



# AAL PERFORMANCE REPORT

FOCUS ON METRICS



Release: 14 March 2026

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*\*This report covers metrics for calendar year 2025.*

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# FROM THE DIRECTOR

DR. CASEY PERLEY

The war in Ukraine has highlighted two critical technology lessons: the need for rapid iteration with Soldiers in the field and interoperability between systems. Historically the Army has taken a different approach. Technologies under development were siloed and tested at disparate Soldier touchpoints without integration alongside other capabilities or in realistic conditions. This year AAL has changed the paradigm.

The impact of technology development extends beyond new equipment; it influences how the Army organizes, trains, and fights. AAL's cohort methodology places Soldiers at the center of this process and it brings requirements writers, scientists, and acquisition professionals to the table to provide a path to scaling successful technologies. We further pioneered the approach this year with our Deep Terrain Shaping and Remote Breaching projects (see pg 57). In May 2025, seven companies and Soldiers from three engineering brigades spent two weeks at Fort Leonard Wood conducting platoon STX training. They iterated on their technologies, tested combinations of tools to achieve their military missions, and refined how a platoon could "fight with the system." The event was an overwhelming success, leading to all seven technologies advancing into further experimentation with the 36th Engineer Brigade at Fort Hood.

Using a similar model we launched xTech Overwatch (see pg 38) in partnership with the Army xTech Program and the Army SBIR Office. In October 2025, 37 companies participated in a 10-day event at the Bush Combat Development Center, working alongside Soldiers from 1-1CAV. This event involved collective training and experimentation with suites of capabilities before a final evaluation. Twenty of these companies were selected for continued iterative development with 1-1CAV beginning in February 2026.

AAL's goal is for the technology developed by companies to be adopted at scale. Two factors are critical to achieving this: continuous Soldier feedback and honest performance assessments. Early and consistent user involvement ensures that new technologies solve real-world problems. After all, if a Soldier does not use new equipment (i.e. leaves it behind in a connex) it isn't a solution, but a failure.

Metrics that measure adoption rate and potential return on investment to the Army are key to knowing if technology development is on track for fielding and adoption by Soldiers. Yet, more than a decade into the defense innovation revolution, there are no agreed-upon standards to measure the return on investment for new technologies or to evaluate the effectiveness of the innovation enterprise as a whole. For comparison, venture capitalists constantly evaluate their portfolios to assess their risk/return ratio and performance. Organizations in the government focused on technology development should emulate those practices when it makes sense. With that comes the realization that sometimes a solution won't work. A success rate of 90%, or even 50% would indicate we are not taking enough risk to drive ten fold versus two fold improvements in capability. We also need to be honest with ourselves and our stakeholders – Congress, the Department of War, and the companies we work with – about what our success rate is, so they can determine if we are worth investing in.

This year AAL has evolved our business model and provided companies unparalleled access to end-user feedback and in-the-field experimentation. We have spent the last year refining our metrics and using them to drive decisions about which projects we take on and the types of technologies that merit investment. These metrics now help us evaluate our portfolio to ensure we are solving the Army's most pressing and challenging problems. We also used these metrics to gather data and provide return-on-investment information to stakeholders, enabling the Army to make informed decisions on further investing in technology development or procurement. Just as important, we have used these metrics to evaluate our own performance and ensure we are delivering on our mission to get the best technology into the hands of warfighters faster.

I am happy to lay out for you how we think AAL is doing and ask you to judge where we are falling short and where we are succeeding.

This is my last year as AAL's Director and I am extremely proud of the work this team has done – not just this year, but for the past 7 years. And we are starting to see the effects of our work snowball. This year, our follow-on contract total almost equaled all previous years combined. The same is true for the amount of private funding our companies have raised. This year we've continued to push the envelope by pioneering approaches to measuring innovation success for the DoW, and changing the paradigm on how non-traditional companies interact with Soldiers to develop capability. I am excited to see what impact these innovations have in the years to come.





# EXECUTIVE SUMMARY

COL CLAY MCVAY - DEPUTY DIRECTOR  
ARMY APPLICATIONS LABORATORY

Quick tech development through rapid iteration in the field is how we get truly useful technologies into the hands of Soldiers. This can only happen when we work together with our partners who provide everything from funding to pathways for transition. Metrics also act as tools to provide transparency; industry solvers, investors, and our government stakeholders need to clearly see how innovation organizations like AAL are performing. This helps confirm the right efforts get funded to deliver the right technologies. This year we included new metrics into AAL's Performance Report to highlight efforts where we applied rapid iteration of technologies in the field and how we assess military utility.

DoW innovation organizations have an important role to play in rapidly getting capability to Soldiers. In this report you will get a detailed look at some of our projects, how we fund them, and where they are headed next. These case studies don't just show our successes, they highlight challenges that still need to be worked through and showcase the myriad of pathways through which technologies can transition into the Army.

## LOOKING INTO THE FUTURE

AAL is now providing direct support to the newly-established Pathway for Innovation & Technology (PIT) that the Army announced in October 2025. The PIT is the "+1" of the newly established PAE "6+1" construct that restructured the Army's legacy Program Executive Office (PEO) structure. Moving forward, alongside and in partnership with PIT's Global Tactical Edge Acquisition Directorate (G-TEAD), the Joint Innovation Outpost (JIOP), and FUZE, AAL will continue its work to get the best technology to the hands of our Soldiers.



# FOCUS ON METRICS

Measuring innovation effectiveness is a challenge even for corporate America – often, there are disagreements on what metrics signal success. That said, initiatives that increase profit for the company are rather easy to identify and can serve as a bellwether on whether innovation is succeeding.

The greatest barrier to DoW innovation isn't a lack of metrics; it's the culture. To successfully integrate commercial technology, the DoW must adopt the mindset of a venture capitalist, rigorously evaluating the return on investment of its innovation portfolio. This is a necessary shift to capture and field the best capabilities.

When AAL was founded 7 years ago, we thought transition to a program of record was the holy grail metric for success. Years later, we've learned that this metric only tells a tiny portion of the story. **Now we define transition as the DoW and/or US allies continue to use or develop the capability after the project leaves AAL.** This means it could go to a program of record, a laboratory for additional development or integration, to a sister service or allied partner, or come back to the Army as a subcontractor on a prime vendor proposal. In all of those scenarios, companies and the government continue to gain value from the work being done on the technology.

Recognizing that transition is only one part of the equation, we began asking new questions. We started measuring how many technologies were getting into the hands of Soldiers for extended experimentation - a practice that improves both the technology and its tactical application. We assessed how many requirements documents, which pave the way for fielding new capabilities, and were influenced by our projects.

We also recognize that measuring transition alone won't tell us if we are addressing the difficult problems the Army needs to solve. It doesn't tell us if we are expanding DoW's access to commercial industry or capitalizing on the large amount of commercial internal research and development funding being deployed.

Next, we will review the metrics we use to evaluate our projects and measure their return on investment we provide to the Army, selected from over 100 indicators we now collect.



# AAL FUNDING

# TOTAL RAISED

TOTAL INVESTMENT

# 2025

# \$1.192B

In 2025

# \$2.977B

Cumulative

C  
A  
L  
E  
N  
D  
A  
R  
Y  
E  
A  
R

Total Invested

## \$29,091,019

AAL Invested

## \$13,996,865

Co-Invested

## \$15,094,154

# AAL PORTFOLIO

# METRICS

AVERAGE DOW FOLLOW-ON  
CONTRACTS

after working with AAL

10.7

AVERAGE DOW FOLLOW-ON CONTRACT FOR  
COMPANIES WITH 0-20 CONTRACTS

after working with AAL

4.3

COMPANIES VALUED  
AT <100M

prior to working with AAL

191

COMPANIES VALUED  
AT >\$100M

in AAL portfolio

20

COMPANIES REACHED \$100 MILLION  
VALUATION

after working with AAL

7

COMPANIES THAT HAVE LIMITED DOW  
EXPERIENCE

in AAL's portfolio

91%

\$974.9M

SUCCESSFUL  
EXITS

Since AAL started

\$660.6M

SUCCESSFUL  
EXITS

in 2025

26

COMPANIES WITH  
SUCCESSFUL EXITS

Since AAL started

2

UNICORN PORTFOLIO  
COMPANIES

After working with AAL

43

TECHNOLOGIES ITERATIVELY  
INTEGRATED INTO FORMATIONS

10

NUMBER OF UNITS  
WORKING WITH AAL

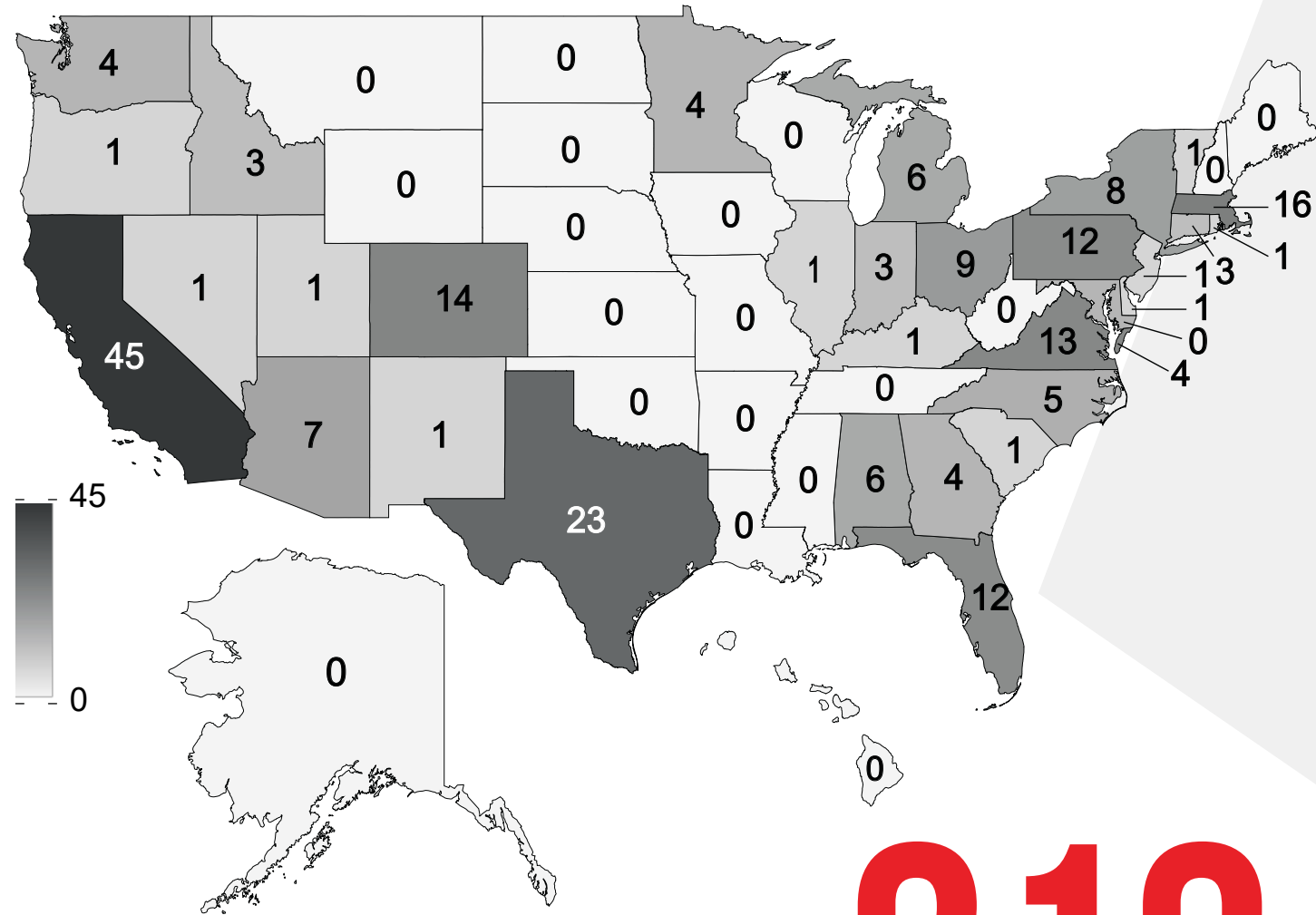
20%

OF PROJECTS ARE CROSS-  
SERVICE COLLABORATIONS

# DEMOGRAPHICS

AAL'S PORTFOLIO COMPANIES  
SPAN **31 STATES**

AAL works with  
companies across  
the United States.



# 213

**TOTAL OF AAL  
PORTFOLIO COMPANIES**

## COMPANY SIZE BREAKDOWN

72	1-10 Employees
100	11-100 Employees
36	101-1,000 Employees
5	1,001-10,000 Employees

## PRIOR DOW WORK BREAKDOWN

17	0 DOW Contracts
177	1-20 DOW Contracts
12	21-100 DOW Contracts
7	More than 100 DOW Contracts

# PORTFOLIO METRICS

**51%** **TRANSITION RATE**

**25** **TOTAL PROJECTS TRANSITIONED**

## ACTIVE PROJECTS

TOTAL INVESTED	<b>\$78,207,718</b>
AAL INVESTED	<b>\$32,577,243</b>
DOW & PRIVATE CO-INVESTED	<b>\$45,630,475</b>

## COMPLETED PROJECTS

TOTAL INVESTED	<b>\$171,748,264</b>
AAL INVESTED	<b>\$114,740,014</b>
DOW & PRIVATE CO-INVESTED	<b>\$57,008,250</b>
FOLLOW-ON CONTRACTS (TOTAL VALUE)	<b>\$128,369,000</b>

# TRANSITION GANTT CHART

Non-traditional companies are looking for the sure path to high dollar value contracts from programs of record. Hidden in AAL's transition rate is the fact that not all transitions are created equal – some lead to high dollar value contracts, while others quickly end. One of the best ways for a company to plot their own journey is to see what other companies have done. Below is the full story for all of AAL's transition capabilities.

It is important to note that the total value of a transition may not be captured in a single contract. Often, a series of smaller, successive contracts can accumulate to a significant total value over time.

