supports AFRL’s tech transfer mission by providing entrepreneurialism as a viable mechanism for maturing promising AFRL technologies into commercial products.

• EOP consists of two phases
  • Phase I “The Foundation”: Up to 12 month sabbatical laying foundation to start or expand a technology based business
  • Phase II “Enacting the Vision”: Employee separates from government service to continue entrepreneurial endeavors
    • Priority consideration for return to AFRL via MoA within 5 years

7 participants to date!
Partnering w/ Entrepreneurs

• There are currently four similar programs that partner AFRL technologies and S&Es with local college students and/or entrepreneurs to look at commercial applications of AFRL technologies:
  • Commercialization Academy (RI; Rome, NY)
  • FedTech (DC, Maryland)
  • Start-Up Technology Acceleration Project (RQ, RY, 711th, RH, RX; Dayton, OH)
  • Lab Launch (RD, RV; Albuquerque NM)
Commercial Tech Accelerators

- Commercial technology accelerators are proven commercial model for startups and small businesses
  - Typically 3-6 months in length with “cohort” of approximately 5-20 companies
- Focuses on customer discovery and rapid product development, referred to in the commercial world as “lean startup” or “design theory” best practices
- Goal is a successful pitch for funding to venture capitalists at end of program
- Accelerators improve odds of success for startups and de-risking potential investments for VC’s (and DoD)
- AFRL, AF, and DoD are looking at leveraging this business model through two separate efforts by presenting challenges and problem topics
Pilot Space Accelerator

- Focused on space situational awareness and space related domains
  - Goal to experience how aerospace accelerator program operates and what AF pain points were
  - Flexibility to attract and work with both startup and established companies
- Partnered w/ LightSpeed Innovations (Los Angeles) ($300K for program, $330K for prototyping by two companies)
- Virtual participation (LA kickoff and Silicon Valley demo day)
- 9 companies accepted (50 applied)
  - GEO small inspector sat, LEO small sat ISR, virtual and augmented reality, next gen SSA software, hyperspectral sensor constellation and others
- Next steps include partnering with SMC around machine learning for space, data analytics and broader access to space focused “non-traditionals”
Mission Needs provided by SMC/AFRL “hack sessions”

3 Planned Space Cohorts in FY17-18

Colorado Springs – Catalyst Campus, Jan-Mar 2018

Machine learning topics for SMC, AFSPC, and AFRL problems

In-residence mentor based, with software development floor

Silicon Valley

Solicit the most forward leaning startups in the world

Work with DIUx, Hacking 4 Defense, and other DoD minds

Virtual – LightSpeed

Virtual participation is the lowest barrier to entry

Not all founders or employees want to relocate
Pilot Success Stories

- **Chandah Space Technologies**
  - Idea - Microsatellite imaging platform operational to service the insurance companies with 1cm resolution imagery of satellites in GEO
  - Identified government utility in supporting capability gaps in the GEO Space Catalog
  - Recently awarded first of its kind, NOAA license for their mission
  - Receiving OTA award to prototype required ground system for data

- **Saber Astronautics**
  - Commercial space operations software
  - Customer discovery and problem statements coming from 18SPCS
  - Receiving OTA award to prototype the application of commercial Predictive Ground station Project (PIGI) software for the Space Surveillance Network providing real-time view of SSA activity
Pilot Success Stories

• **Koolock**
  - Idea Proposed: Remote IR sensing of Earth for commercial market
  - Extensive customer discovery across USAF weather organizations
  - 9 Orgs include: AFRL/RVB, AFRL/CRI, SMC/RS, AFSPC/A5FW, SMC/AD, AFLCMC/HBAW, ACC/A589/A5W, ACC 16WS, AF/A3W
  - DoD Customer found in SMC/RS for additional funding through OTA

• **ASTRA**
  - Idea Proposed: Radiation monitoring for commercial polar flights
  - Program pivot: Ionospheric Data System improving response to ionospheric irregularities disrupting navigation, satellite communications and surveillance.
  - Directly improving DoD capabilities
  - DoD Customer found in AFLCMC/HBAW for funding through OTA
Joint Defense Technology Accelerator

