

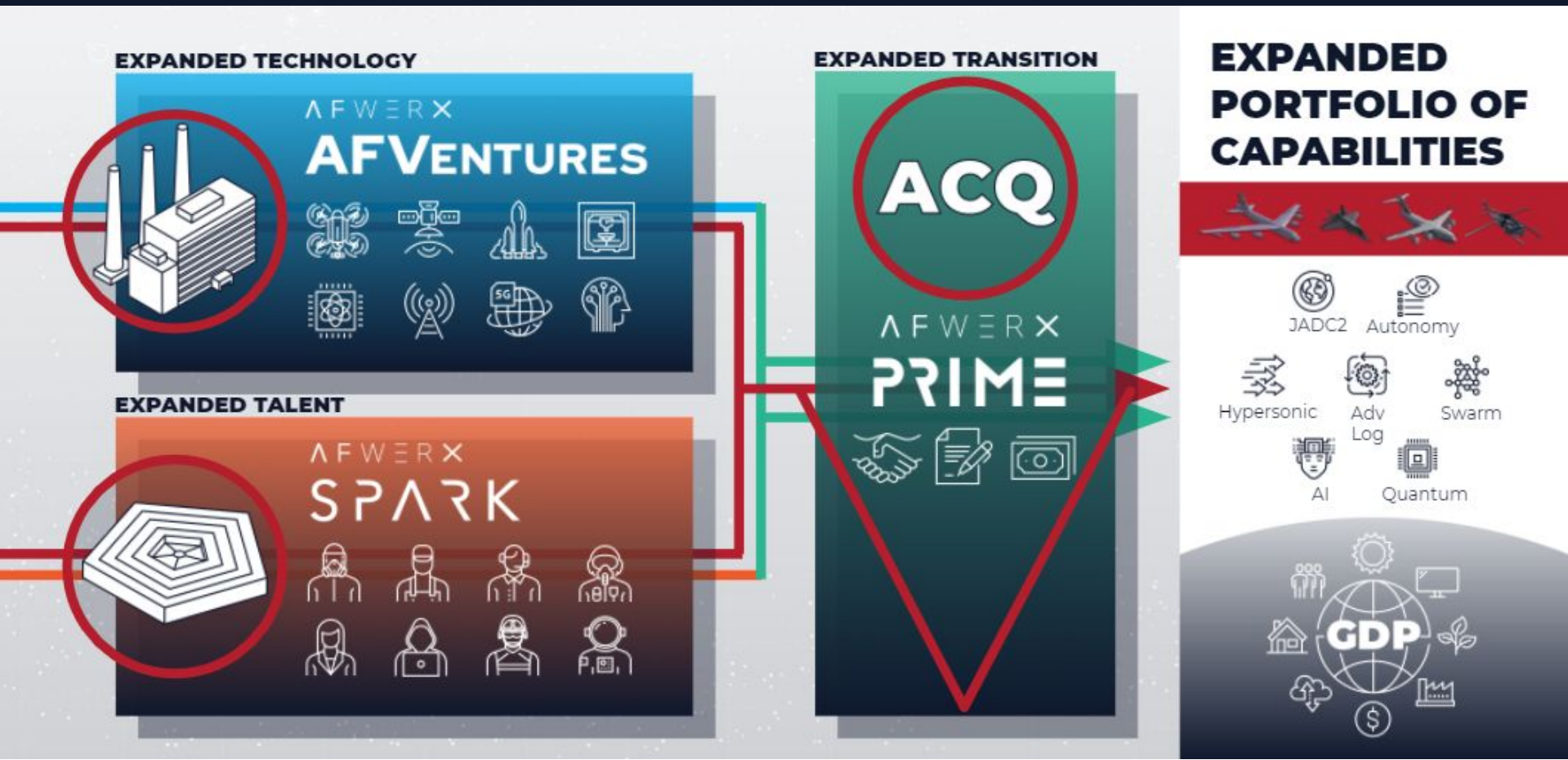


AFWERX

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Mission: AFWERX accelerates agile and affordable capability transitions by teaming innovative technology developers with Airman and Guardian talent.



AFVentures Vision & Mission



AFVENTURES

“DAF’s Commercial Investment Group”

“Currently, the Pentagon is sponsoring multiple groundbreaking programs that foster and integrate innovation and technology developed in the private sector...provide critical capability and have proven successful, but they are currently **too small to leverage private sector technology and innovation at the necessary scale.** However, The establishment of new models, such as AFVentures, to attract greater private sector investment to defense technologies have shown value and should be closely examined for their effectiveness in rebalancing the national security innovation ecosystem.”