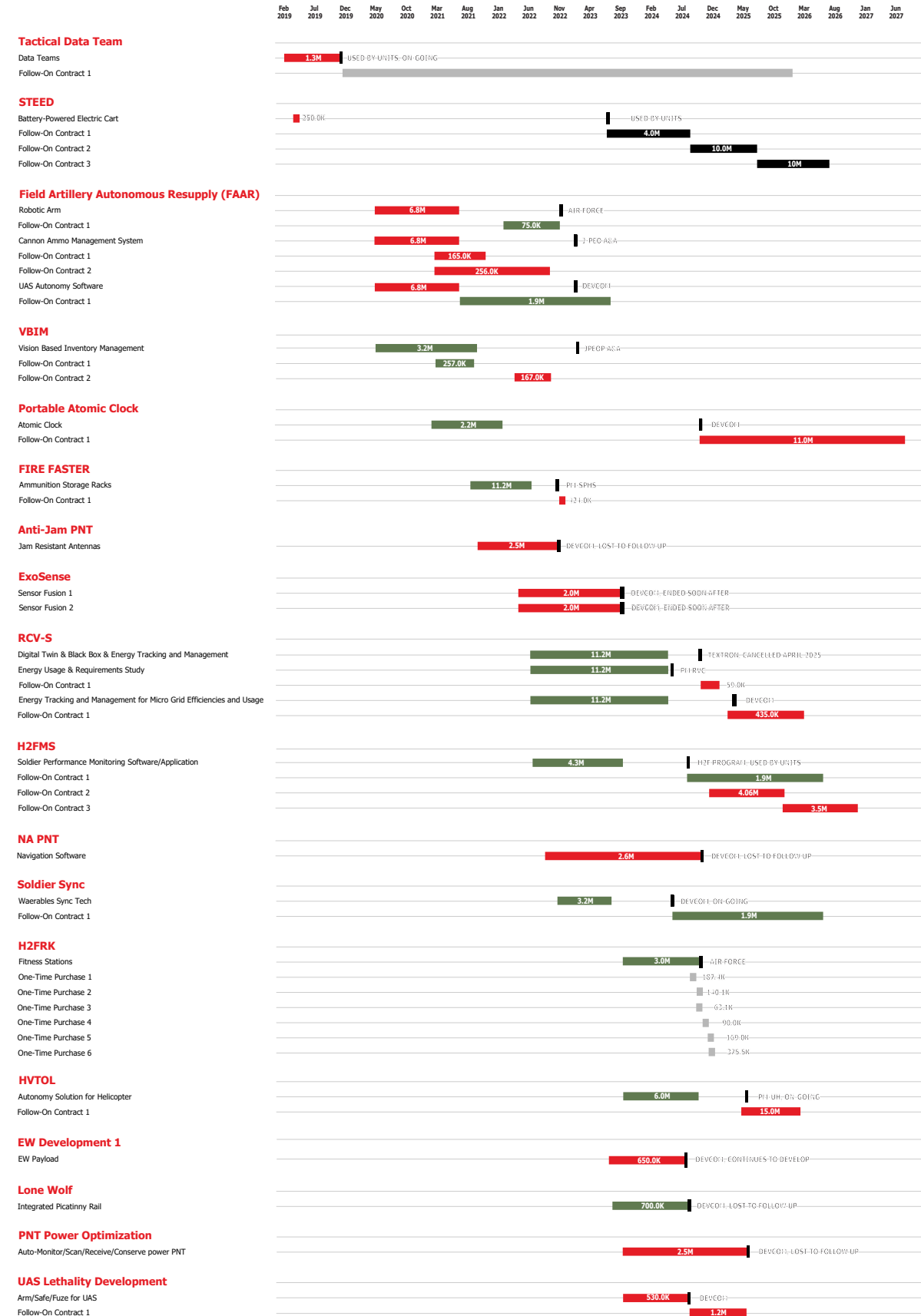
Second, this analysis also highlights an area for improvement: contract gaps. 43% of transitioned projects experienced a delay over three months between the end of their AAL project and the start of their follow-on contract. Gaps of this length make it difficult for companies to retain high performing teams for military projects. While AAL's practice of involving transition partners early is vital, it is not always sufficient to bridge the "S&T Valley of Death." Minimizing and eliminating this gap is a priority for AAL.

**43% of transitioned projects experienced a delay over three months between the end of their AAL project and the start of their follow-on contract. Gaps of this length make it difficult for companies to retain high performing teams for military projects.**

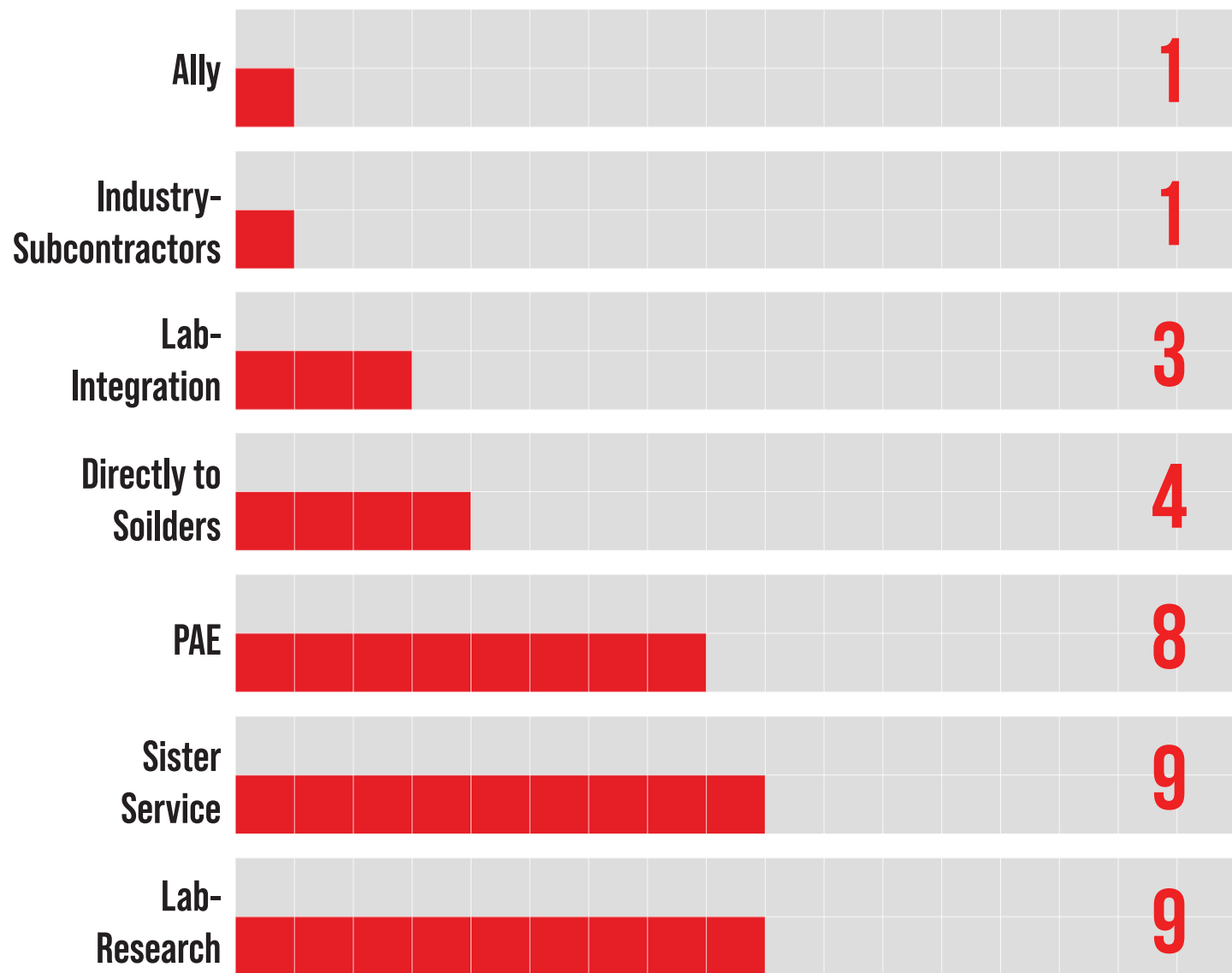
[CLICK HERE TO EXPAND IMAGE](#)

