

**DEPARTMENT OF THE AIR FORCE
OFFICE OF THE ASSISTANT SECRETARY
(ACQUISITION, TECHNOLOGY, AND
LOGISTICS)
WASHINGTON, DC**



1 September 2020

MEMORANDUM FOR THE ACQUISITION WORKFORCE

FROM: SAF/AQ

SUBJECT: AFWERX

Teammates:

The Pentagon is a constantly-changing alphabet soup of military acronyms, talking points, and buzzwords: a peculiar language barely understood outside the five-sided island. Acronyms, though isolating, can be overcome, but talking points and buzzwords are far more insidious, desensitizing until no longer being heard. I fear "competition with peer adversaries" may be buzzing its way towards eventual tuned-out oblivion.

We must all fight the buzz by competing each day.

You have heard me call innovation, itself, a battlefield: every new technology happens somewhere, in some school, laboratory, or business; every new market entrant, somewhere; every new war-winning capability, *somewhere*. Given the daunting challenges we face against peer competitors, the operative question is: "What are we doing to tip the scales?"

One answer is relaunching AFWERX, with expanded authority as a Program Executive Office (PEO)-like organization reporting directly to SAF/AQ. With so much of the battlefield—over 80 percent—in commercial markets, having a frontline organization bridge back to our PEOs, Research Labs, and Major Commands can lower our fence line, multiply our partnerships, and provide a plain-speaking menu for Defense work where the first course isn't acronym alphabet soup.

Like many senior leaders, AFWERX has been an amazing personal journey for me: step one was advising its creation as an innovation organization; step two, empowering its commercial outreach; and step three, now establishing its role as a major component of Air and Space Force acquisition. These small steps turned into giant leaps by our amazing moonshot team! As AFWERX now graduates from startup to scale-up, we're adding financial managers, contracting officers, and lawyers to round out its skill set and, most importantly, connect it with you: the full lifecycle enterprise.

AFWERX cannot be merely a place or organization, but rather, a culture energized by transforming the Air and Space Force into preferred partners for commercial innovation. Anyone can join, part-time or in full. (Apply today!) I expect every organization to have empowered AFWERX liaison units turning



us inside-out to help catalyze commercial technologies. Only then can we compete on the innovation battlefield's entirety.

Organizationally, AFWERX will have three branches: *AFVentures*, *Spark*, and *Prime*. The first, *AFVentures*, is all about tapping both U.S. and global tech ecosystems—using military problems to accelerate commercial technologies. The imperative of partnering with startups and scale-ups is one I've written about to increase awareness (Tab 1). However, exactly how the process works is not as broadly known nor circulated. Tab 2 provides details on how we're transforming the Air and Space Force into an early-stage "investor" that leverages private capital, accelerates commercialization using military missions, and grows the number of companies partnering with us.

The second branch, *Spark*, is all about empowering innovation at the operational edge. Spark connects amazing Airmen and Space Professionals to commercial innovators using virtual collaboration, immersive training, and networking opportunities that inspire ideas and cultivate creative Forces. By connecting operators closer to acquisition, Spark provides both a voice and conduit to turn powerful ideas into powerful operational realities.

This branch will expand on the highly successful impact of Spark Cells, Spark Tanks, Challenges, Colliders, and Hubs—more opportunities coming soon to a theater near you! I am excited to see what Spark ignites next.

The third branch, *Prime*, is all about priming—and then accelerating—emerging commercial markets using military missions and equities. New tech markets create significant economic and military advantages for their parent nations. Competing against nationalized industrial bases will require unprecedented partnerships between our military and commercial sectors to level the playing field and keep markets emerging in the U.S.

In addition to funding, Prime programs will leverage other unique Department resources—like test infrastructure, certification authorities, interagency relationships, and early operational use cases—bringing the Air and Space Force's full value proposition to bear. Tab 3 explains why *Agility Prime*, our first Prime program for flying cars, is a giant leap forward in military thinking on new competitive markets. But *Agility Prime* cannot be the last Prime program if we're to compete long-term. Secure microelectronics, quieter supersonic travel, quantum communication, more-recyclable space systems, and other frontier industries are poised to be next. The future is either made by us or for us. Our Prime branch's job is to make sure it's the former.