HASC Future of Defense Report, 2020

VISION

A transformed industrial base that empowers warfighters

MISSION

Invest in emerging technologies to scale war-fighting capability

APPROACH

Incentivize partnerships between technology companies, research institutions, customers, end users, and investors to pursue national security interests by matching emerging commercial solutions with DAF needs

AFVentures Strategy

STRATEGY: "CAPITAL AS A CAPABILITY"

Develop/manage an easy-to-use open front door for innovative ideas

(Open Topic Program)

Affordably scale ideas by project-based co-investment

(Supplemental Funding Pilot Program)

Develop/execute new financial instruments to grow dual-use companies

(Strategic Investment)

OPEN AND SCALE

Open Topic SBIR/STTR – Present



Feasibility

Up to \$50,000 per award
1000-1500 awards per year
Triannual Solicitation Opening



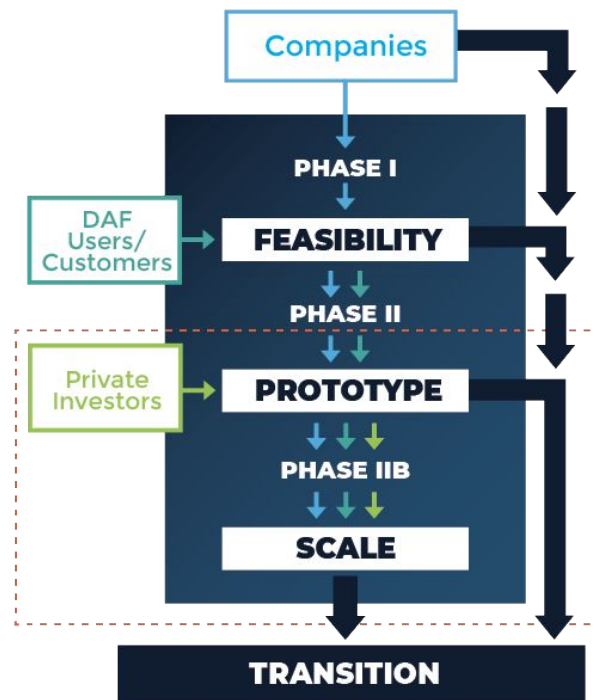
Prototype

Up to \$750K for initial award
Matched funding encouraged
300-500 awards per year



Scale

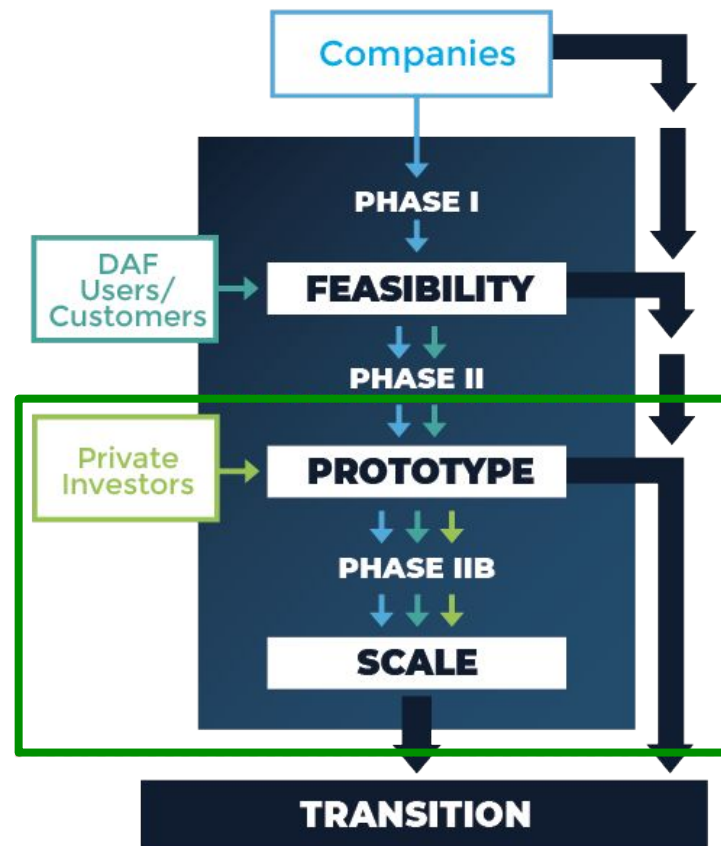
Up to \$15M (SBIR) Awards
20+ Awards per year
Matching funding required
Annual Solicitation