## Project Timeline

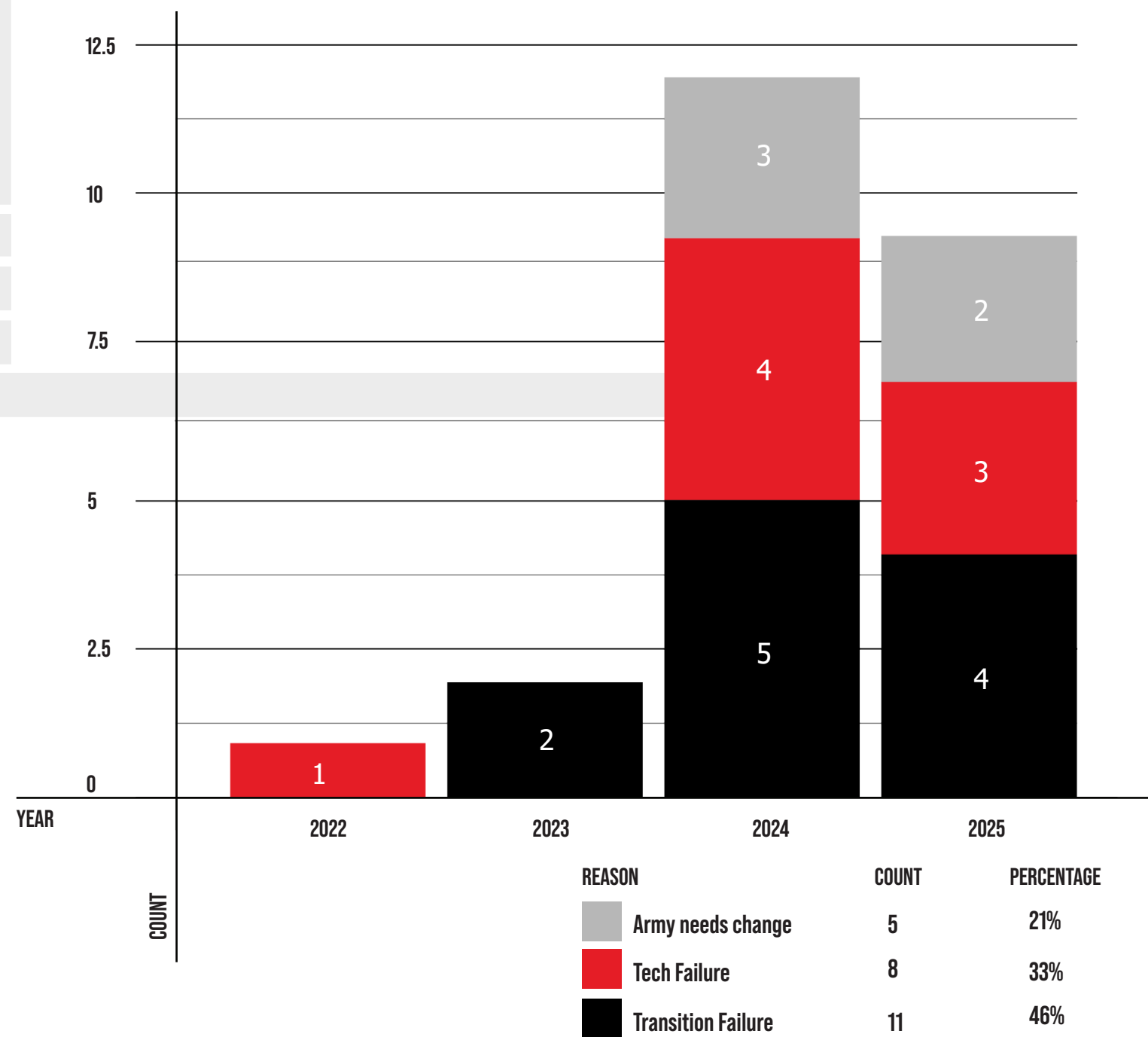
Technologies and Transition Information



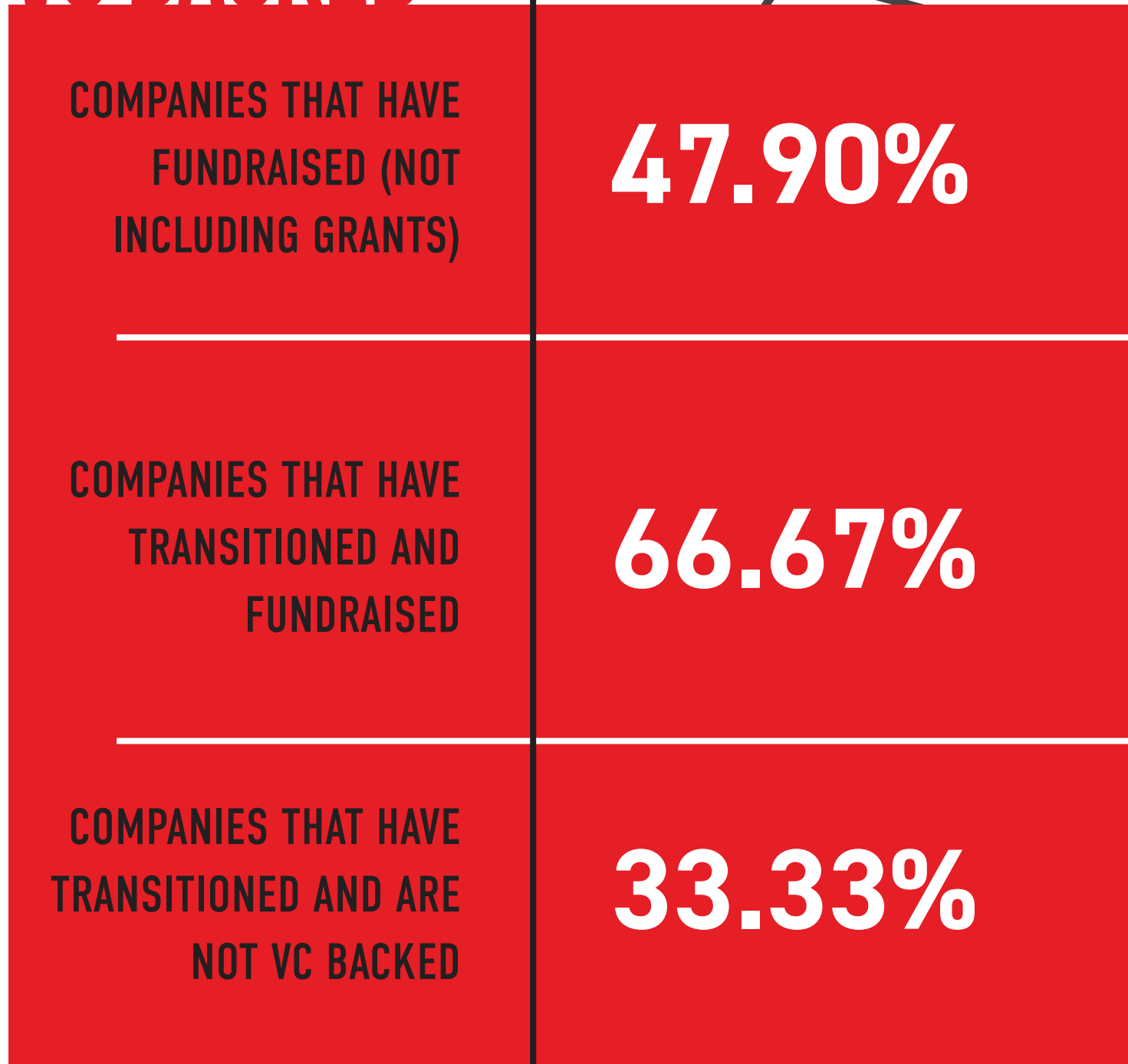
# TRANSITION DESTINATION



# TRANSITION FAILURE REASONS 2022-2025

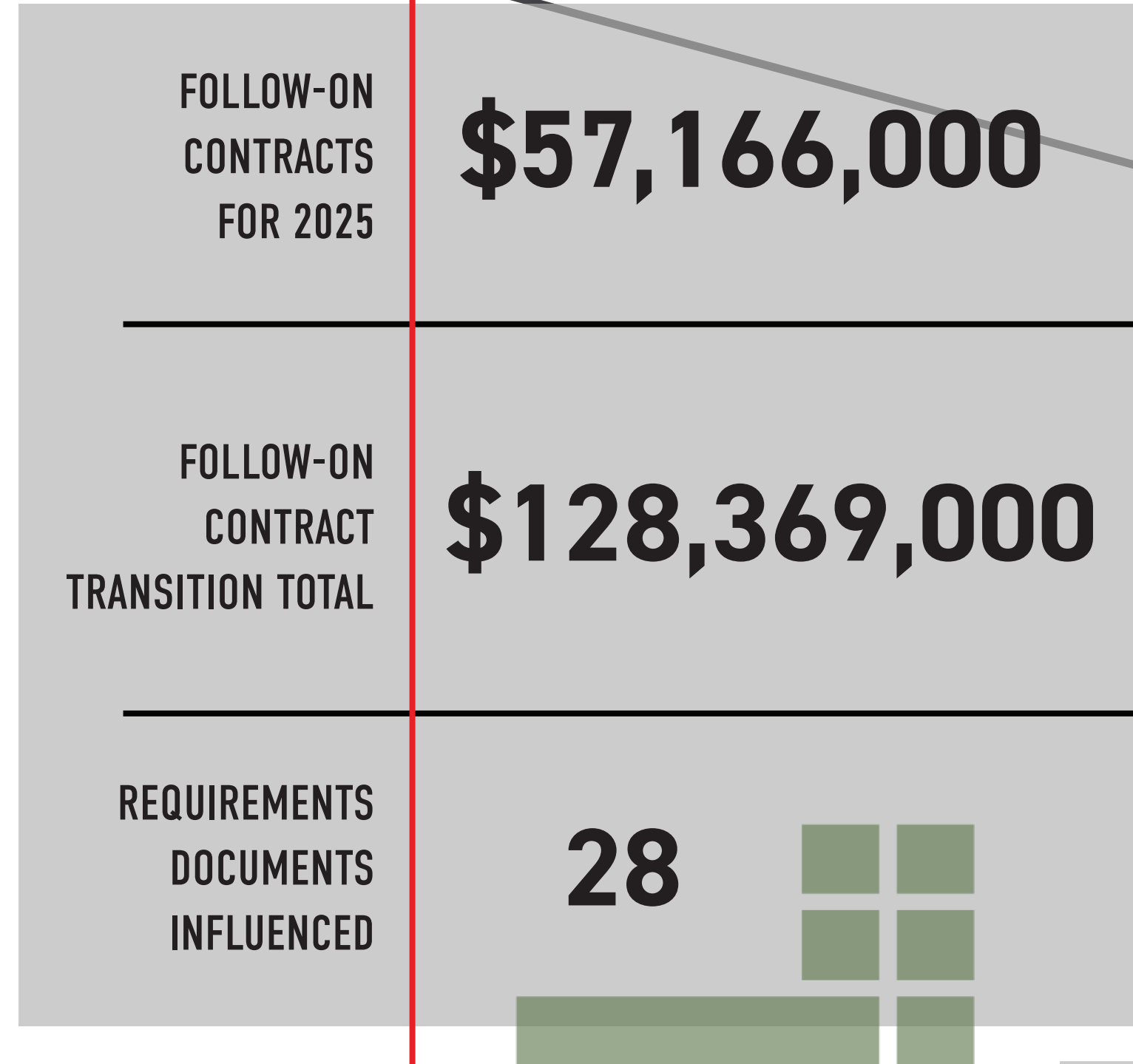


# VC BACKED



COMPANIES THAT HAVE FUNDRAISED AND RECEIVED AT LEAST ONE GOVERNMENT CONTRACT AFTER AAL

**71.50%**

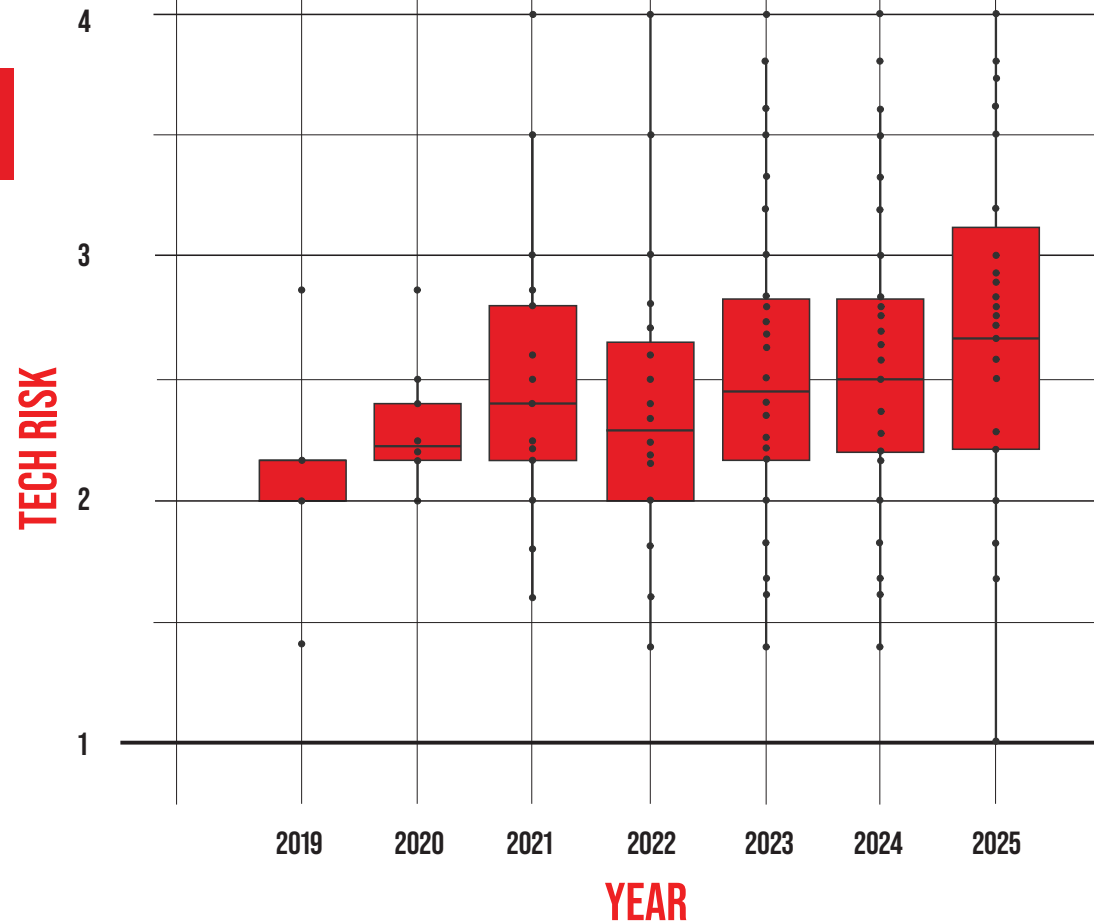


## COMPANIES STAGES OF FUNDRAISING

SERIES	PRE-SEED/SEED	A	B AND LATER
	59	23	20

# TECH RISK 2019-2025

TECH RISK HAS INCREASED OVER TIME.



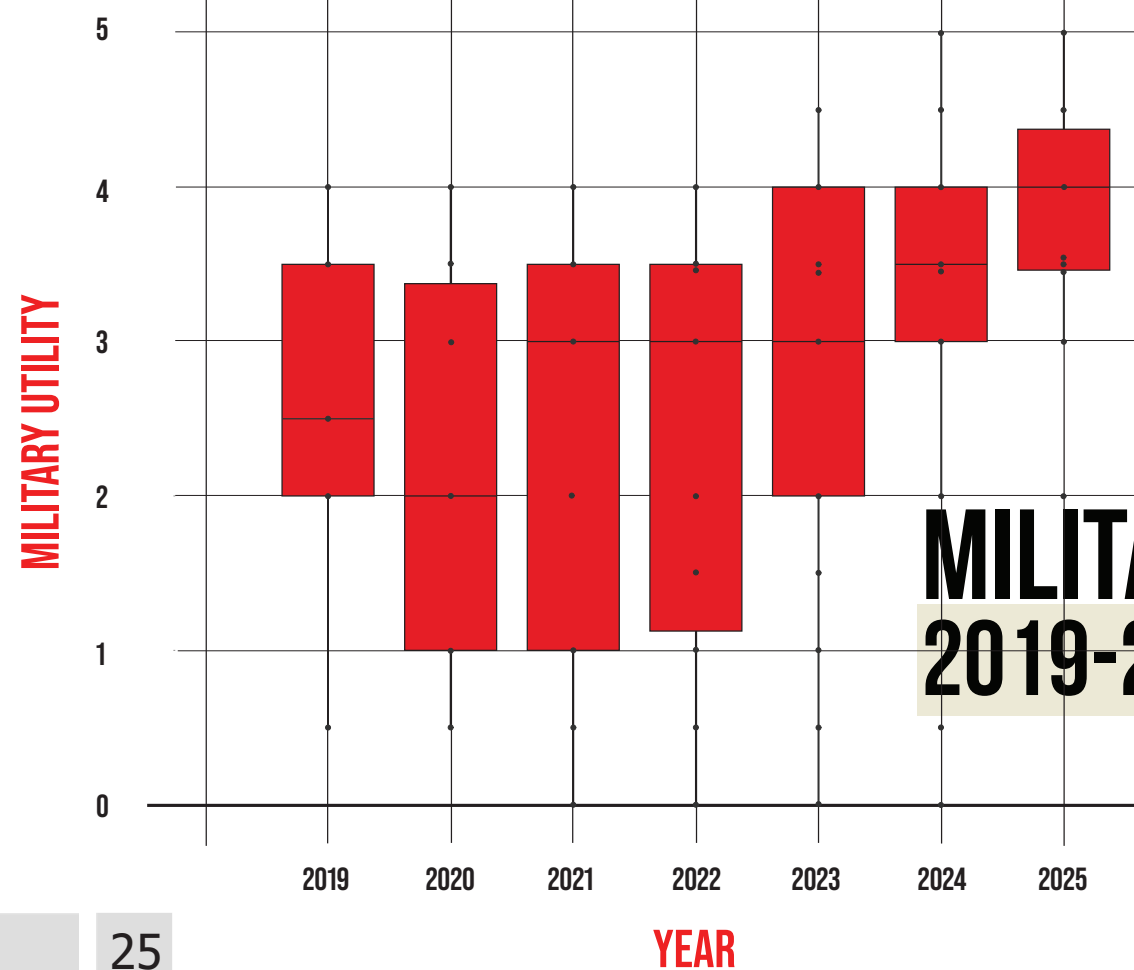
# TECH RISK & MILITARY UTILITY

## AAL TAKES ON PROJECTS THAT MATTER

When AAL ingests a problem, one of the first things we do is determine its military utility and technical risk. For military utility we evaluate the project on a scale from zero to five, and determine to what extent the technology would improve military advantage over adversaries – is it minor, moderate, considerable, significant, or decisive? For technology risk we evaluate the technology against a constellation of factors including maturity, manufacturability, and ease of enemy counter measure deployment. What the matrix shows us is that we are solving important, hard Army problems. AAL's sweet spot is to solve problems with high military utility, but low technical risk. AAL capitalizes on fully developed solutions from industry that can be directly applied to Army challenges. That said, we are increasingly taking on high utility, high technical risk projects, in an effort to solve some of the most pressing Army problems.

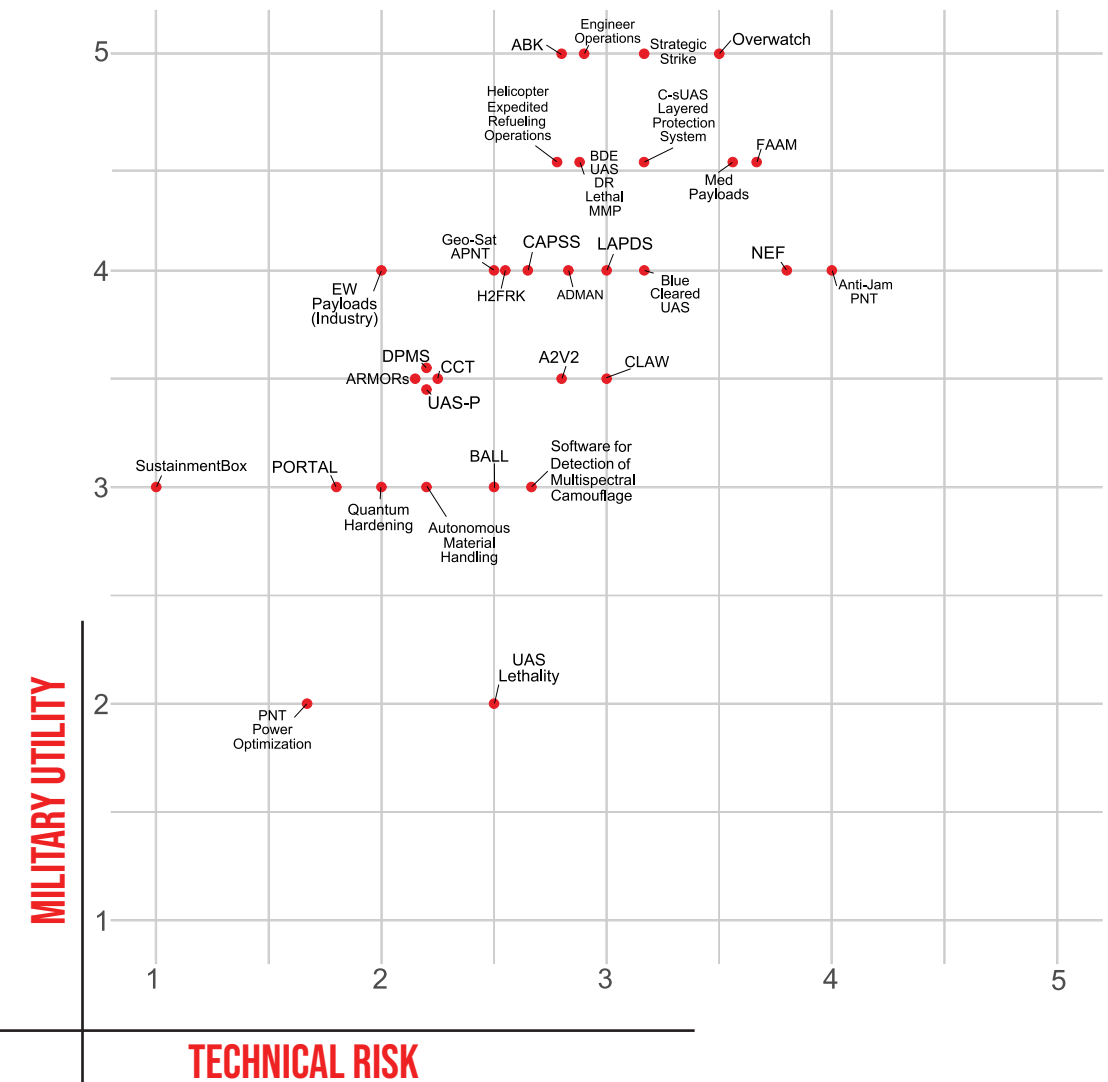
Last year, AAL received guidance from Army Futures Command to take more technical risks in our projects, allowing us to go after 10x vs. 2x solutions. Notably, leaders were okay with a decrease in transition rate in order to support this increased risk. Over the last year, AAL has done just that. As you can see from the plot of our current active profile, the majority of our projects now fall into the upper right quadrant - high risk, high importance problems. This shows that we are solving important problems for the Army.

