Innovative Business Effort within AFRL

UAS Midwest 2019

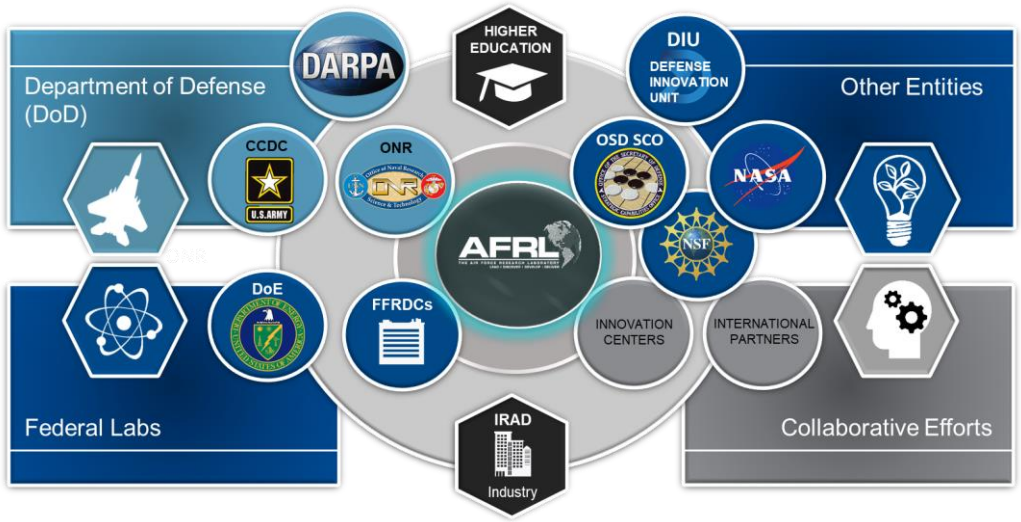
Maj Matt Dillsaver, PhD

AEROSPACE SYSTEMS DIRECTORATE

7 August 2019

Agenda

- Science and Technology Strategy
- Swarm and Search AI Challenge
- ARCNET
- Small Business Innovation Research (SBIR) Program
- SBIR Pitch Day



Science and Technology Strategy

- USAF released a document titled *Science and Technology Strategy: Strengthening USAF Science and Technology for 2030 and Beyond* in April 2019
- The guiding vision is an "Air Force that dominates time, space, and complexity in future conflict across all operating domains to project power and defend the homeland"
- Contained 3 objectives to drive the new vision
  - Develop and deliver transformational strategic capabilities
  - Reform the way science and technology is led and managed
  - Deepen and expand the scientific and technical enterprise

Source: *Science and Technology Strategy: Strengthening USAF Science and Technology for 2030 and Beyond,* April 2019

Deepen and expand the scientific and technical enterprise

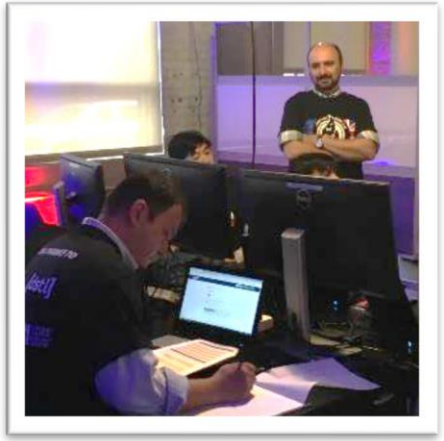
- 2018 National Defense Strategy: “The Department's technological advantage depends on a healthy and secure national security innovation base that includes both traditional and non-traditional defense partners”
- Some of the methods outlined in the S&T 2030 document
  - Increase idea solicitation from all sources by regularly enabling outreach activities to help build expertise and streamline the idea solicitation process
  - Provide a service to connect industry, individuals and government research centers with experts inside the USAF S&T enterprise. Encourage deeper dialogue with these new connections to identify novel partnerships and potential opportunities for innovation
  - Expand non-traditional contracting to access and leverage commercially-driven innovation in private sector companies relevant to the USAF mission

Source: *Science and Technology Strategy: Strengthening USAF Science and Technology for 2030 and Beyond,* April 2019

Swarm and Search AI Challenge

- Joint AFRL-UK Defense Science & Technology Laboratory (DSTL) pilot project, managed by Wright Brothers Institute (WBI) to find innovative approaches, using Machine Learning or Artificial Intelligence, to control UAV swarms.
- Using complex fire mapping scenarios, nine teams from around the United States competed for over $65,000 in prizes during the final showdown event, on March 29-31 in Dayton, Ohio
- Teams demonstrated the ability to plan and control UAVs actions to map the fire as it advances and find targets of interest