TACFI & STRATFI Program

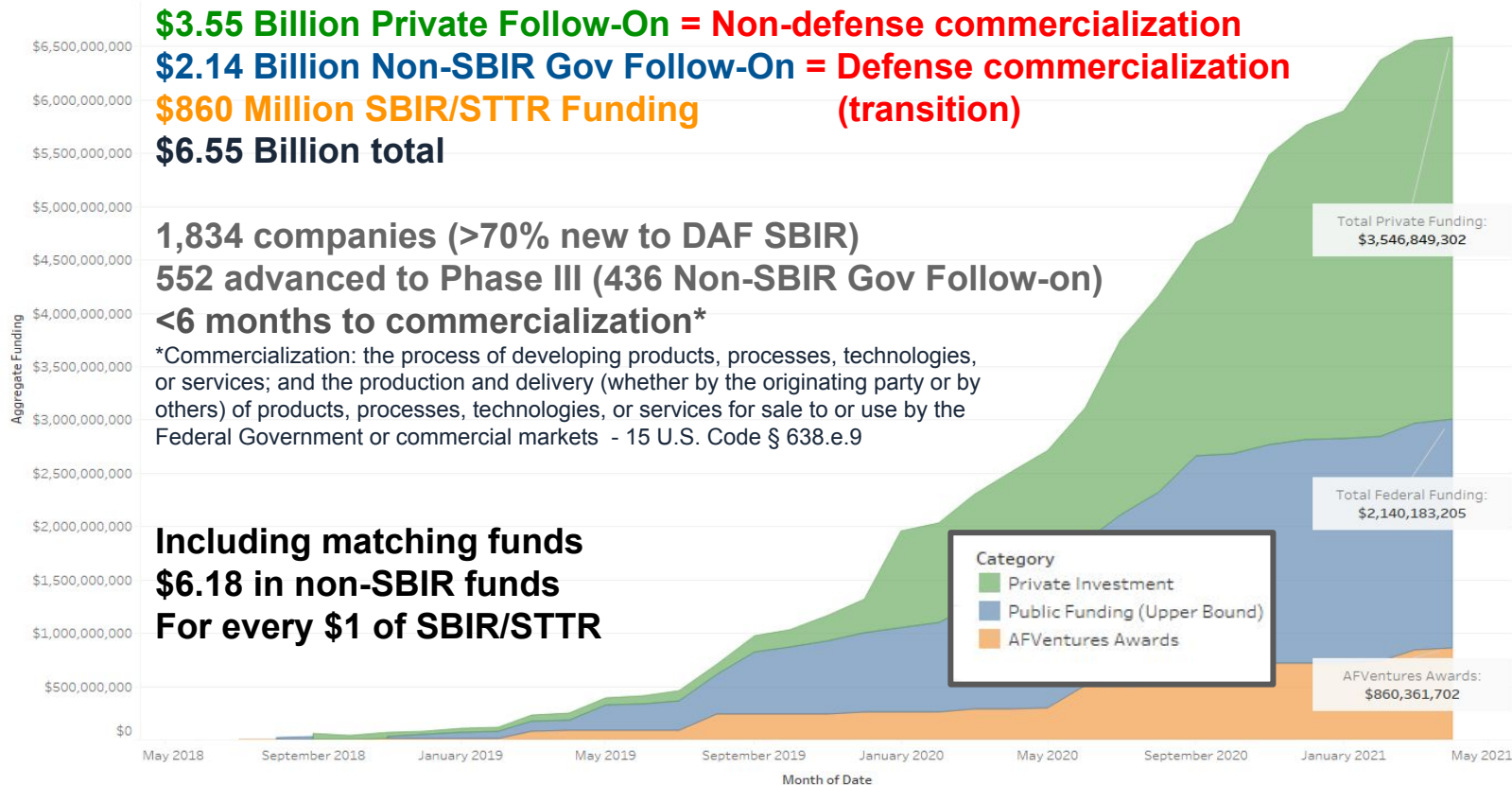
TACFI and STRATFI

- **Follow-on Funding, with additional requirements**
 - Requires matched funding
 - Requires customer ownership
 - Designed to scale to transition (when supplemental funding is required)
- **Tactical Fund Increase (TACFI)**
 - Tactical needs with low capital requirements
 - Fund request for >\$375K, <\$1.7M
 - Requires 1:1 Government or 1:1 Private Matching
- **Strategic Fund Increase (STRATFI)**
 - Strategic needs with high capital requirements
 - Fund request for >\$3M, <\$15M
 - Customer must be DAF PEO or equivalent
 - Requires 2:1 Government OR 1:1 Government & 2:1 Private Matching