These first three branches are an exciting start, but they may not be the last. The tech ecosystem will evolve and so must AFWERX and our acquisition team writ large. Though friendly-sounding on paper, ecosystems are brutal places in reality. Resources are scarce, and all organisms compete for them. Only apex predators rest comfortably, and even they can be upended by an unforeseen meteor. Like Mike Tyson said: "Everybody has a plan until they get punched in the mouth." Becoming mouth-punchers and meteors—the disruptors instead of the disrupted—is the X factor we need to thrive in the tech ecosystem and, ultimately, on the innovation battlefield. AFWERX is how we get there faster.

Acronyms are indeed a dime-a-dozen in Defense, and "AFWERX" was not intended as one. But if it meant in the Department of the Air Force, WE R "X", that might be an acronym I could get behind.

The future awaits!

But only if we make
it each day —
let's make it!



William B. Roper, Jr.
Assistant Secretary of the Air Force
(Acquisition, Technology & Logistics)

TAB 1 – Roper: “Startup.mil to Startup.com? Why accelerating tomorrow’s tech companies is a no-fail Air Force mission.” (*Medium*, 8/30/2020)

With today’s accelerating pace of technology, our military’s practice of forecasting far-term security threats is obsolete. With too many possible futures to pick one confidently, routine innovation—disrupting in lieu of countering—is our best military strategy. Innovation *is* the new battlefield, waged in every classroom, laboratory, business, and nation. And there has never been a more complex, dynamic proving ground for globally-competing ideas.

As recent decades witnessed amazing commercial innovation—from the expanding internet of things to recent quantum supremacy—the Pentagon sat comparatively lifeless, fettered by Cold War habits that hinder agility. Like the impeded response of Xerox to personal computers, Sears to e-commerce, or Blockbuster to video streaming, our military could easily face the barrel of disruptive technologies—instead of the sights—unless we wake up *now*.

Fortunately, across the Air and Space Force last year, a Pinocchio spark animated the limbs of our purchasing system, cutting strings that once hindered speed and innovation. With a new “AFVentures” investment arm in commercial-friendly AFWERX (pictured above) we partnered with over 1,000 tech companies—two thirds new to government work, conducted 15 pay-in-a-day pitch events, and successfully completed the Pentagon’s first venture capital contracts, matching \$1.1B of private investment with \$360M of non-dilutive government funds. We even virtualized the government’s largest tech startup event this year, committing over \$900M in a single day.

So why are small startups such a big deal to us?

Many areas of commercial innovation—autonomy and artificial intelligence, to name just a few—keep booming thanks to big investment and broad participation. But these peaceful (and yes, highly profitable) technologies also lower barriers to revolutionary weaponry. Past weapons breakthroughs, like satellites, microelectronics, and the internet itself, were created nearly exclusively for the U.S. military at costs prohibitive to most nations, let alone companies. Now even startups can rival once military-grade capabilities, and established companies, once science-fictional. From sensing drones to sentient neural nets, future warfare has a “.com” domain.

But it’s not just future military might that’s at stake. These same technologies are impacting portions of the globe in ways once imagined by Orwell or Netflix’s dystopian *Black Mirror*. Ensuring new technology enables freedom of ideas, markets, and elections, not unflinching control sought by perpetual governments, is an ideal many share with us. But with controlling “closed-system” governments anointing, fully backing, and even stealing designs for their own companies, how are U.S. and free world innovators to compete on a level field?