Plotting the military utility of our projects over time shows that we are assuming more important projects since AAL's founding seven years ago. The increased technical risk has not impacted AAL's transition rate and is a testament to the AAL model.



# MILITARY UTILITY 2019-2025

UTILITY HAS INCREASED OVER TIME



# INNOVATION: BREAKING BUREAUCRACY



## WHAT IS VERTEX?

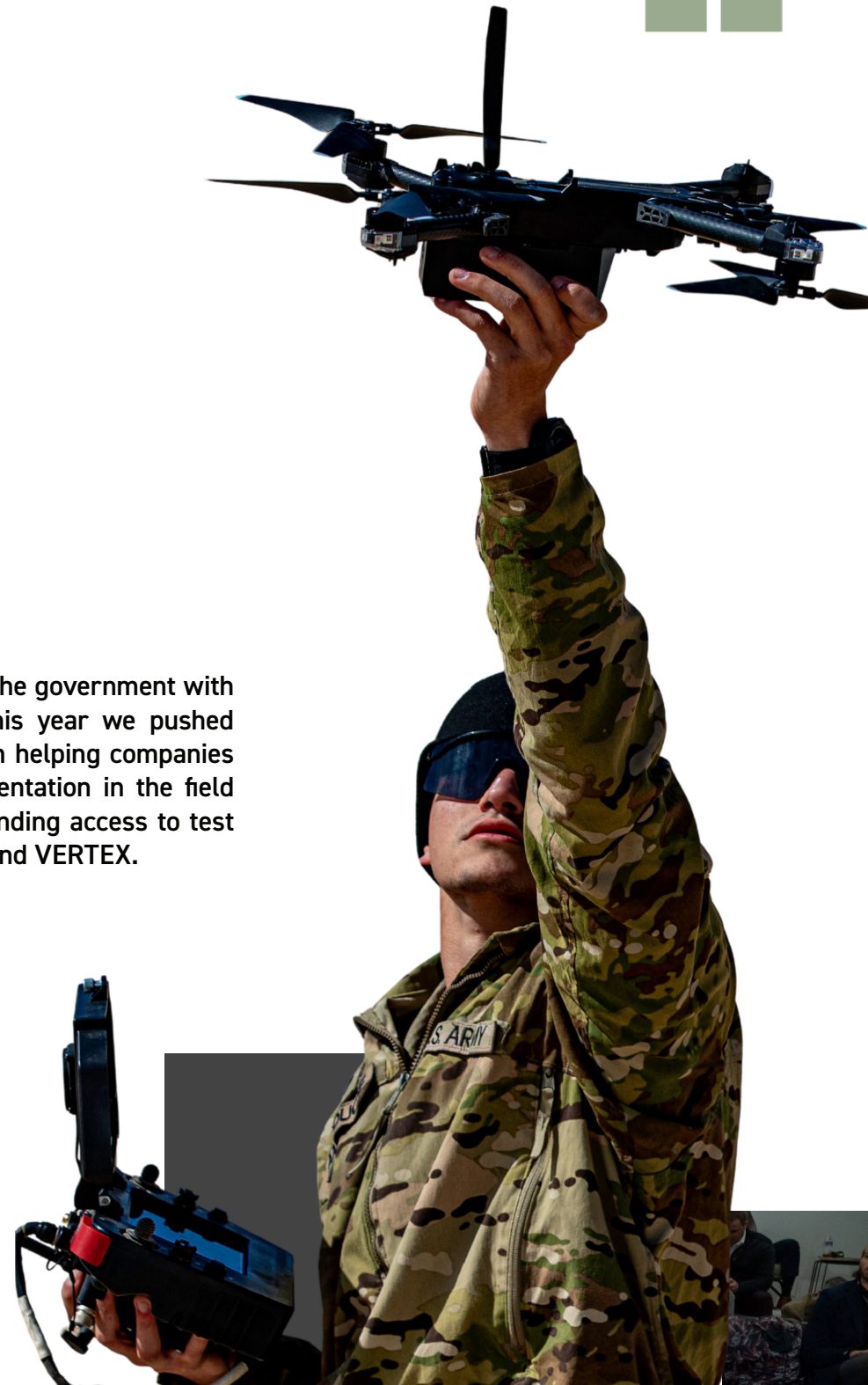
The VERTEX event series is designed to provide a technical exchange between defense stakeholders and non-traditional defense companies of all sizes. Each VERTEX focuses on a different topic and presents a new set of use cases connected to current Army problems. The two-day symposium offers attendees an opportunity to work side-by-side in a collaborative technical exchange - giving industry attendees insight into Army challenges, and government attendees insight into emerging technologies.

## 2025 VERTEX

In 2025, VERTEX pushed further into human-machine integration, first in February with a focus on Advanced Autonomy and later in July with the topic of Launched Effects. VERTEX programming featured morning keynotes and panels from across the Army and industry innovation community, and afternoon breakout sessions allowed smaller groups to have deeper conversations on each use case. Mornings helped build context for the audience, and afternoons gave time for the exchange of ideas on the Army's focus areas.

For nontraditional companies, VERTEX continues to create insightful exchanges, the kind of context not found in traditional solicitations. For government attendees, they find value in extending their network of industry solution developers and synchronizing with other members of the research and development community. VERTEX serves as a cross-cutting initiative, bringing together stakeholders and innovators to an event curated to break down barriers and drive solution development.

AAL is always improving how it brings together the government with industry partners for solution development. This year we pushed forward on efforts that included everything from helping companies navigate Army FUZE Board approvals, experimentation in the field with Transformation in Contact (TiC) units, expanding access to test ranges, DevX Autonomy (a digital marketplace), and VERTEX.





# VERTEX

## ADVANCED AUTONOMY

FEBRUARY 11-12, 2025

VERTEX | Advanced Autonomy focused on human-machine integrated formations (HMI-F) and examined use cases for autonomous systems to enhance Soldier effectiveness and reduce vulnerability. This VERTEX targeted companies with more mature technologies to better support the experimentation effort that would follow.

A key highlight was our Soldier panel featuring members of the 20th Engineer Brigade, 75th Ranger Regiment and the Joint Readiness Training Center, which focused on their experiences with human-machine integration in training operations. Additionally, we had stakeholders and subject matter experts from cross functional teams, Capability Development Integration Directorates (CDIDs) (requirements writers), labs and centers and program executive offices.

On November 6-7, 2024, Human Machine Integration (HMI) Summit IV, in Bryan, Texas brought together over 800 industry, government and academic participants to discuss the US Army's efforts in HMI platforms and capabilities. This summit created the opportunity for VERTEX organizers to meet with all the relevant stakeholders in-person to refine use cases.



The following VERTEX use cases were developed based on what we learned:

### USE CASES

- Division Of Labor | Optimizing Workload In Human Machine Integrated Formations
- Intuitive Interactions
- Mission-Oriented Autonomous Systems
- More Robots, Less Operators
- Survival Of The Fittest | Hardening Robotic Systems For Harsh Environments
- Show Me Where To Look | Aided Target Recognition
- Autonomy Override
- Let Me Use The Stuff I Have | Integrating Autonomy In Legacy Systems
- Sustaining Robotic Systems

Each use case was given a breakout session with dedicated Army stakeholders. Industry attendees were able to choose which sessions to attend, and voice their questions or propose solutions in a technology-specific forum. Following VERTEX, AAL released a Request for Information (RFI) connected to advanced autonomy. This RFI helped supplement the face-to-face discussions that occurred during afternoon breakout sessions, and gave participants an opportunity to provide more detail on their technology and solutions.

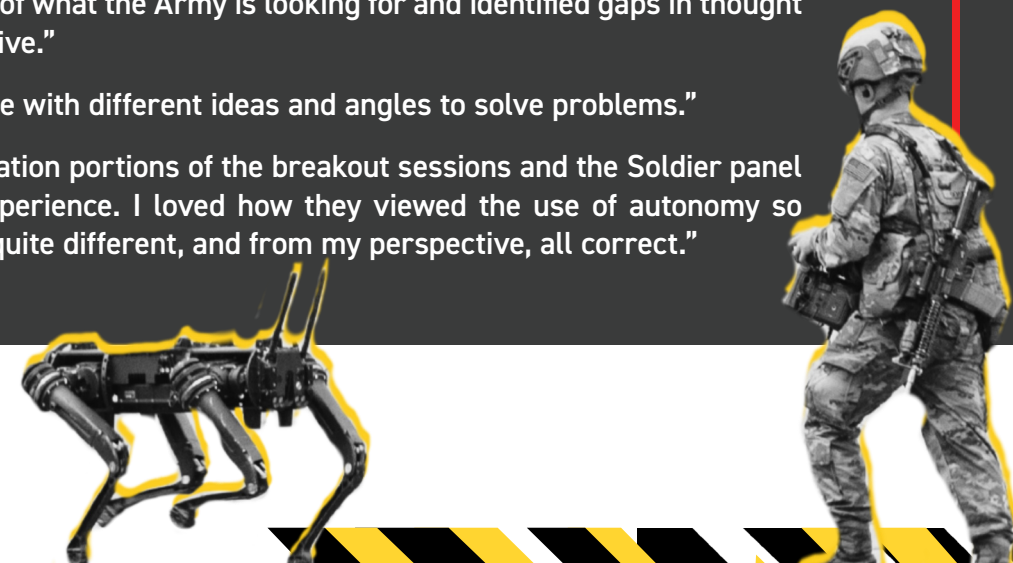
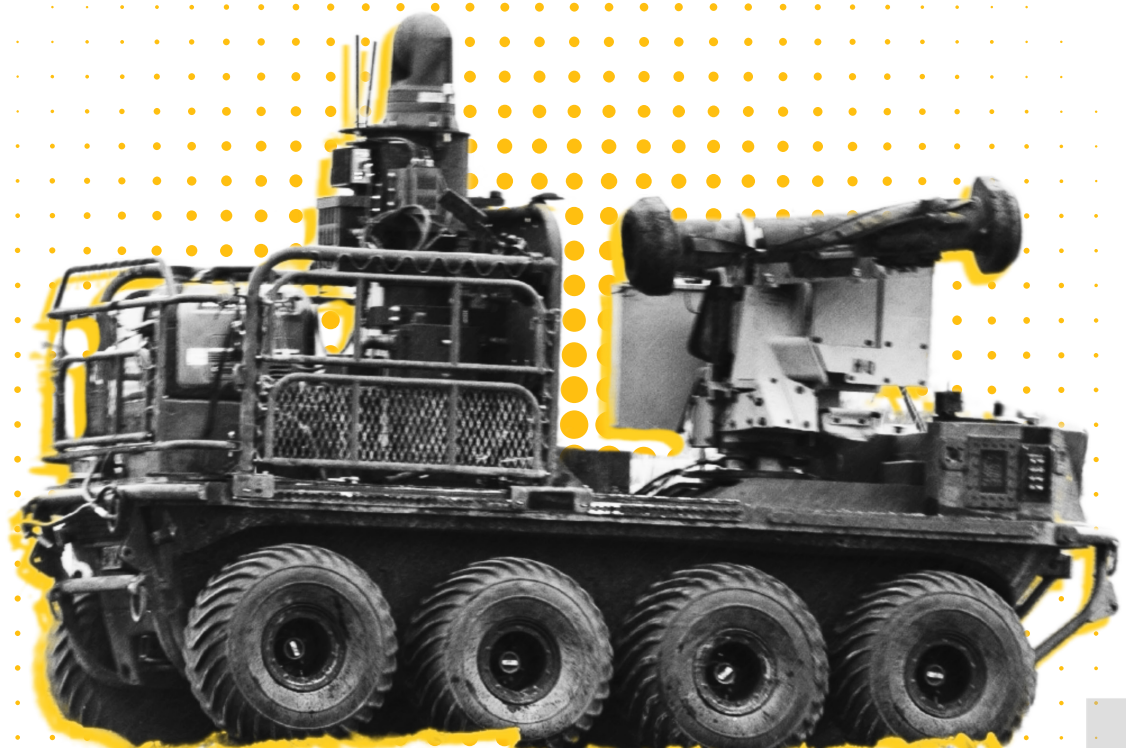
The outputs of VERTEX breakout sessions resulted in the xTechOverwatch competition which launched in May. AAL worked together with xTech on a multi-phase \$40M competition to solicit industry technology through a downselect process ending with multiple experimentation events. Many of the same VERTEX government stakeholders went on to become evaluators in the competition. Many of the same VERTEX industry participants competed in the event. See more on xTechOverwatch on pg38.

### From VERTEX Participants

"I gained a clearer picture of what the Army is looking for and identified gaps in thought from an industry perspective."

"Met a lot of diverse people with different ideas and angles to solve problems."

"I appreciated the presentation portions of the breakout sessions and the Soldier panel that talked about their experience. I loved how they viewed the use of autonomy so differently. They were all quite different, and from my perspective, all correct."





# VERTEX

## LAUNCHED EFFECTS

JULY 22-23, 2025

VERTEX | Launched Effects focused on capabilities that deploy reconnaissance, communications, electronic warfare, lethal, and other effects from air, ground, and sea systems (short and long range). Launched Effects (LE) is a US Army initiative for a new class of autonomous, expendable, and unmanned systems that can perform a range of missions.

The VERTEX Soldier panel had innovation and targeting officers giving their perspective on experimentation and training with launched effects. Their expertise gave the context needed for industry to better understand “real-life” training requirements for our Soldiers. Additional stakeholder and SME support came from Cross-Functional Teams including Air and Missile Defense, Long Range Precision Fires, and Future Vertical Lift. CDIDs also supported the event from across the Army along with our partners from the Army’s labs and centers.

While previous VERTEX topics have focused on general warfighter initiatives - Energy, Robotics, Human Performance - this VERTEX focused on a specific emerging capability with established requirements. VERTEX provided a platform to understand the status of current efforts and outline targeted use cases for which there is work left to be done.