AFVentures Post-Award Impact

AFVentures Aggregate Phase III Funding (upper bound gov't PIII estimate)

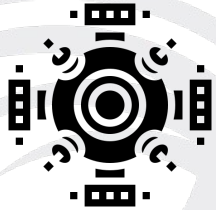


Spark Overview

MISSION: We relentlessly inspire and enable Airmen and Guardians to unleash their potential and to drive capability development that increases the efficiency, effectiveness and quality of life of the warfighter.

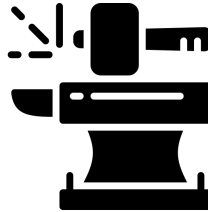
TAG LINE: Empowering Innovators, Accelerating Results

We do this by **Connecting**, **Developing**, and **Supporting** Airmen and Guardian Innovators



Network Branch (RGSC)

Specializes in promoting the expansion, connectivity, energy and culture of the innovation ecosystem



Development Branch (RGST)

Specializes in training and developing Airmen & Guardian Innovators through curriculum and experiences



Innovation Catalyst Branch (RGSJ)

Specializes in accelerating capability development through advocacy, advisement and common tools

Spark Programs

CONNECT

(92) Spark Cells - base-level, Commander-owned, AFWERX-supported innovation cells

(10) MAJCOM Cells - MAJCOM-level, Commander-owned, AFWERX-supported innovation cells

Colliders & Focus Areas - scalable methods to pair industry providers with DAF customers and end-users

Augmentee Opportunities - large-scale efforts to empower decentralized government talent to solve hard DAF problems

DEVELOP

Fellowships - full-time experiential and curriculum-based innovation training:

- **Defense Ventures Fellowship** - 8-week, intensive immersion with startups and venture firms (~10/yr)
- **AFWERX Fellowship** - 5-month immersion with AFWERX (3/yr)

Internships - semester-aligned, experiential training that pairs AFROTC & USAFA cadets w/DAF innov. efforts (3/yr)

Innovation Training - virtual and in-person training for innovators:

- **Design Warfare** - 4-week, intensive design thinking training
- **Spartan-V** - 1-week version of D.W.

(Both created by AFGSC)

SUPPORT

Spark Tank - annual competition for Airmen/Guardian-generated efforts; elevates, celebrates & supports winners

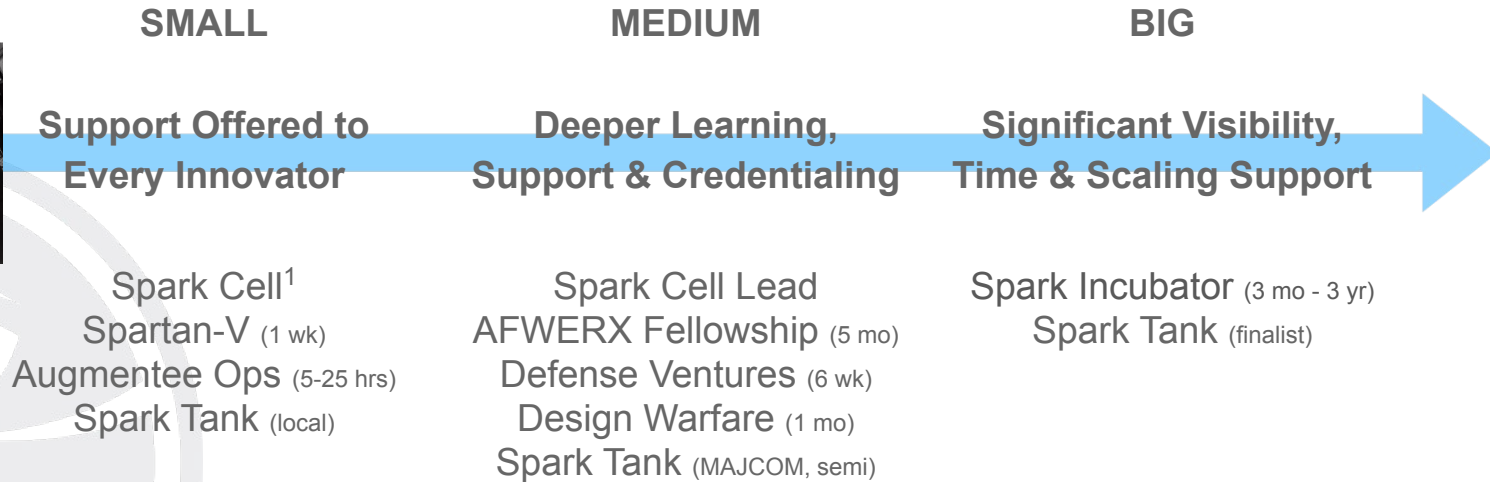
Products & Tools - advocates for and develops best-in-class innovation tools