AFVentures helps level the innovation battlefield by making military missions an easy-to-use launch pad for commercial enterprise. There are many reasons why the Air Force and Space Force are ideal innovation partners: our funding is significant, non-dilutive, and patient; our payment system, finally faster and predictable; and our mission and people, critical to national security and prosperity. With nearly a billion dollars dedicated annually to startups and scale-ups, we’re one of the largest potential early-stage “investors” in the U.S. And these dollars connect to our \$160B-per-year military market where successful entries can be higher in risk, lower in quantity, and higher in price as they bridge towards future commercialization.

With all these advantages, the dearth of “defense unicorns” indicates just how dangerously isolated the Pentagon has become.

Jump-starting tomorrow's tech companies is a massive defense pivot, but one that cannot misstep. With our defense industrial base shrinking—and military research and development now only twenty percent of our nation's whole—AFVentures must trend virally until our military routinely connects to our vibrant tech ecosystem. Using the military market to accelerate innovation—wherever it's found—may be the unexpected X factor for future national security and ultimately winning on the innovation battlefield.

Fortunately, the Air and Space Force are off to a good start. After all, getting new and exciting things off the ground is literally what we do.

TAB 2 – How AFVentures “WERX”:

As the Department of the Air Force's commercial investment arm, the prime directives for AFVentures are: (i) measureable returns on military investment, (ii) catalytic effects on the U.S. tech ecosystem, and (iii) positive UX for all who participate: companies, investors, government teams, and users. Here's how AFWERX and lifecycle teams ensure it “WERX”.

AFVentures Phase I – Small Bets:^[1] Every year, AFVentures will award over 1,000 small, entry-level awards (i.e., up to \$50K of Small Business Innovative Research (SBIR) Phase I funding) to connect new companies or new ideas with potential Air Force and Space Force customers to explore technical feasibility. Calls for proposals are made via three separate solicitations per year, which open for submission in January, May, and September per the schedule below. The full schedule of upcoming solicitations and all associated events can be found at <https://www.afwerx.af.mil>.

Phase I is the front door for doing new business with the Department of the Air Force (DAF): AFVentures' job is making it easy for new companies to walk through and explore working with us. An added benefit of our Phase is that, after receiving an award, companies may sell associated solutions to anyone in the U.S. government without having to re-compete, effectively making Phase I a “hunting license” for new customers across the U.S. government!

AFVentures will collaborate with Venture Liaisons and SBIR Program Managers (who represent different DAF user groups) on customer exploration and education opportunities, so you do not need to speak defense to speak our language. To start their journey, companies need only go to the AFWERX website.

AFVentures Phase II – Product-Market Match:^[2] After companies or ideas find potential customers, they are ready to show how their technology can take flight and impact the way the Air Force and Space Force operate. We will target over 300 medium-sized Phase II awards each year, starting at \$750K for the initial award but with opportunities for additional awards throughout the duration of Phase II.

An exciting aspect of the AFVentures approach to Phase II awards is that many will occur during live or virtual “Pitch Days”. The idea of a Pitch Day is simple. A company gives a ten minute pitch to Air Force and Space Force experts. We ask five minutes of questions, deliberate for five more, and if promising, award contracts and make the first payment in 15 minutes flat! Not all companies will need cash this quickly, but we do it to show we are serious—both to companies and their investors. Pitch Days will occur throughout the year, based around the Phase II solicitation cycle on the schedule below.

Another *big* difference for Phase II companies is the potential for supplemental awards with matching Air and Space Force program investments. Because our \$800M of SBIR funding is legally fenced for early-stage innovation, it alone is not a strong indicator of product-market fit. This is where AFVentures' matched funding approach comes in. Government matching is *encouraged* for the initial Phase II award and *required* for any supplemental awards—such as the **Tactical Fund Increase (TACTFI)**, which rolls out later this year and allows for continuous conditions-based modifications to active Phase II awards to add additional scope, and the flagship **Strategic Fund Increase (STRATFI)** that is described below. Government customer funding is key because it represents a strong potential for recurring revenue for companies via a marked commitment by a future customer. SBIR funding is a valuable start, but it is the customer funding that represents real potential for growth. That is why the AFVentures process combines progressing amounts of both SBIR and customer funds to represent true potential for military product-market fit.