The following use cases were reviewed and finalized during VERTEX Forge, a pre-event in Fort Bragg, North Carolina with warfighters and select government SMEs:

### USE CASES

- Design for Manufacturing and Repair
- Extended Range Communications
- Flexibility Through Modularity
- Future Capabilities on the Horizon
- Navigation for Launched Effects
- Reducing Cost to Achieve Scale
- Training and Experimentation

Following VERTEX | Launched Effects, PEO Aviation and PM UAS released a solicitation inviting vendors to propose affordable launched effects solutions that are ready for evaluation. They were able to tap into the VERTEX attendee network to reach targeted and ready industry solvers. AAL paused the solicitation that would have derived from VERTEX | Launch Effects due to SBIR reauthorization delays.

### From VERTEX Participants

“The information exchange was strong, and encouraged bubble hopping to get folks out of their own heads.”

“The timed [breakout session] structure was needed to move the discussion forward. While the people in the groups I participated in randomly self-selected, there was a mix of Soldier, industry and acquisition people who vocally shared opinions/experiences, listened to each other, and cross-educated. Much different than an Industry Day.”

“VERTEX repeatedly is able to bring a strong mix of innovation and invention from industry. This should be a must sustain with the potential to improve by having a well defined path to awards/contracts.”

# TEST RANGE RFI



## THE PROBLEM

Non-traditional industry awareness of available commercial test ranges is low. The problem is most acute for launched effects, especially those that travel beyond line of sight, and disruptive electronic warfare (EW) technologies that operate outside of the ISM (industrial, scientific, and medical) bands. This can lead to longer technology developmental timelines at increased costs for capabilities the Army needs most.

Especially for early-stage companies, testing is iterative and often sees failures through the process. If an early-stage company must use a government range to test, due to lack of commercial site availability or capability, stakeholder oversight could prevent the company from testing without judgement. If government contract or program officials are present when that happens, companies may potentially lose reputational credibility. A company should never have to conduct their first live-testing with government stakeholders present due to commercial range accessibility issues.

Providing company access to test ranges for iterative development provides an opportunity for innovative solutions to mature and get to the warfighter faster at a lower development cost.

## BACKGROUND

In the last two years there has been a significant increase in non-traditional defense companies specializing in low-cost, lethal, electronic warfare, and UAS/C-UAS technologies.

The problem of test range awareness or access for these systems has become so acute that in a recent Defense Innovation Unit (DIU) survey, test range awareness and access was identified as the second biggest barrier to defense innovation, after reliable transition funding. There are three main types of ranges – industry, government, and privately owned.

## INDUSTRY OWNED RANGES

Industry owned ranges are operated by companies primarily for their own use. Large defense primes often have their own limited access test ranges or special agreements with government sites for frequent testing. For example, Lockheed Martin has a dedicated site on the Army's White Sands Missile Range. Defense primes, such as GDLS and Lockheed, sometimes sell range time on their own large sites, but could restrict access to any competitor.

As a result, companies have begun to develop their own testing sites. However, this can require extensive capital, co-investment, time to clear licensing, and regulatory barriers. The significant time and financial risk involved with technology development and operationally relevant testing poses a major hurdle particularly for small businesses to establish their own ranges.

## PRIVATELY OWNED RANGES

Some private test ranges operate for profit, while others are simply landowners allowing companies to use their land for experimentation. These ranges are often not instrumented with NIST (National Institute of Standards and Technology) compliant equipment, and sometimes knowledge of their existence is word of mouth. Some rural landowners who are willing to allow their property to be used as a test range are still waiting for strong, consistent DoW demand signals before undergoing the arduous FAA, environmental, and ATF approval processes.

## GOVERNMENT OWNED RANGES

Army Test and Evaluation Command (ATEC) operates several test sites around the country with land, instrumentation, staffing, and storage facilities capable of testing a wide range of materiel. To learn more about how to access these facilities look at notice ATEC\_122025 on [SAM.gov](https://sam.gov), announcing industry partnership opportunities at eight major test facilities.

## ACTIONS:

The DoW is working to improve industry awareness and access to safe, affordable test sites, absent from official evaluation, for iterative testing and development cycles. This helps achieve desired technology development timelines and ensures we get solutions to the warfighter quicker. Following are two actions the Army has taken this year to improve access for industry:

1. Based on needs identified at three separate VERTEX events, AAL created a commercial range database of over 60 facilities that can test UAS and/or EW capabilities. AAL continuously updates the database to allow for new entrants and information on available ranges. Beginning in summer of 2026, companies in search of a commercial test facility can email [ranges@aal.army](mailto:ranges@aal.army) with a list of their range needs and AAL will provide the contact information for all commercial facilities we are aware of that can accommodate the technology.
2. AAL had the chance to brief the majority of members of the House Armed Service Committee on barriers to defense innovation. One outcome of that meeting was that congressional study language on expanding DoW range access for non-traditional companies. Congress is looking for recommendations from the Defense Innovation Unit on barriers non-traditional companies face, and recommendations for improving range access.

# AFSRB U.S. Army Fuze Safety Review Board

## THE PROBLEM

In order for a novel munition to go into full rate production, the fuze system must undergo review by an independent panel of experts, the AFSRB, to ensure that the system is safe for Soldiers to use. Full qualification for a Materiel Release has an average time of four years. As the Army adopts a more iterative fielding model, this traditional four-year process has become unsupportable.

For a company to submit a design to the AFSRB for review at no cost, a government agency must sponsor the munition or fuze system. Companies not on contract with the government historically have not had access to the AFSRB during early-stage development. Additionally, unlike defense prime contractors, non-traditional industry is unfamiliar with the standards and regulations needed to get novel munitions approved for fielding. This can lead to slower development cycles and costly redesigns later in development.

## CURRENT MITIGATION

To support rapid fielding of new technologies this process must move quicker. The AFSRB has implemented changes to make the process more accessible for non-traditional vendors without a government sponsor who want to begin conversations with the AFSRB early in development. The AFSRB and the DoW Fuze Integrated Product Team (IPT) have established a formal Joint Emerging Technology Review Panel (JETRP) Cooperative Research and Development Agreement (CRADA) where unsponsored companies can get their systems reviewed for nominal cost. This JETRP CRADA is maintained by the DEVCOM Armaments Center. Any company that is a member of the National Armaments Consortium is eligible to request a review of their fuze system under this CRADA.

Fuze system evaluation via the CRADA costs are \$6,000 for a single system, or \$10,000 for two. There is no limit to how many reviews a company can request under this CRADA. To date, fifteen industry partners' projects have been/are being reviewed under the CRADA, which reflects a considerable increase in reviews over the last two years. Despite these improvements, challenges remain if the US Army wants to reach the speed of munitions innovation witnessed in Ukraine.

## FUZE BOARD 101

The AFSRB is charged with reviewing fuze systems and hand emplaced munitions to assure acceptable safety exists and residual risks are properly described in risk acceptance documents. The AFSRB reviews and maintains oversight of any non-nuclear fuze, safety, and arming system, throughout their life cycle. There are three stages to the review process:

- 1. Technical Assist Review:** Ideally conducted early in technology development, and focused on early fuze safety design assessments in identifying potential safety issues before hardware development.
- 2. Initial Review:** First formal review of programs of record pursuing a production and/or fielding action. Occurs prior to qualification testing in support of an Interim Safety Certification in permitting the program to begin low-rate or full scale production.
- 3. Status Review:** Follow-on formal review(s), as required, occurring prior to Materiel Release. AFSRB grants Final Safety Certification of the fuze system in support of fielding. The average time for new design approval is four years, however Materiel Release Qualifications can happen in as little as 8 months for well-prepared submissions, or up to 10 years if unique challenges arise. Due to the length of approval and complexity of issues, the AFSRB recommends frequent engagement with the developer.

For testing of a new fuze system, the developer generally follows a two-test strategy approach. The first fuze configuration is an inert system for concept development in operational settings. Once confidence is built through the inert configuration testing, live energetics testing begins.

## AAL SUPPORT

AAL helps companies navigate the AFSRB and prepares them to meet the board standards early on, connects companies to Army experts who understand the requirements, and coordinates testing pathways. These efforts ensure companies design products that will meet Army qualifications standards, and do so more rapidly than they could on their own.

## EXAMPLE AAL PROJECT AFFECTED

As more non-traditional industry has begun developing lethal capabilities, the proportion of lethality projects in AAL's portfolio has increased.

Aeon Industrial is an example of an AAL portfolio company working with the Fuze Board in early stage development:

Aeon Industrial is the developer of the Zeus man-portable missile platform, a next generation anti-tank weapon with increased capabilities, including aided target recognition and greater range, at lower cost. As a munition, Zeus will require AFSRB approval. AAL facilitated meetings between Aeon, multiple Army labs, and the Fuze Board to sponsor the project. Aeon spent six months testing their warhead and fuzing system and briefed the AFSRB on its performance in December 2025. By getting feedback early from the AFSRB, Aeon is likely to have an easier time passing its first formal design review.

## RECOMMENDATIONS

AAL recommends increased and earlier access to the AFSRB.

### 1. Small Business Engagement and Education

Educating non-traditional industry about the ways to access the AFSRB, their procedures, and development standards can help level the playing field between non-traditional industry and defense prime contractors. AFSRB, with AAL support, will develop an outreach campaign that focuses on these issues. Companies can also join the National Armaments Consortium to gain further insight on the approval process and provide inputs to the fuze safety review implementation plan.

### 2. Technology Development Testing Strategy

For systems below Technology Readiness Level (TRL) 6, companies should adopt a mandatory two-test strategy—one configuration using live energetics for civilian testing, and one inert system for concept development in operational settings. This better prepares companies for the rigorous testing required for AFSRB approval.



**INNOVATION: BREAKING BUREAUCRACY**

# EXPERIMENTATION AND RAPID ITERATION

Getting technology into units for rapid iteration and experimentation is critical for designing capabilities Soldiers will actually need. Transformation in Contact (TiC) units are designated by the Army to receive the most modern version of capital platforms as well as mature experimental capabilities. Working with TiC units allows portfolio companies to iterate designs and adapt their tech to warfighter needs quicker. For some projects, TiC units have become the primary warfighting customer/end user selecting the types of technology they want to test, influence, and ultimately adopt into their formations. The following are examples of projects where AAL and TiC units have combined efforts for real-time evaluation and feedback.



## XTECH OVERWATCH

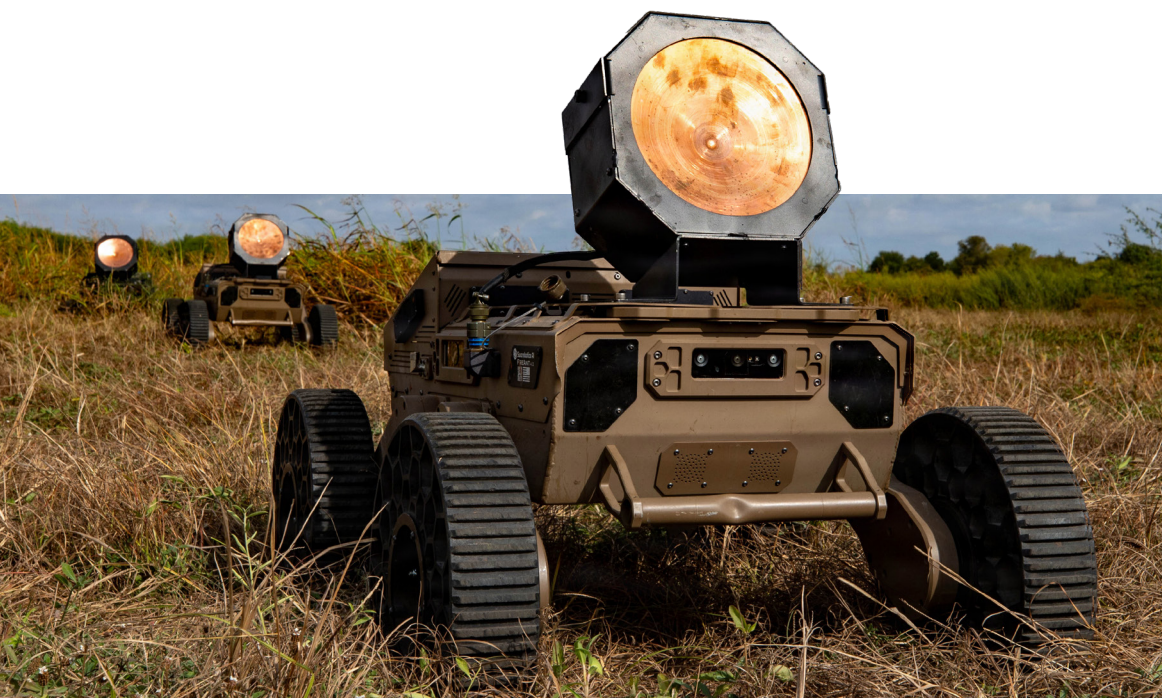
AAL partnered with xTech for the Overwatch competition, which sought autonomous systems capable of conducting overwatch and terrain-shaping tasks by leveraging advanced AI, robotics, secure networking, and real-time data processing. 1st Cavalry Division was able to test and provide feedback to all 40 finalists - helping their solutions be more field-ready for armored maneuver units. This phase of the competition ended with the selection of 20 companies for further experimentation.

## C-SUAS LAYERED PROTECTION SYSTEM

The rapid proliferation and effectiveness of unmanned systems have exposed significant vulnerabilities in traditional Army formations. This project focuses on a range of proposed solutions - active, passive, kinetic and non-kinetic that can protect armored vehicles (e.g. M1 Abrams and Bradley fighting vehicles) from sUAS threats. 1st Brigade 1st Cavalry Division is the unit working in conjunction with AAL and other stakeholders to test and iterate the various types of proposed solutions.

## AUTONOMOUS SYSTEM FOR 4ID EXPERIMENT OPEN CALL

AAL worked with the 4th Infantry Division (4ID) to find readily available solutions, capable of extended experimentation with NGC2's open architecture software. This architecture enables a unified information network and provides Soldiers with real-time information. 4ID plans to test the chosen solutions and provide critical feedback to solution developers and NGC2 for needed improvements.



## INNOVATION: BREAKING BUREAUCRACY

# DEVX AUTONOMY

## A Digital Marketplace for Award-Ready Autonomous Solutions

### WHAT IS DEVX AUTONOMY

DevX Autonomy is an online marketplace that allows the government to accelerate the discovery, assessment, and award of innovative developmental technologies in autonomy and unmanned systems.

The DevX platform allows companies to submit a 6-minute pitch video that describes proposed autonomy solutions. Each submission is assessed by subject-matter experts using published criteria. Solutions deemed award-ready are added to the DevX Autonomy repository and are ready for government award. This allows decision-makers to move from discovery to award in a fraction of the time it usually takes.