- **VISION** - DAF Innovation PM Platform and Connectivity Layer

Spark Incubator - DAF innovators with high-potential projects embed with AFWERX as they pursue their innovations (supported by AFWERX)

A Pathway for Innovation to Scale

By making **progressively larger investments** in our Airmen & Guardian innovators as they show promise and demonstrate success, we mitigate risk, control costs, and increase the likelihood that truly disruptive innovators (and the capabilities they are creating) realize their full potential.



Growing next generation of DAF Innovators // forging leaders of the Innovation Corps

¹ Items listed in one category are also available to all innovators in later categories (further right on the continuum)

Spark Cells

Common Characteristics:

- Commander owned
- Direct Report to Wg/CC
- MAJCOM aligned (objective)
- AFWERX partnered
- Manage SIF for instillation
- Leverage SBIR/STTR
- FOC - 1 CGO/FGO lead, 1 CIV deputy, 1-2 enlisted

AFWERX Role

- Connect the ecosystem
- Host training events
- Empower (versus own)
- Create common products
- Proliferate best-practices
- Support build-out of new cells

Common Focus Areas:

- Mental Health
- AR/VR
- 3D Printing/AM
- Drones
- TO Changes
- Training program improvements



Dyess AFB - Created Design Warfare Innovation Course; trained 100+ personnel



Vance AFB - key partner in the authoring and execution of UPT 2.0 & 2.5

Hickam – 1st tactical level software factory: TRON



- ▲ AFSOC
- ▲ USSF
- ▲ AFCENT
- ▲ ANG
- ▲ AETC
- ▲ USAFE
- ▲ AFGSC
- ▲ AMC
- ▲ ACC
- ▲ AFMC
- ▲ PACAF



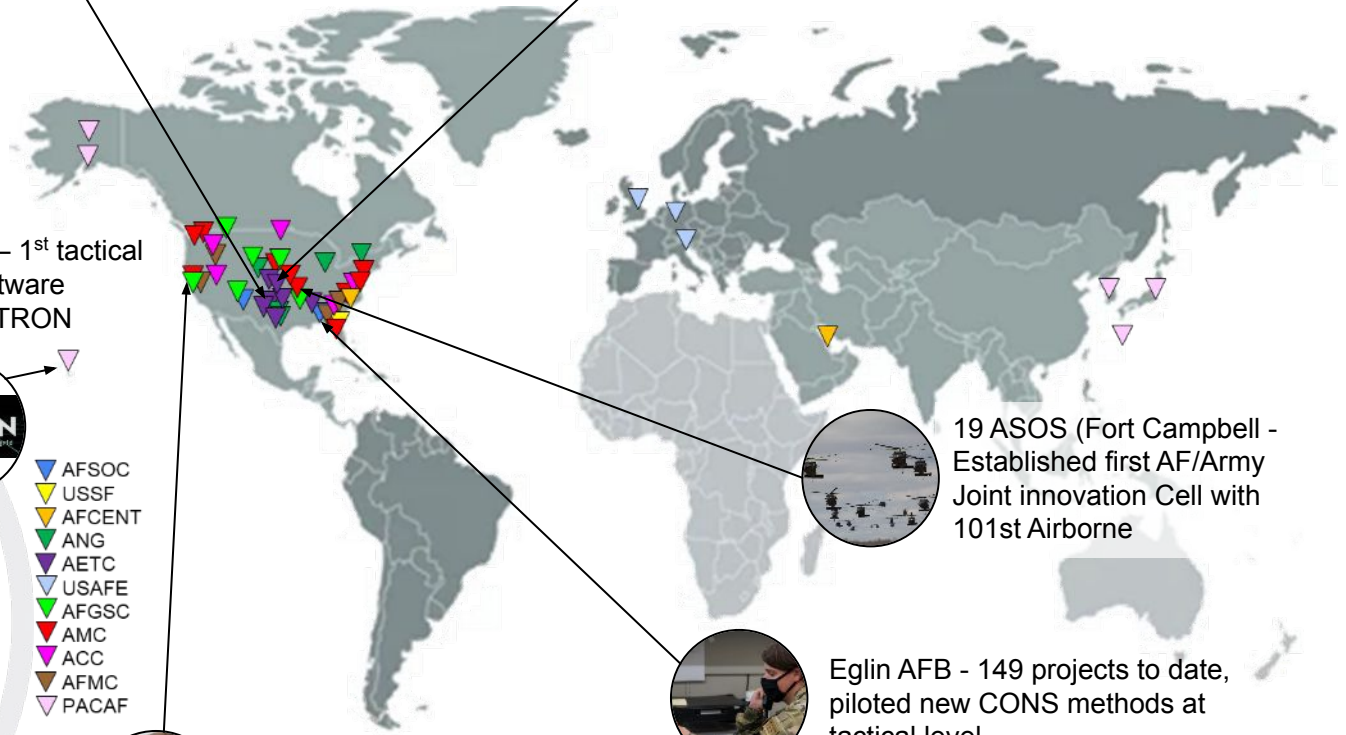
Travis AFB - 28 active SBIR/STTRs at installation