Strong Team, Execution Underway
- Sponsored by AFNWC/NIC, DTRA J9/10, and OSD (Nuclear Matters)
- Top Tier private sector partner – Techstars
- Problem area with Government/Commercial strategic interest (Drone/Counter Drone)

Autonomous Technologies - focusing on the problem (not a solution):

- Drone Platform
  - Detection
  - Neutralization
  - Artificial Intelligence
  - Drones Operations and Management
- Sensors
  - Wide Area Sensing
  - Sensors and Communication
- Planned program announcement in June 2017
- Expecting ~500 companies to apply (selecting up to 10)
- Cohort will work in same location for 3 months with intense mentorship
- Demo Day estimated for April 2018

- Robotics
  - Remote Detection
  - Artificial Intelligence
  - Autonomous Navigation
- Data Fusion
  - Data Visualization
  - Decision fusion
Joint Defense Technology Accelerator

Operator Involvement

Program Timeline

1. May:
   - Program Kickoff

2. July:
   - Program Announced
   - Applications Due

3. October:
   - Companies Notified

4. November:
   - Q1 2018

5. Q1 2018:
   - Demo Day

1 problem statement
C-UAS/Autonomous Technologies

2. ~500 companies
   - Industry\DOD Downselect

3. 10 Companies work in same location
   - Boston with DoD Mentors

4. Demo Day with VCs and...
   - Warfighter Customers
AFRL i2i Exchange

• AFRL’s i2i (intellect to intellect) Exchange pilot:
  • Embedding S&Es w/ startups and non-defense oriented companies for high intensity short duration collaborative development efforts

• Goals for AFRL’s i2i Exchange:
  • Facilitate rapid commercial partnership and leveraging of ongoing R&D
  • Enabling high intensity short duration collaborative development
  • Expose AFRL researchers to industry agility/innovation, bringing insights to AFRL enterprise
  • Tap into industry to build research connections ensuring that Air Force can incorporate commercial tech developments as rapidly as possible

• Currently working w/ Facebook and Oculus on two different exchanges
AFRL's Makerspace and connection to the Maker Community

Focus on desktop manufacturing capabilities, open source design tools, and rapid innovation through prototypes and tech sprints

Located at WBI Tec^Edge – Orville Room

Operates at the intersection of workforce development and tech transfer

Open 8AM - 5PM

AFRL Maker Hub POC: Emily Fehrman, PhD
emily.fehrman_cory.1@us.af.mil
• Defense Innovation Unit Experimental (DIUx) was started in 2015 by SecDef Carter
  • Outposts in Silicon Valley, Boston, DC, and Austin
  • Serves as bridge between military and cutting edge tech companies
  • Continuously iterate on how best to identify, contract, and prototype novel innovations through nontraditional sources

• In-Q-Tel accelerates the development and delivery of cutting-edge technologies to U.S. government agencies that keep our nation safe
  • Bridges gap between national security agencies technology, rapidly changing innovations of startup world, and venture community that funds startups
Other Models and Players

• Defense Entrepreneurs Forum
  • “An innovation engine disrupting the status-quo by inspiring, connecting, and empowering young leaders to have an out-sized impact in their professions.”

• RATPAC
  • Network of like-minded junior acquirers that collaborate on acquisition tactics, techniques, and procedures aimed at solving tactical issues

• MD5 National Security Technology Accelerator
  • Promotes civil-military industry collaboration and venture creation through the development of human-centered networks

• National Security Technology Accelerator (NSTXL)
  • Accelerates the discovery, development and deployment of innovative technology solutions for operational missions and installations of the U.S. Military at home and abroad

• Army Venture Capital Initiative (AVCI)
  • Investments in young, small, growth oriented companies developing innovative technologies of interest to United States Army

• NSF I-Corps Program
  • Foster entrepreneurship that will lead to the commercialization of technology based on federally funded research
WRIGHT BROTHERS INSTITUTE – 2nd Street: AN AFRL PARTNERSHIP

NURTURING AN INNOVATION DISTRICT IN DOWNTOWN DAYTON, ANCHORED BY AFRL
They are geographic areas where leading-edge anchor institutions and companies cluster and connect with start-ups, business incubators and accelerators.