### TECHNOLOGY FOCUS AREAS

DevX Autonomy focuses on hardware, software, and service solutions that advance autonomy in the following areas:

#### Platforms -

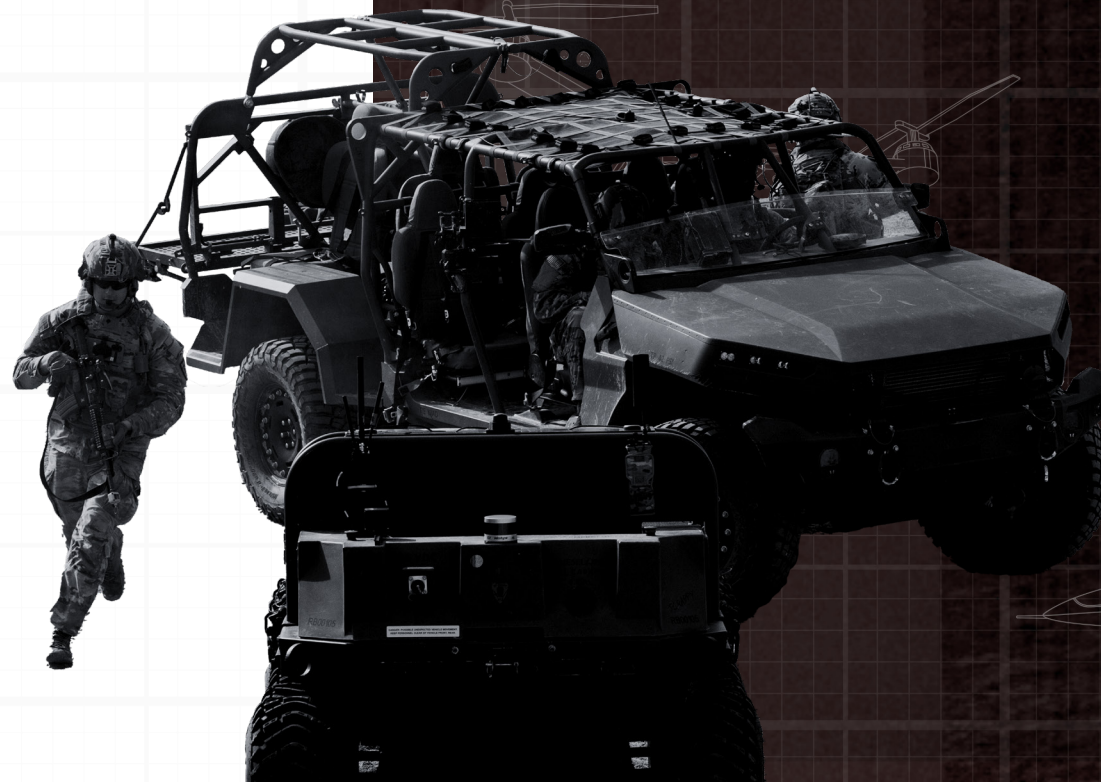
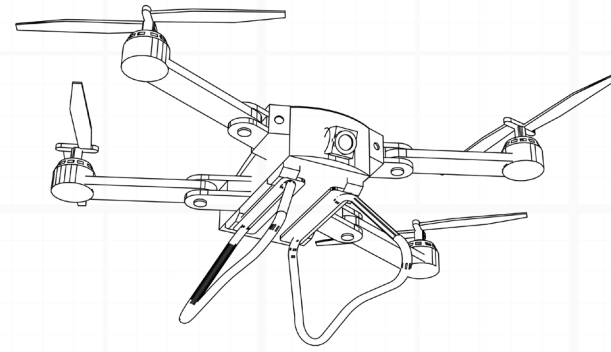
Development or improvement of autonomous platforms that operate in the air, ground, and maritime domains.

#### Payloads -

Development of hardware and/or software that provide mission-specific autonomous capabilities. Examples include sensors, effectors, communication devices, or other specialized tools.

#### Mission-Enabling Solutions -

Development of hardware and/or software that enable autonomous systems to operate cohesively with humans and other systems, interpret mission objectives, and generate plans that can be adjusted dynamically based on changes in the environment or mission priorities.



#### Lethal Capabilities -

Development of autonomous solutions aimed at enhancing the lethal capabilities of existing platforms and introducing new capabilities for current or future platforms. This includes improvements to existing lethal effects and the delivery of novel effects across domains such as explosives, kinetic systems, safety mechanisms, fusing technologies, guidance systems, and other critical components.

#### Sustainment Solutions -

Development of hardware and/or software that enhances the use of autonomous systems, including solutions for charging, fueling, deploying, recovering autonomous systems, and maintenance solutions that automate diagnostics, plan maintenance, or enable rapid repair.

#### Subcomponents -

Development of subcomponents such as motors, sensors, or controllers that enable or improve capabilities of autonomous systems.

#### Other Disruptive Autonomy Solutions -

Development of hardware and/or software that markedly modifies, improves, or disrupts currently known autonomous technologies and capabilities.

### APPROVAL PROCESS

The process for vendors to be included on the DevX Autonomy platform is straightforward. Vendors submit a 6-minute video demonstrating their solution, which is then reviewed monthly by subject matter experts from AAL and DEVCOM for compliance, relevance, and technical merit. Approved solutions are added to the DevX Autonomy platform. From there, government stakeholders can evaluate the solutions, select vendors, and request full proposals. The platform's embedded contracting support, simplifies the process of awarding full contracts.

### IMPACT

AAL is committed to accelerating the delivery of technology to Soldiers by connecting industry solution developers with government problem owners. The DevX Autonomy platform facilitates this by showcasing award-ready solutions directly to government stakeholders who are actively seeking new technologies for their units. This enables them to select and field test desired technologies immediately, rather than waiting years. Additionally, the platform's integrated contracting support streamlines the acquisition process, allowing units to procure technology easily without requiring a dedicated contract-specialist.

# SUMMARY

Let's take a look at some of the most interesting AAL projects from 2025. We will begin with the Autonomous Bridging Kit (ABK) project, where we focus on making wet gap crossings safer for Soldiers, and then move onto efficiency for forward arming and refueling point (FARP) Operations with our Helicopter Expedited Refueling Operations (HERO) project. We also worked with the Marines this year exploring uncrewed Heavy Vertical Takeoff and Landing (H-VTOL) systems and a novel munitions capability with the Strategic Strike project.

## PROJECTS

AUTONOMOUS BRIDGING KIT ABK

HERO

HVTOL

STRATEGIC STRIKE

ENGINEERING OPS



# ABK Autonomous Bridging Kit



Wet gap crossings are high-risk, high-priority operations, that historically have high casualty rates. This is due to the intensive time and resources required to deploy bridging systems properly and ensure they remain in place. Bridging operations require coordination from land and water vehicles to transport bridge materials, as well as several Soldiers on site to deploy and manually lock bridge bays. Soldiers then must sit in boats to hold the bridge in place. Today's near-peer threats make traditional bridging even more dangerous, with precision fires and drones targeting exposed Soldiers.

We first visited this problem at VERTEX | Armored Formations during the "Obstacle Breaching & Water Crossing Operations" use case. During this breakout session, Army stakeholders and industry attendees discussed various wet gap crossing solutions and how improvements, such as autonomy or robotics, could reduce the need for equipment-intensive technology and expedite operations.

Formation Base Layered Protection (FBLP) CDID recognized that this problem aligned with their efforts to improve wet gap crossings, including their future requirement called RAPTR. Together, FBLP FCD and AAL gathered the right stakeholders to inform the project, including: PM Bridging, Contested Logistics CFT (CL CFT), DEVCOM Ground Vehicle Systems Center (GVSC), U.S. Army Engineer Research and Development Center (ERDC), 3rd Infantry Division (3ID), 497th Multi-Role Bridge Company (MRBC), and the 36th Engineer Brigade (ENG BDE).

The Autonomous Bridging Kit (ABK) project set its sights on developing an autonomous assembly of the Improved Ribbon Bridge (IRB). The IRB is commonly used because it is designed to carry heavy combat vehicles and trucks via a floating bridge/ferry system. Creating an autonomously assembled IRB would revolutionize wet-gap crossings by removing Soldiers from harm's way, accelerating bridge deployment, and ensuring maneuver forces maintain tempo in contested environments.



## DIRECT TO PHASE II

In August 2024, RMD Systems, an engineering firm specializing in defense technology, was selected for this project with a 12-month period of performance and a \$1.9 million SBIR budget. RMD Systems was asked to develop a kit/system that autonomously maneuvers individual bays into position and connects them by interlocking the lower lock drive, once in the water.

The solution's capabilities also needed to include:

- Interoperability with the current IRB system bay connection
- No interference with delivery of IRB into the water nor increase time to emplace and attach the IRB bays
- Bridging platforms enabled to conduct fully automated waterway navigation across a minimum distance of 600 meters
- Autonomously connecting and disconnecting bays while maintaining remote, human-in-the-loop capability
- Autonomous navigation and maneuverability of bridging platforms on waterways while maintaining remote, human-in-the-loop capability
- Detection and avoidance of obstacles in the water and transmission of obstacle recognition and location data to external platforms
- Full assembly of bridging solutions in under 20 minutes



An Improved Ribbon Bridge (IRB) is a modern floating bridge system designed to provide ground forces with the capability to transport heavy military equipment such as loaded heavy equipment transporter (HET), weapons systems, wheeled / tracked combat vehicles, trucks, suppliers and troops over rivers, and wet gap obstacles.

## SOLDIER TOUCHPOINTS

During the mid-point demonstration, two important capability needs were discovered. In-person testing with the 497th MRBC showed that the in-development navigation system transmitter for synching bays was not as precise as needed for autonomous use. And the bay locking mechanisms required Soldier intervention to tighten properly, which became a major pain point that needed to be addressed. The final demonstration in December 2025, held at Fort Hood, showed great improvement on previous concerns and successfully proved the solutions' ability to autonomously maneuver bays and ramps in the water with little Soldier intervention.

## FUTURE TRANSITION

RMD Systems developed a promising autonomous bridging solution. Their revamping of the bridge's locking mechanism enhanced the development of the final solution and has helped generate continued interest from stakeholders.

RMD Systems is looking to move forward with project development. This next phase of development will focus on hardening the developed autonomous solution for full operational deployment, including features such as an advanced propulsion system and extended continuous operation time.

# ABK Autonomous Bridging Kit CONTINUED

## LESSON LEARNED

### Access to GFE:

This project required unique government furnished equipment (GFE) including providing a company access to a functioning IRB system. FBLP CDID identified this need early on in the project and began the acquisition process. They were able to secure access to a real IRB system that the company could modify for the demonstrations, which allowed for realistic testing of the solution. This foresight also ensured that early stage demonstrations could occur on the IRB platform, providing the company with valuable insights that could not be achieved through testing on a surrogate platform.

### Early Stakeholder Involvement:

An integral building block for this project's successful transition was including multiple levels of stakeholders in the planning, development, testing, and transition of the solution. Having requirements writers, subject matter experts, and unit-level users involved was critical in creating a solution that truly addressed Soldier survivability and has the financial and policy-related support needed for implementation.

### Realistic Testing Environment:

A major factor to the success of this project is hosting Soldier touchpoints and demonstrations in a realistic testing environment. The developer's ability to demonstrate their capability on an IRB on the water enabled stakeholders to see the hurdles in real time and support tailored iterations, which helps deliver technologies to Soldiers faster.

# HERO

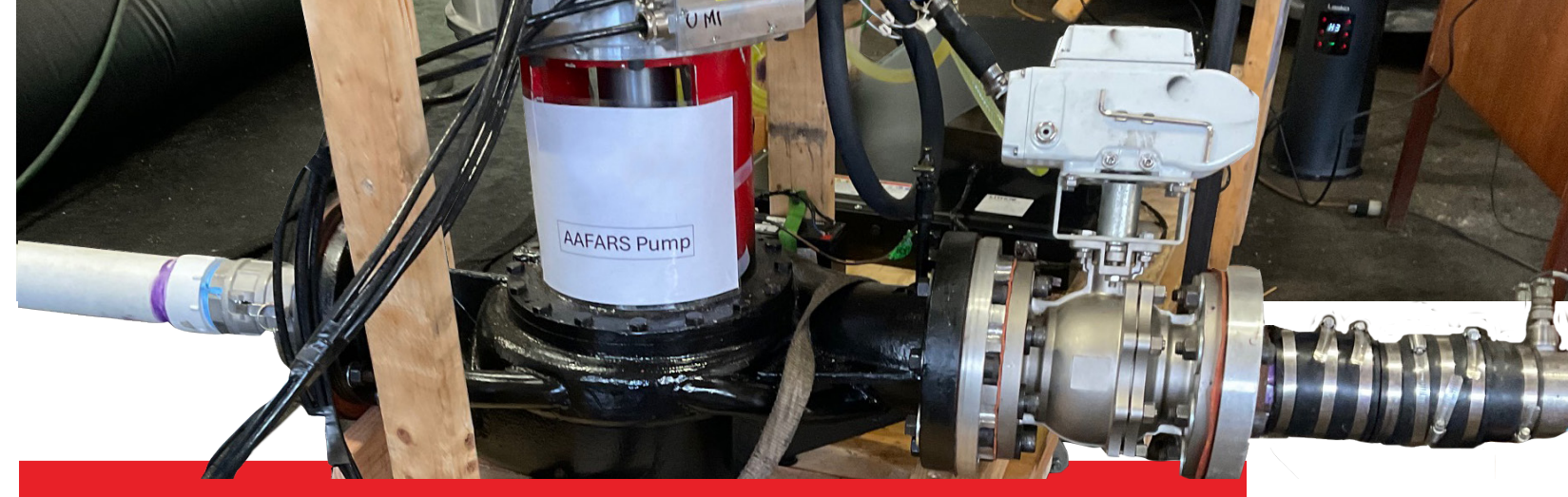
## Helicopter Expedited Refueling Operations

Helicopters are vulnerable to attacks when they are on the ground for refueling near the front lines during forward arming and refueling points (FARP) operations. The most common FARP is equipped to refuel four aircraft simultaneously, which can in some cases take over 20 minutes. In addition, traditional FARPs require a large clear area where equipment is easily visible, making them lucrative targets to the adversary.

The Brigade Commander from the 12th Combat Aviation Brigade sought assistance from AAL to enhance FARP operations. In his 20+ years of experience with the military, he had seen little to no changes in these operations despite an ever changing battlefield.

Early on, the AAL team realized that the technology goals for this project had applications beyond the aviation community, extending to the greater sustainment ecosystem. The multi-use nature of this project brought in several different stakeholders including: Contested Logistics (CL CFT), Sustainment CDID (S-CDID), Aviation CDID (A-CDID), Future Vertical Lift (FVL CFT), PEO Aviation, PEO Combat Support & Combat Services Support (PEO CS & CSS), 101st Airborne Division (101st ABN), 10th Mountain Division (10th MTN), 12th Combat Aviation Brigade (12th CAB), and Marine Corps Systems Command (MARCORSYSCOM).