^[1] 15 U.S. Code 638(e)(4)(A) – SBIR Phase I

^[2] 15 U.S. Code 638(e)(4)(B) – SBIR Phase II

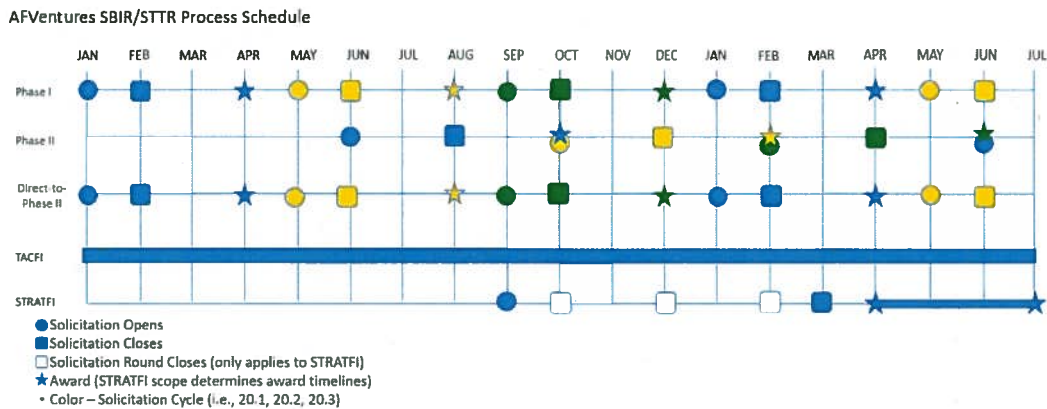
Results thus far have made private investors take notice. Last year, over three dollars of private investment matched every dollar of government funds we spent—and that rate continues to climb! This positive response from investors—which we must continue to earn—is increasing the number of companies applying, impact of our government funding, and likelihood of future commercialization. Leveraging AFVentures investment with private capital is a game-changer for competing in commercial tech!

AFVentures STRATFI Awards – Big Bets:^[3] Every year, we will allow Phase II companies to propose disruptive next-level developments—those requiring greater capital and time to take flight—for a DAF-wide competition, called the Strategic Fund Increase (STRATFI), where they can receive up to \$15M in SBIR (Phase IIB) funding over the course of four years.^[4] The schedule for this process is shown below. These Big Bets require matching funding at rates of either (i) two dollars of private funds and one dollar of government customer non-SBIR funds for every dollar of SBIR or (ii) two dollars of government customer non-SBIR funds for every dollar of SBIR, no private matching required. (Note: to comply with the many laws and policies governing SBIR, these figures are subject to change, and award size is dependent upon SBA waiver approval. Authoritative instructions for AFventures STRATFI awards will be released in the summer each year.)

Our goal is 20-30 STRATFI awards per year—but only if proposals merit award. We want these Big Bet awards to be the military equivalent of Good Housekeeping Seals of Approval, strongly encouraging private investors to match our funding because of potential government product adoption as a means to accelerate future commercialization. For our first round, we were proud to announce over 20 Big Bet winners that were selected to receive over \$200M of government funding and nearly \$350M of private funding over the next four years.

It is this STRATFI “top of the pyramid” that helps us build a strong base of companies and ideas each year. Without it, our investment process would not allow for large enough awards to capitalize big ideas into future military bills of sale, like our private sector counterparts. It is critical AFVentures not have a dead-end. When successful, STRATFI contracts should routinely transition to bills of sale, generating recurring military revenue and catalyzing growth in both defense and non-defense markets. Our goal is for future world-leading companies to get their first big chance on Air and Space Force dollars: **creating “defense unicorns” to compete long-term on the innovation battlefield.**

But like the commercial tech ecosystem we engage, AFVentures—launched over the past 18 months—is a startup, itself. We continue to listen to the needs of our customers and partners, both internally and externally, to identify ways to improve. So while this three-phase fund is how we execute today, we aim for better in future. The “adventure” has only just begun!