**WHAT IT LOOKS LIKE:**
- physically compact
- transit-accessible
- technically-wired
- inviting with mixed-use housing, office, and retail

**Anchor institutions** are defined as universities, hospitals or laboratories with extensive R&D.
Vision

- A new environment for AFRLers to work in
  - Co-working
  - Purpose Driven Short Term Resident Teams
- Enabled by
  - Makerspace (Rapid Prototyping)
  - Events/Challenges/Prizes
  - Community Partnerships
  - Tech Transfer (T2)
- Resulting in
  - New and Deeper Business Engagements
  - Commercialization of AFRL IP
  - In-sourcing of Cutting Edge Technology
  - Recruitment and Retainment of the Future Workforce
The Location
The Look
The Layout
Founded By AFRLers

Prior to 2015
Founded or Grown By
AFRLers or AFRL Technologies Since 2015

More to come!
Join The Movement

• Have an idea that you would like to see happen? Let's try and make it happen!

• Get involved:
  • Defense Entrepreneurs Forum: [https://defenseentrepreneurs.org/](https://defenseentrepreneurs.org/)
  • Contact Ryan.Helbach.1@us.af.mil

• With your help, coming soon:

  Fast fun awards system:
  • Flub Award, Innovation Award, Supervisor Award, You Done Did Good Award
Questions
Problem
The Persistent Capability Gap

Under traditional acquisitions you’ll never close this gap
Problem
Rapid Acquisitions

“Rapid Acquisition” shortens the timeline, but the issue is the same.
Solution: Space Accelerator
Leverage Commercial Investment For Operational Needs

Operational Customers

Space Accelerator

Access to Data

Tier 1
Large Traditional Businesses
Existing Prime Contractors

Tier 2
Small Traditional Businesses
Existing Subcontractors

Tier 3
Non-Traditional Small Businesses
No Government Experience

Access to Operators
The Result?

Developed Capability (Agile)

Developed Capability ("Rapid Acquisitions")

Developed Capability (Traditional)

Baseline

Anticipated Mission Need

Actual Mission Need

Years

Months

Capability Gap

The Result?

Close the gap and keep it closed!
## Accelerator Structure

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### Catalyst Campus
- via PIA (USAFA and/or AFRL)
- via OTA, DIUx (Space Enterprise)

### Good Ideas

#### Topic Areas
- Commercial Positioning, Navigation, and Timing
- Big Data
- Battle Management Command and Control

#### Concepts
- Modern Financial Models
- Diverse Data Interpretation
- Futuristic Command Frameworks
Technology Transition: Stand Alone

Stand-alone problems:

- Problems shared with commercial industry
- Problems caused by rapidly growing technology
- Technology areas growing rapidly in the commercial market

Stand-alone solution integration mechanisms:

- Prototyping contracts (e.g. OTA)
- SBIRs
- Commercial solutions offering
- Traditional Acquisitions (e.g. BAA)
- Integration into current developing system
- DoD Prime Acquisition

Stakeholder Key Integration Points:

- Problem Statement Development
- Kick-off
- Recruiting
- Applicant Review & Selection
- In Program: Team Mentorship
- Demo Day
Technology Transition: MOSA Acquisition Programs

Modular system needs:
- Needs shared with commercial industry
- Technology areas growing rapidly in the commercial market

MOSA integration mechanisms:
- Prototyping contracts (e.g. OTA)
- SBIRs
- Commercial solutions offering
- Traditional Acquisitions (e.g. BAA)
- DoD Prime Acquisition

Accelerator Technology Use Cases: OPTIONALITY
- Find out where tech is going
- Encourage Dual-use tech dev
- Discover available & affordable options
- Update Components to meet evolving needs of mission