19 ASOS (Fort Campbell - Established first AF/Army Joint innovation Cell with 101st Airborne



Eglin AFB - 149 projects to date, piloted new CONS methods at tactical level



AFWERX Prime



AFWERX
PRIME

MISSION AND STRUCTURE

Mission: Expand technology transition paths to accelerate emerging dual-use markets by leveraging government resources for rapid and affordable fielding

Strategy: Co-investment with industry to field a capability in 2-4 years

- o Identify emerging technology sectors with industry & investment community
- o Identify commercial tech sectors aligning with warfighter requirements
- o Achieve a 20:1 ROI (all colors of money) while delivering rapid military utility

Structure: Diverse Partnerships

1. Industry
2. Investor
3. Interagency
4. State and Local
5. *International**
6. Laboratory
7. Acquisition Community
8. Warfighter



Prime the pump to advance US National Security and economic prosperity



Agility Prime Overview

WHAT: “Third Revolution in Aerospace”

Electric Vertical Takeoff and Landing (eVTOL) Aircraft
Coalescence of 3 technologies:

Electric: Large electric power systems (auto industry)

Autonomy: AI/Autonomy/Simplified Vehicle Operations

Manufacturing: Advanced manufacturing/materials/scale

WHY: Global Leadership / Accelerate Fielding of eVTOL

Strategic: zero emission/runway independent aircraft

Process: New transition paths (contracts, certification, budget)

Product: Field operationally relevant air mobility in FY23

HOW: Collaborative Risk Reduction

Tech Risk: Opportunities for collaborative test and eval

Regulatory Risk: Early military airworthiness review

Financial Risk: Contracts for testing and early use cases



Agility Prime By The Numbers

7B
Over \$7B in commercial investment

22
22 contracts awarded to 14 companies

Over 250 small business and university contracts for research and development
250

5
5 exercises complete or planned

30 companies applied to the Air Race
30

100\$
Over \$100M AWARDED

Simulator Locations
3

200+
Over 200 flight tests

Key Milestones

Beta Technologies -- Electric Aviation: continues to advance eVTOL technology with manned flight testing of ALIA all electric aircraft and strategic installation of vertiport charging stations across the NE US.

- [Beta first manned electric aircraft flight airworthiness](#)
- [First charging station](#)
- [First USAF piloted operations](#)

Joby Aviation -- Batteries and Electric Infrastructure: leads the eVTOL industry with key technology contributions, increasing battery flight cycle, additive manufacturing, quiet propeller design and also investing in infrastructure to develop takeoff and landing sites in North America.

- [Joby Batteries \(2k - 10k cycles\)](#)
- [Infrastructure Partnership](#)

Kitty Hawk -- Autonomy, Medevac Exercise, BVLOS testing, first USAF remote-piloted ops: matures and optimizes its Heaviside II prototypes, including autonomous flight, medical evacuation demonstrations, BVLOS testing, and first USAF remote-piloted operations.