The Helicopter Expedited Refueling Operations (HERO) project's aim was to reduce the amount of time rotary-winged assets are on the ground by increasing the efficiency of FARP setup, refueling operations, and disassembly.



### DIRECT TO PHASE II

In this Direct to Phase II SBIR project, Beacon Industries and Integrated Solutions for Systems (IS4S) were selected out of 14 applicants, and received \$1.1 million each for an 18-month period of performance. The Army requested solutions that would increase the efficiency of aircraft refueling operations on FARPs. Solutions could be “drop-in” replacements for existing parts/components or augment existing systems.

All solutions needed to:

- Expedite aggregation/assembly/setup/breakdown of FARP vehicles, hoses, or equipment
- Decrease aircraft refueling times
- Decrease aircraft wait/loiter times

AAL selected two companies with very different approaches to the overall problem set of “make fueling faster”. Creating two different solutions provided multiple options for stakeholders to assess how best to enhance aircraft refueling.

Beacon Industries: pursued an improvement to pump technology including a new motor-system to increase fuel flow rates by twice the current pump capacity and eliminate flow rate differences when multiple helicopters are refueling at the same time.

IS4S Solution: pursued a fully autonomous fueling robot including waypoint navigation, real-time path planning, and obstacle avoidance to deliver aviation fuel to aircrafts for refueling.

At the beginning of the project, both companies got to see the current state of FARP operations through Soldier touchpoints with the 101st ABN in Louisiana and the 12th CAB in Germany. This provided critical insight into operational, design, and technology requirements that could be applied to each company's solution.

During the final demonstration at the Beacon Industries facility in Newington, CT the pump delivered a peak flow rate of greater than approximately 200 GPM (gallons per minute) at all four fueling points. Stakeholders attended virtually and included the Sustainment CDID, Aviation CDID, CL CFT, and personnel from the Petroleum and Water Distribution course at Fort Lee, Virginia.

The IS4S solution's final demonstration occurred at Fort Campbell with the 101st Airborne Division. During the demonstration, the solution successfully showed autonomous refueling for AH-64 and CH-47 helicopters in less time than is currently required. The solution also enabled the dispersion of a FARP, reduced required personnel, and reduced equipment needs.





# HERO

## Helicopter Expedited Refueling Operations

### CONTINUED

A Forward Arming and Refueling Point (FARP) is a mobile, temporary facility, often in austere or forward locations, designed to rapidly refuel and rearm combat aircraft (especially helicopters) to maximize time on station.

#### FUTURE TRANSITION

AAL is still currently looking at transition opportunities for both capabilities.

#### LESSON LEARNED

##### Multiple Collaborators:

As AAL collaborated with stakeholder teams within the sustainment community to garner support for this project, the importance of incorporating stakeholders from the Joint Services, including the US Marine Corps, became apparent. The Army uses the same pump to fuel helicopters, ground vehicle fueling, and for the distribution of water. Therefore, AAL then brought in personnel from the water distribution community to include the Advanced Individual Training (AIT) school at Fort Lee to advise as Technical Points of contact advisors on the project.

##### Modifying Goals to fit the Circumstance:

AAL listened to the needs of the companies and shifted the development schedule as needed for the best results. Typically, a mid-point demonstration is held so solution developers can receive specific feedback from stakeholders. However, both companies needed more engineering time; the decision was made to turn the midpoint demonstration into a design review.

##### Ease of Engineering Change:

Drop-in equipment replacements, like a new fuel pump which don't require additional changes to other parts of the broad system, are one of the easiest types of transitions to facilitate, as they do not require changes to a requirement documents – they only need an engineering change plan. This project demonstrated the potential for commercial solutions to provide better pump systems than those currently in the Army inventory. The upgrade won't require any changes to existing Army equipment.



## CASE STUDY

# H-VTOL

## Hybrid Vertical Take-Off and Landing



Currently, almost all Army resupply missions require heavy Soldier involvement, whether by ground convoy or crewed helicopters. These operations put both Soldiers and high-cost platforms at risk. Future conflicts are becoming increasingly dispersed, and resupply routes are more heavily targeted with unmanned aerial systems and indirect-fire.

### HOW PROJECT CAME TO AAL

Lieutenant General (Ret.) Thomas Todd, while serving as Deputy Commanding General for Acquisition and Systems at Army Futures Command, requested that the Army research how it could advance their vertical takeoff and landing capabilities. In response, Sustainment CDID (S-CDID) conducted an in-depth study into the subject, including estimates of what a battalion resupply operation required, how different load capacities would affect mission efficiency, and the role autonomy could play in new solutions.

S-CDID identified a need for a solution capable of a 1000lb lift. AAL partnered with S-CDID to address this challenge through the Heavy Vertical Takeoff and Landing (H-VTOL) project. Additional stakeholders were brought in to provide technical expertise, DEVCOM Aviation & Missile Center (DEVCOM AvMC), Contested Logistics CFT (CL CFT), and Aviation CDID (A-CDID).

### PROJECT GOAL

This project looked to advance uncrewed vertical takeoff and landing operations into a compact platform that could carry between 800 - 1400lbs at a distance up to 100 miles. These unmanned platforms would maximize resupply efficiency for company and battalion-sized elements, substantially reducing the risk to Soldiers, and support other missions such as casualty evacuation.

Vertical Take-Off and Landing (VTOL) aircraft can hover, take off, and land vertically without runways, combining helicopter-like versatility with fixed-wing efficiency.



### DIRECT TO PHASE II

In September of 2023, Near Earth Autonomy and Piasecki Aircraft were selected to develop an H-VTOL system over a 24-month period of performance with each company receiving around \$3 million dollars in SBIR funding.

Each company was asked to design, develop, and demonstrate their unmanned H-VTOL system with the following capabilities:

- Loading and unloading controls
- Fly autonomously or with human takeover
- Navigation of routes while avoiding obstacles
- Ability to select from multiple routes
- Autonomously select safe landing zones
- Possess Soldier/human override abilities
- Use or integrate modular mission payloads and common attachment system

After the mid-point demonstration, AAL's Project Manager coordinated the H-VTOL project with the USMC MARV-EL program, which was developing a similar platform and capability. This became a fortuitous relationship because it allowed for easy collaboration across the Army and Marines.

### TRANSITION

Near Earth Autonomy in partnership with Kaman (UAS Aircraft) was able to demonstrate a successful flight that met requirements. Following that success, Near Earth Autonomy transitioned critical aspects of their technology development to PM Utility Helicopter through a SBIR Catalyst award worth up to \$15M.

### LESSONS LEARNED

#### Resources Need to Match the Ask:

At the start of this project, AAL knew that the standard SBIR award — around \$2M — would not be sufficient to fund technology development of the entire system. Instead, we hoped to incentivize private capital to contribute funding, or companies to contribute IRAD to make up the difference. It did not work as well as we'd hoped in this situation. Maintaining maximum flexibility in SBIR funding to properly support technology development is key to ensuring we can get the solutions we need right now. The standard cap greatly limits the ability to move fast in technology development. Waivers for funding exist but the waiver process highly scrutinizes numbers of waivers and the amount requested.

## CASE STUDY

# STRATEGIC STRIKE



## VIPER A VTOL STRIKE AIRCRAFT

### PROJECT GOAL

In modern warfare, the proliferation of low-cost, man-portable infrared capabilities has created a significant challenge: maneuver elements can detect threats faster than they can engage. Traditional artillery and mortar systems, while powerful, require considerable setup time and risk revealing the warfighter's position. Air support, though effective, is often costly and vulnerable to enemy fire. As a result, there is an urgent need for a rapidly deployable, lethal capability that doesn't compromise a unit's location.

Furthermore, future conflicts will demand high volumes of precise, long-range lethal effects at scale, but the Army is constrained by the high costs associated with traditional missile systems. Innovative solutions are needed to provide tactical strike ranges comparable to current ballistic missiles, but at a significantly reduced cost, thereby enhancing operational flexibility and effectiveness on the battlefield.

### HOW PROJECT CAME TO AAL

After meeting with AAL's Commercial Ventures team, Mach Industries submitted their technology solution to AAL's Broad Agency Announcement (BAA). Mach proposed a unique solution, already in development, that had significant financial support and plans for self-sustaining manufacturing. Due to the unique nature of the technology, AAL identified it as a potentially disruptive capability that could help build magazine depth at low cost.

Despite not having an official requirement yet, AAL was able to bring in several partners across the DoW to assist with testing and advise on technical development. Stakeholders included US Army Special Operations Command (USASOC), DEVCOM Armaments Center, DEVCOM Aviation and Missiles Center (AvMC), PM Tactical Aviation and Ground Munitions (PM TAGM), PEO Aviation, 75th Ranger Regiment, and 1st Cavalry Division Artillery (1CD DIVARTY).

### PROJECT GOAL

Develop a low-cost munition capable of penetrating armored targets at ranges >150 miles, to help increase stand-off distance for non-armored infantry units.

### RDT&E

After submitting a proposal through the BAA, MACH Industries was awarded \$1.5 million in RDT&E funding to further develop their Viper solution. MACH Viper is a vertical takeoff (VTO) subsonic precision strike asset designed to increase the lethality of brigade and division level maneuver elements. The primary objectives for this effort were to integrate an anti-armored warhead into the Viper platform, perform a successful explosive demonstration, and reduce cost per fire. This solution would provide Soldiers with a portable platform to eliminate high-payoff targets.

This solution is a unique capability that will enhance the US arsenal. To put the technology into a context related to current solutions: the Viper system will exceed Hellfire effects at the Army Tactical Missile System's (TACMS) range for a roughly equivalent cost.

Project demonstrations were held at Dugway Proving Ground with the Army Test and Evaluation Command (ATEC) with support from Redstone Test Center (RTC). Soldiers attended the demonstration to provide feedback, but were unable to test the solution due to the lethal effects being used.

To date, the project has successfully demonstrated over 20 inert test flights and a final kinetic demonstration is planned. AAL will continue to develop the capability in fiscal year 2026.



## CASE STUDY

### LESSONS LEARNED

#### **ATEC Testing Ranges:**

Getting companies access to government test ranges is critically important for munitions that fly beyond line of sight – most civilian ranges cannot accommodate the technology. Working with official government facilities requires an extra level of cost and coordination, but it also lends a level of legitimacy to project testing and the results calculated. MACH's contract provided them government sponsorship, giving them access to government ranges at approximately 45% of the non-sponsored rate.

#### **Unique Technology Requires A Unique Mindset:**

Novel technologies that fall between the gaps in the Army's acquisition structure are hardest to transition. It is difficult to gain interest from possible transition partners up front if the organization doesn't have an existing program, or think it might ultimately become the office primarily responsible for the technology. AAL's methodology is able to bridge some of these gaps, but it still remains difficult to plan for transition when a requirements document is still being aligned. In October 2025 the acquisition community created the Pathway for Innovative Technology (PIT) which is designed to help develop and obtain limited quantities of capabilities for long-term experimentation, where requirements documents and program of record funding are still being aligned. This is a critical step forward for helping novel capabilities transition into formal Army programs.

The Viper is designed as a vertical takeoff (VTO) surface-to-surface cruise missile. Taking advantage of the emergence of low-cost, man-portable intelligence, surveillance and reconnaissance (ISR) assets allowing maneuver elements to see farther than they were previously able to, the Viper is intended to enable tactical units to engage high-value targets, such as radar arrays and artillery pieces, well beyond the forward line of troops.



# ENGINEERING EFFORTS

## Consolidating Efforts

This project came from the consolidation of two projects, Deep Terrain Shaping Operations (DTSO) and Remote Breaching of Obstacles (RBO). These were independent projects started at different times that ultimately led to complementary solutions. While the stakeholders and transition partners differed slightly, it became clear that it would be beneficial for these projects to run concurrently. This would provide a better understanding of battlefield obstacles and terrain, and identify capabilities that could be used to solve both problems. This would not only reduce coordination time with stakeholders, it would also save on resources for experimentation. Below we will break down projects independently to clarify funding and period of performance and then combine the lessons learned to be better aligned to how this effort is being executed.

## DTSO Deep Terrain Shaping of Obstacles (DTSO)

The Army's current approach to deep terrain shaping uses scatterable mines delivered by artillery, helicopters, or fixed wing aircraft to create obstacles to enemy movement. These delivery methods are expensive resources not controlled by the engineer units tasked with emplacing terrain shaping obstacles, making coordination and resourcing difficult. Additionally, scatterable mines do not discriminate among enemy, friendly, and civilians. As a result, policy changes have limited the use of anti-personnel mines, leaving scattered mines vulnerable to enemy tampering.

Maneuver Support CDID (MS CDID) was pursuing a solution to enhance terrain shaping capabilities. Their efforts, paired with the information gained during VERTEX | Armored Formations, solidified the need for more modern approaches for deep terrain shaping. AAL partnered with MS CDID, DEVCOM Armaments Center (AC), US Army Engineer School (USAES), JPEO Armaments and Ammunition (AA), PM Close Combat Systems (PM CCS), U.S. Army Engineer Research and Development Center (ERDC), and the Marine Corps to apply the latest advances in autonomy and robotics to address deep terrain shaping challenges.



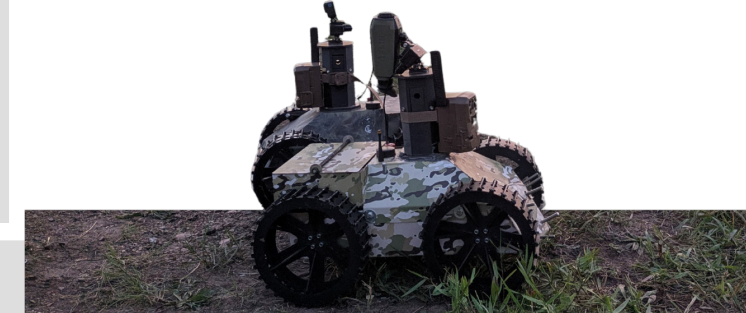
### PHASE I

Phase I of this SBIR project awarded \$1.35 million for a 12-week period of performance to six companies: Dragoon Technologies, GaardTech USA, IoT/AI, Novel Engineering, Overland AI, and TB2 Aerospace.

These companies focused on exploring terrain shaping methods and determining what commercial capabilities could enhance Army capabilities. By the end of Phase I, AAL and DoW stakeholders realized that the scope of the effort was greater than even originally thought. This deep terrain shaping effort gained so much traction that it became a major catalyst for changing how the whole community viewed approaching obstacles on the battlefield.

### PHASE II

After final presentations, five companies advanced to Phase II and were awarded a total of \$7.7 million for an 18-month period of performance. The companies were: Dragoon Technologies, GaardTech USA, IoT/AI, Novel Engineering, and Overland AI. These five companies were asked to develop solutions that allow Soldiers to conduct terrain-shaping operations 70+ km beyond the FLOT (Forward Line of Troops).



This included technology solutions that could be employed by air or ground uncrewed systems or launched from a safe distance. If the solution included a lethal munition, it had to be able to classify and/or discriminate between types of target.