[3] SBIR Policy Directive, May 2, 2019 at page 74 – SBIR Phase IIB
 [4] Award size dependent upon SBA waiver approval.

TAB 3 – Roper: “Flying Cars Could Take Off Soon, If We Let the Military Help” (Wired, 4/27/2020)

Since “THE JETSONS” premiered in 1962, Americans have been fascinated by the prospect of flying cars. In the show’s memorable opening, George Jetson somehow folded his sleek space sedan into a briefcase, a bit of design wizardry science will find challenging to recreate.

Cartoon physics aside, we’re much closer to developing flying cars than you might realize.

Flying vehicles portend the elevation of terrestrial military missions—and entire commercial industries—into the third dimension. With over 200 companies leveraging advances from hybrid and electric cars to create affordable “electric vertical takeoff and landing” (eVTOL) systems, a radical transportation future is not too far-fetched, nor too far away. Especially if the Air Force helps precipitate it.

Previous transformations in aviation generated spectacular leaps in performance, but hand in hand with increased costs that limited quantity. Flying cars are quite the opposite. Given their mechanical simplicity and high degree of automation, costs for purchasing and maintenance could be an order of magnitude lower. This would make the quantities of these systems needed for base security, rescue, disaster relief, and other missions affordable. Moving these missions into the third dimension would provide greater responsiveness for American troops and a faster first use-case for the companies building them.

The biggest impediment is not technical know-how. It is creating a fundamental change in how the military interacts with emerging commercial markets.

Over 80 percent of our nation’s R&D funding now goes to the private sector. Most new opportunities lie in commercial markets that charge ahead without military partnerships. This continued absence will have far-reaching consequences that could imperil the national security advantage our nation has enjoyed for decades.

Consider small drones. The Pentagon’s absence as this market emerged allowed China to dominate the global supply chain. Now we react to the security challenges this creates. In hindsight, proactive engagement by the military—interjecting the steady demand of our market for trusted systems, even at higher prices—might have supported a small US industry base against collapse.

Hobbyist drones are one thing, but other dual-use technologies—ones with greater potential impact on the global economy, especially intelligent automation—are in development as we speak. There’s no guarantee they will commercialize in the US first. But to tip the scales, it is imperative our military view proactive acceleration of these technologies as essential.

In the case of eVTOL, the Air Force is doing just that. Our new program, *Agility Prime*, leverages unique Air Force assets—test ranges, safety certifications, and military missions capable of logging steady flight hours—to build confidence in the technology, attract investors, and hopefully expedite domestic commercialization. It also provides the Air Force revolutionary agility for numerous missions.

Agility Prime will partner with industry on a series of live-fly challenges starting with a virtual launch event from April 27 to May 1, bringing together companies, investors, and airmen from across the nation. These “Air Races” will identify vehicles ready to perform military missions now and fast-track them to initial operations within three years. Because our aim is accelerating and procuring commercial systems capable of military use, difficult defense-unique mods will be strictly out of bounds—an important step in using our military market to catalyze a commercial one.

Flying cars aren't the only commercial technology the military can help accelerate. Next-generation AI, quantum systems, and zero-trust software technology are just a few areas where we are actively pursuing future Agility Prime-like initiatives.

As we explore new military concepts for logistics and rescue, we will not lose sight of our broader goal of creating a new industry and sparking a revolution in aviation—fostering our nation's enduring innovation engine is essential to overcome challenges, today and tomorrow. In a sense, we are returning to our roots by doing so. Air Force hallways in the Pentagon are lined with pictures of groundbreaking aircraft: from the Wright Brothers' cloth and wood designs, to the sleek jets that thundered past the sound barrier, to the stealthy weapons systems that dominate the skies today.

With Covid-19 forcing everyone to think differently, now is the perfect time for a new innovation partnership model and, just maybe, a new picture for the Pentagon.