Swarm and Search AI Challenge



- New kind of collaboration
  - Informal agreement with DSTL allowed for international cooperation without the bureaucracy
  - Concept to Showdown event in just over six months
  - Over 100 unique users of Air Force-designed AMASE simulation software
- Three phased approach
  - Phase 1: Jan 2019, practice phase with 29 teams
  - Phase 2: Feb 2019, online competition with top 9 teams emerging
  - Phase 3: March 2019, showdown competition

THE AIR FORCE RESEARCH LABORATORY

Swarm and Search AI Challenge

- Dayton event had 50+ attendees
- 9 teams from 5 states plus Germany
  - 4 small businesses
  - 4 universities
  - 1 DoD team representing 3 services
- Networking opportunities including chance for AFRL SME and competitor interactions

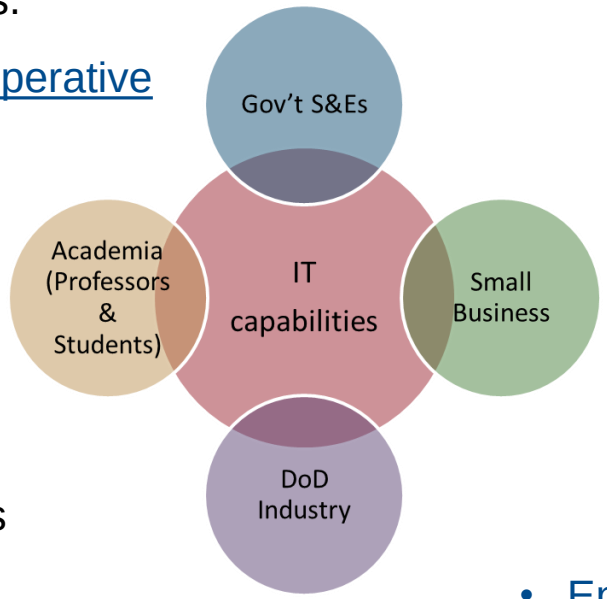
"I want that algorithm!" – *An AFRL SME, after the presentation of one of the novel approaches.*

" The new people, the challenging scenarios…I can't wait to do this again!" – *Showdown participant.*

ARCNET – a new, *faster* way to conduct autonomy research

What is it?

- ARCNET is a "Consortium" designed to enable collaboration between government researchers, academia, and small and large businesses.
- ARCNET has been created through a Cooperative Agreement with SPG Institute
  - *Not a CRADA*
  - Easy for new entities to join
    - Universities
    - Traditional defense contractors
    - Small businesses
    - Tech Startups and AI companies
- Broad scope – Available to all of AFRL
  - Any autonomy-related technology
  - Applied to any USAF mission



Why is it?

- ARCNET enables a new collaboration paradigm
  - Agile contracting
    - Compete research and award sub-Agreements within the Consortium
    - AFRL contracting only needs to add funds
    - Cooperative Agreement allows dialogue during topic development and proposal evaluation
    - *Less than 60 days to award a new project*
  - Government purpose rights or better for all government-funded R&D
  - Provides collaboration infrastructure for joint R&D projects
- Enables DoD to reach non-traditionals and startups in the AI/Autonomy technology space that don't normally work with us