- [First exercise KH \(AFRL article\)](#)
- [First USAF remote operations](#)

Lift Hexa -- JROC Urban Demo and C-130 Load: Lift Aircraft's Hexa all electric multicopter shows promise as a proving ground for key eVTOL enabling technologies including autonomy development, hybrid electric propulsion, and a variety of cargo or emitter payloads for operations.

- [LIFT demonstration JROC \(AFRL\)](#)
- [C-130 Load of LIFT Hexa](#)

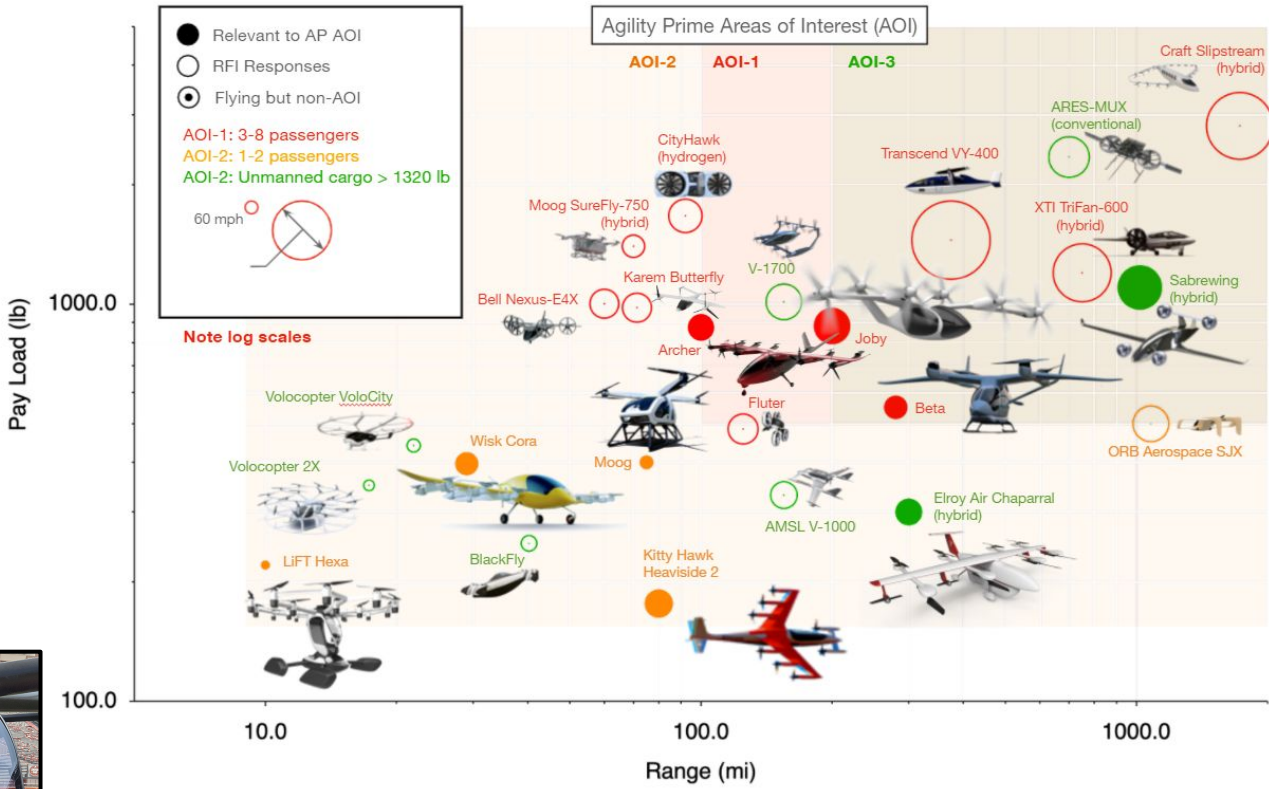


EVTOL Spectrum of Performance

AOI 1
 Payload: 3-8 personnel
 Range: Greater than 100 miles
 Speed: Greater than 100 mph
 Endurance: Greater than 60 minutes

AOI 2
 Payload: 1-2 persons (equivalent)
 Range: Greater than 10 miles
 Speed: Greater than 45 mph
 Endurance: Greater than 15 minutes

AOI 3
 Cargo aircraft
 MGTOW: Greater than 1,320 lb
 Payload: Greater than 500 lb
 Range: Greater than 200 miles
 Speed: Greater than 100 mph
 Endurance: Greater than 100 minutes



Orbital Prime Overview

Mission and Objectives

Expand technology transition paths to accelerate emerging dual-use markets by leveraging government resources for rapid and affordable fielding

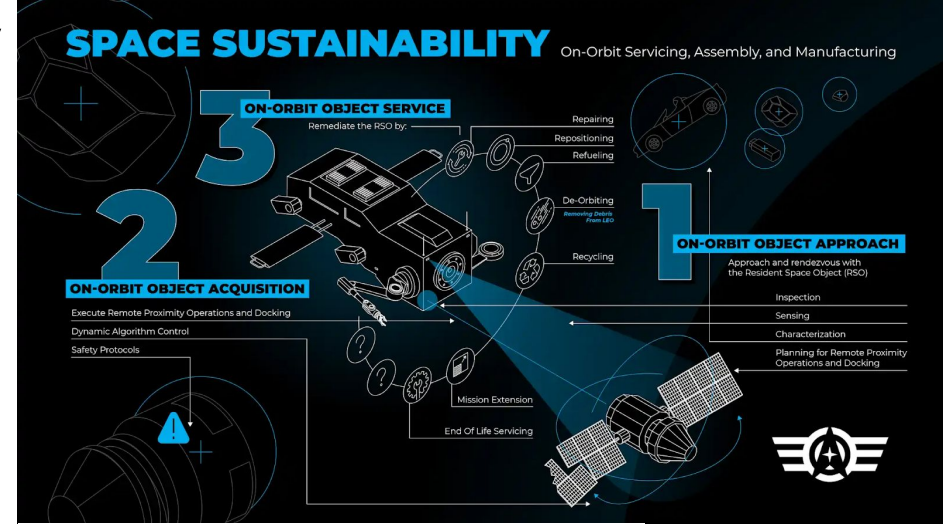
- Identify emerging technology sectors with industry & investment community
- Identify commercial tech sectors aligning with warfighter requirements
- Achieve a 20:1 ROI (all colors of money) while delivering rapid military utility

WHAT: In-Space Servicing, Assembly, & Manufacturing (ISAM)

1. **On-Orbit Object Approach:** Object characterization, Approach, Advanced power and maneuver
2. **On-Orbit Object Acquisition** - Robotics for capture, control, docking, remote proximity operations and associated control algorithms
3. **On-Orbit Service:** provide end-of-life servicing, mission extension, orbit relocation/de-orbit

WHY: ACCELERATE FIELDING OF EMERGING DUAL USE TECH

1. **Strategy:** Build domestic industrial base for ISAM through on-orbit demonstration of Active Debris Remediation (ADR)
2. **Process:** New transition paths (contracts; ex. STRATFI)
3. **Outcome:** Inform Space Commercialization Office make-or-buy decision



HOW: COLLABORATIVE RISK REDUCTION

1. **Tech Risk:** Synergize existing lab/testing efforts utilizing resources across US Govt & Industry
2. **Regulatory Risk:** Drive policy needed for National Security and Commerce with Interagency & International partners
3. **Financial Risk:** Partner with Venture Capital to ensure adequate due diligence, appropriate resourcing, and timely scaling

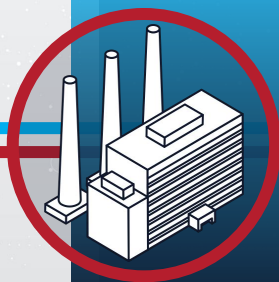
Recent Activities:

- **4 Nov 21:** Orbital Prime Announcement
- **17 Nov 21:** Out-of-Cycle STTR Release/Launch into Orbital Prime Webinar
- **12 Jan 22:** XPRIZE Design Sprint Kickoff
- **17 Feb 22:** STTR Solicitation Closed and all proposals received

CAPABILITY DEVELOPMENT (AFWERX)



EXPANDED TECHNOLOGY

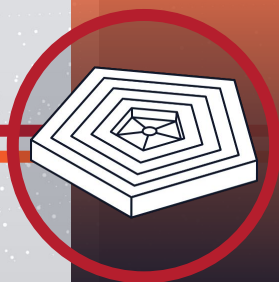


AFWERX

AFVENTURES



EXPANDED TALENT



AFWERX

SPARK



EXPANDED TRANSITION



AFWERX

PRIME



EXPANDED PORTFOLIO OF CAPABILITIES



JADC2



Autonomy



Hypersonic



Adv Log



Swarm



AI



Quantum