Questions? Contact Dr. Corey Schumacher

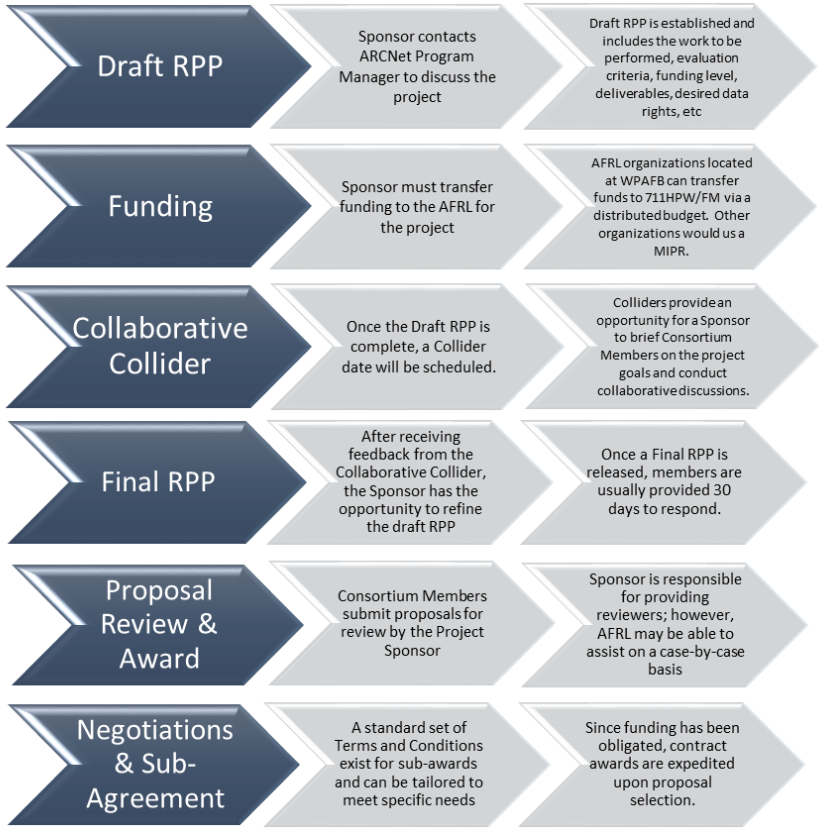
corey.schumacher@us.af.mil

ARCNET: Things to Know

- All R&D projects awarded through ARCNet are competitively selected
- An organization must be a member of ARCNet to submit proposals
- Membership steps:
  - Apply - Pay $500 membership fee - Sign NDA
- SPGI (ARCNet Administrator) awards sub-agreements to project performers
  - Due to Cooperative Agreement rules, sub-awards are cost plus zero fee contracts
  - There is no blanket requirement for contractor cost share on projects
    - It can be considered, requested, or required on specific projects, as defined in each Request for Project Proposal.
  - AFRL Contracting has minimal role in awarding a new project – just a funding action
- AFRL has a substantial role in managing ARCNET
  - Government “Project Owner” performs technical evaluation of proposals
  - Final say on how USAF funding is spent

ARCNet Project Process

- Process details are tailorable for each project
- Draft RPP/Collider: Dialogue to shape project requirements
- Final RPP / Proposal Development: allows dialogue to clarify project requirements
- Goal: less than ***60 days*** from RPP release to Project Award



Small Business Innovative Research (SBIR)

- Program created in 1982 by National Science Foundation
- Awarded $43B+ in awards, agencies must set aside 3.2% of R&D funding
- 4 goals of SBIR program
  - Meet federal R&D needs
  - Increase private sector commercialization of innovation derived from federal R&D funding
  - Simulate technological innovation
  - Foster and encourage participation in innovation and entrepreneurship by socially and economically disadvantaged persons

Source: https://www.sbir.gov

Small Business Innovative Research (SBIR)

- Traditional SBIR process is a gated process with three phases
  - Phase 1: Concept development, 6 months, <$150K
  - Phase 2: Prototype development, 24 months, <$1M
  - Phase 3: Commercialization, program funded, no SBIR funds

Source: https://www.sbir.gov

Small Business Innovative Research (SBIR)

- Traditional SBIR process is a gated process with three phases
  - Phase 1: Concept development, 9 months, <$150K
  - Phase 2: Prototype development, 27 months, <$1M
  - Phase 3: Commercialization, program funded, no SBIR funds

When compared to adversary research timelines, this is TOO SLOW

Source: https://www.sbir.gov

SBIR Pitch Day

- New SBIR process with the goal of streamlining & expediting the entire SBIR process
- Geared towards companies with products already in commercial markets and/or prototypes already demonstrated
- Proposals themselves are shorter (5 pages vs 20 pages)
- Phase 1 is now 3 months, $75K
  - Conduct a feasibility study, identify USAF end user, and deliver minimum viable product to be matured during phase 2
- Phase 2 is now 15 months, $750K
  - Develop, install, integrate and demonstrate prototype from phase 1

SBIR Pitch Day

- Evaluation and contracting timelines also greatly reduced
  - 31 May: DoD SBIR 19.2 call released
  - 1 July: Proposals Due
  - 12 July: Invitations to pitch day released
  - 24 Jul: Pitch Day
- Award decisions made on the spot, contract signed immediately, 40% of money delivered via credit card
  - 13 companies on contract & received $30K 54 days after call **released**!
  - Compared to typical 90-day solicitation period, 90-day evaluation period and 90-day contracting period
  - Timeline reduction of 80%
- 13 pitches, award decisions and contracting actions in less than 2.5 hours
  - Fastest time to contract was **4.5 minutes**