Solutions that were considered included, but were not limited to, the following:

- Uncrewed systems capable of forming obstacles to shape existing terrain, affecting the adversary's ability to maneuver
- Uncrewed systems that can position multiple explosive loitering munitions
- Uncrewed systems that can position themselves in the deep battlespace and activate when a threat is identified
- Lethal or non-lethal effectors initiated from behind the front line to impact enemy maneuver in the deep fight 70+ km
- Integration of remote sensing and lethal effectors at machine speed with human-in-the-loop to approve lethal action



# RBO

## Remote Breaching Of Obstacles



When enemies place scatterable minefields (both rapidly and deliberately), friendly forces must have the ability to conduct breaching operations without significant obstacle intelligence. Whether the combined arms breach is conducted in a deliberate manner on a known pre-existing obstacle or is hastily executed on a newly-emplaced scatterable minefield obstacle, breach operations must be as fast and precise as possible in order to maintain momentum and reduce the enemy's ability to target friendly forces.

This problem was brought to AAL by General James E. Rainey, Commanding General of the U.S. Army Futures Command (AFC). AAL partnered with Maneuver Support CDID (MS CDID), DEVCOM Armaments Center (AC), US Army Engineer School (USAES), JPEO Armaments and Ammunition (AA), PM Close Combat Systems (PM CCS), Command, Control, Communications, Computers, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR), U.S. Army Engineer Research and Development Center (ERDC), 20th Engineering Brigade (20th ENG BDE), and the Marine Corps to develop more effective means of breaching obstacles while removing risk to Soldiers.

### PHASE I

Phase I of this SBIR project awarded \$1.35 million for a 12-week period of performance to seven companies: C-2 Innovations, Lunar Resources, Nine Five North, Physical Sciences, SIFT, Stratin Engineering, and TETAC.

### PHASE II

After Phase I presentations, three companies advanced to Phase II and were awarded a total of \$5.7 million for an 18-month period of performance, including: Lunar Resources, Physical Sciences, and Stratin Engineering.

These three companies were asked to develop and demonstrate novel solutions for breaching minefields and wire obstacles, eliminating risk to Soldiers by removing them from the point of breach. Solutions needed to address the following areas:

- Detection and targeting of mines and wire
- Neutralization of lines or wire through explosive, mechanical, kinetic, electromagnetic, or other means
- Proofing the breach lane to ensure the obstacle has been neutralized
- Marking the breach lane to guide safe passage
- Command and control of the breaching operation

### DEMOS/TOUCHPOINTS + END RESULTS

The first RBO demo took place in early 2025, with DTSO launching their first demo in March of that year. This was followed by the Maneuver Support and Protection Integration Experiments (MSPIX) at Fort Leonard Wood in May of 2025. Seven companies spent a week conducting platoon STX training with representatives from the 20th Engineer, 36th Engineer and 555th Engineer brigades. Soldiers were given two separate missions: a minefield breach followed by a movement to contact and a terrain shaping operation. The Soldiers were provided training on the technologies but were also given the freedom to mix and match capabilities regardless of their intended use case. Soldiers experimented not just with individual capabilities but with combinations of technologies put together in the field. In addition through close coordination with ATEC, many of the technologies had Soldier safety releases granted, allowing Soldiers rather than company employees to operate the systems.

Based on the success of the event MG Beck, the Maneuver Support Center of Excellence Commander, asked LTG Admiral, the III Corps Commander, if he would let 36th Engineer Brigade continue training with the technology for use in 1st Brigade, 1st Cavalry Division's CALFEX exercise in March 2026.

These projects not only provided 10 small businesses with unparalleled access to Soldier feedback and experimentation, but it also led to a holistic evaluation of capabilities that were considered far more than material. The First RBO demo took place in January of 2025. These initial experimentation events provided valuable assessments of the prototype capabilities, allowed the Army to assess the full spectrum of implications (eg. Doctrine, Organization, Training) for new capabilities, and helped companies gain valuable feedback relatively early in development allowing Soldiers hands-on opportunities with new technology. While a great first step, it is clear that more testing and experimentation will be required to develop a system ready for fielding.

### LESSONS LEARNED

#### Merging Efforts:

By consolidating the two projects into one experimentation event at MSPIX, the Army was able to get a more holistic picture of future engineer capabilities. It also reduced travel time, cost, and coordination for several stakeholders who had previously been doubling their trips to see both projects separately.

#### Mutually Beneficial Shifts:

Both project timelines were altered to maximize the effectiveness and schedule needs of participating units. Often, Soldiers are asked to attend a specific event to test technology, which limits availability and options. Instead, these project teams made sure to meet the Soldiers at their scheduled training - which allowed for more Soldier participation and more real-world testing of the technology. This approach also ensures Soldiers have had time to train with capabilities prior to undergoing evaluated training exercises - this training makes it far more likely the Soldiers will use the capability to its maximal extent rather than discarding in favor of more familiar equipment.

#### Affordability at scale (is needed) :

Creating technology that is both inexpensive and able to hit a localized target with a high degree of accuracy is incredibly difficult, and the more pieces of equipment required to accomplish the task, the greater the room for error. During the RBO project development, it became clear that we still need legacy-type breaching methods, due to their affordability. While technology for point detonation of mines exists, creating the sensors at scale, and cheaply enough to be fielded to the entire Army is unfeasible at this time.

#### Test Range Access & Training Needed:

Companies with high-power payloads can only test their technology on a limited number of ranges. The technical data from these tests not only help develop the technology but also help find transition partners. In particular, testing and training with electronic warfare (EW) payloads is not allowed on most installations. With EW becoming increasingly relevant on the modern battlefield Soldiers need time to fully train with these items before being put in a live attack situation.



# PROJECT UPDATES

AAL takes on a broad range of projects from many different sources. Following are updates on three long running efforts. ARMORS (Augmented Reality Maintainer-Operator Relay System) helps maintainers by allowing Soldiers to use Mixed Reality technology to receive live maintenance support. DPMS (Diver Performance Monitoring System) increases diver safety by giving cadre and safety personnel live biometric feedback of divers. H2FMS (Holistic Health and Fitness Management) System seeks to improve Soldier health and readiness by monitoring the five domains of the Army's H2F (Holistic Health and Fitness) program.



# H2FMS

## HOLISTIC HEALTH AND FITNESS MANAGEMENT SYSTEM

**COMPANY:** CoachMePlus (Virtuvia)

**PROJECT DESCRIPTION:**

H2FMS tracks Soldier/unit readiness across the five domains of the Army's Holistic Health and Fitness (H2F) program: physical, mental, nutrition, sleep, and spiritual. This software tool enables long term tracking of all five domains of data through a user-friendly interface that allows leaders to understand the readiness level of their force, and identify struggling Soldiers before failed physical fitness tests or major injuries occur.

**UPDATED:**

- CoachMePlus was awarded an additional Phase III for \$3.5 million and a period of performance of 12-months by H2F.
- The Soldier readiness tracking software developed will be used throughout eight brigades thanks to an approved 12-month authority to operate with conditions (ATO-C).





# ARMORS

## AUGMENTED REALITY MAINTAINER-OPERATOR RELAY SYSTEM

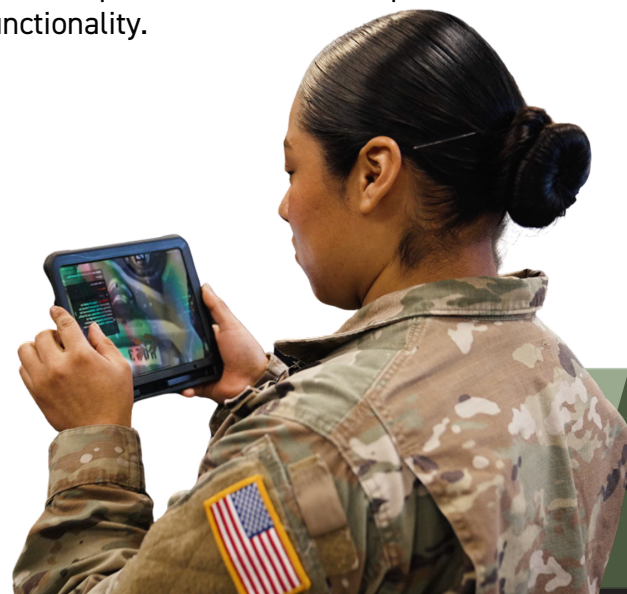
**COMPANY:** Taqtile

**PROJECT DESCRIPTION:**

ARMORS is a tele-maintenance tool that employs augmented reality-based guidance displayed on AR goggles or tablets. It allows Soldiers to identify, document, and manage vehicle maintenance faults easily and efficiently. It also provides remote maintenance support when in-person mechanics are not immediately available.

**UPDATED:**

- AAL is working with C5ISR to obtain an authority to operate (ATO) credential for ARMORS allowing the Army to place the tool on its network. In the past, the lack of an ATO prevented robust experimentation with the capability by forward deployed Army units. This not only solves that problem, it also enables units to buy the ARMORS tool on Computer Hardware Enterprise Software and Solutions (CHES) with full functionality.



# DPMS

## DIVER PERFORMANCE MONITORING SYSTEM

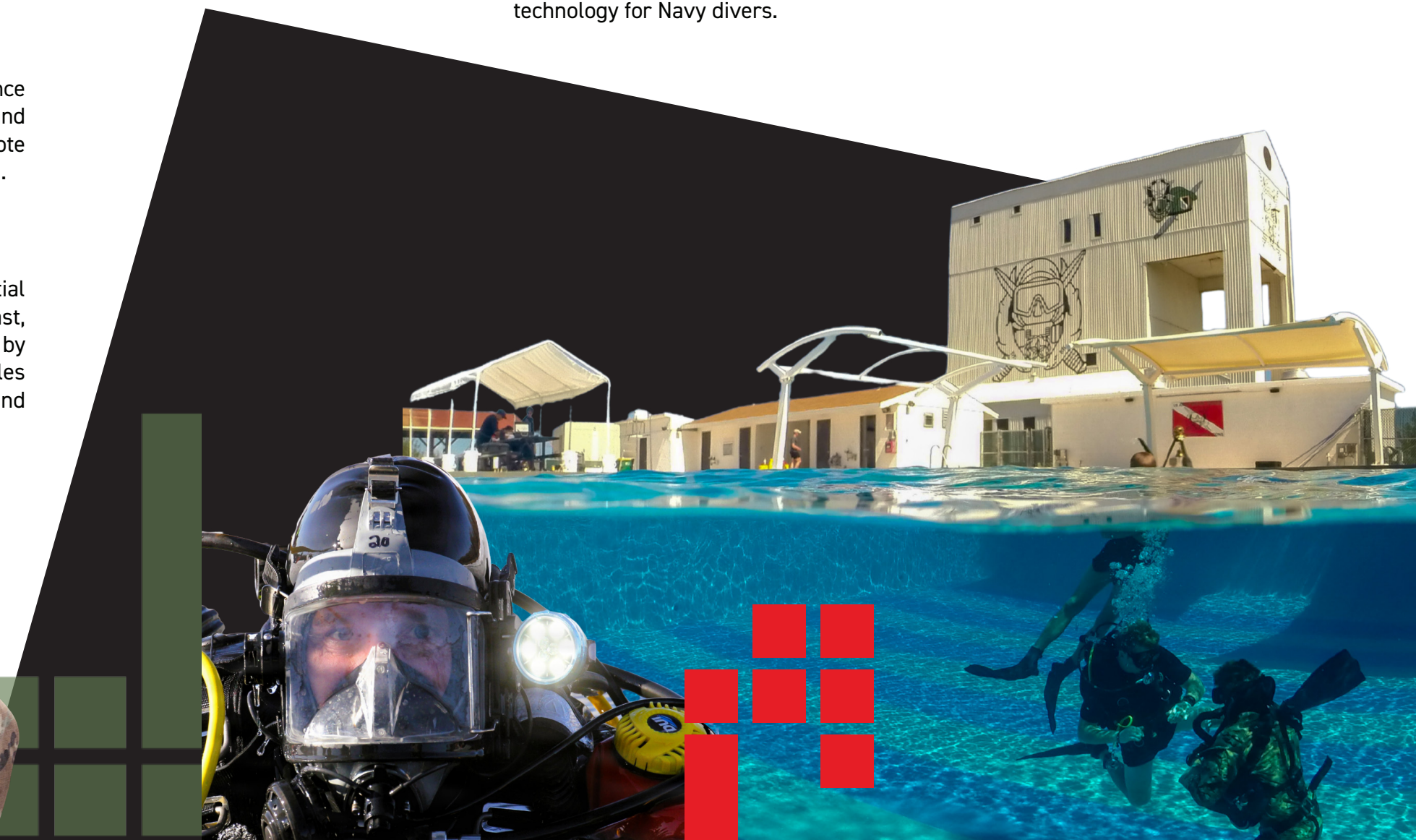
**COMPANY:** Altec

**PROJECT DESCRIPTION:**

DPMS improves diver safety by monitoring trainee diver heart rate and oxygen saturation levels under water while providing real time alerts. This will help keep divers safe and identify at-risk trainees who are not manifesting physical symptoms.

**UPDATED:**

- Altec successfully created the first wearable biometric sensor that can transmit data underwater using sonar technology.
- Pending SBIR reauthorization, Altec will continue development with Special Operations Forces Acquisition, Technology, and Logistics (SOF AT&L).
- Once refined for tactical use, PEO Maritime is also planning to use this technology for Navy divers.



# LESSONS LEARNED & RECOMMENDATIONS

## AUTHORITY TO OPERATE - WHAT CHANGED

In 2025, DoW focused on implementation of two new processes that will reduce the time, cost, and complexity of ATOs - the [Cybersecurity Maturity Model Certification \(CMMC\) Program and Software Fast Track \(SWFT\) Initiative](#).

As of February 2026, Army Contracting Command (ACC) is preparing a document that outlines Army CMMC requirements for contracts. Current guidance can be found [here](#).

As of February 2026, SWFT has no formal mechanisms. NETCOM, owners of the policy and process of Army ATOs, have begun to implement risk management framework (RMF) changes that align to the emerging SWFT methodology.

These changes include:

- eMASS Stale Record Policy: To ensure ATO packages are moving through the approval chain quickly, NETCOM will put stale records into a decommissioned (locks approval chain) state or deletes the record.
- RMF Step 4 Update: The most time consuming portion of the RMF process is the Control Assessment (Vulnerability Assessment) step, or step 4. NETCOM has implemented a new process that is aimed at reducing the assessment process down to 40 working days.
- Coinciding with 2025 policy guidance, Interim Authorities to Test (IATTs) no longer require a control assessment that is validated outside of the system owning organization. ISSM and AO/AODR approval for the organization's acceptance of vulnerability risk is all that is required.

With a new Cybersecurity Specialist onboard at AAL, the following actions have been or will be completed within FY26 to further alleviate the strain of the ATO process on the AAL mission:

Identify an AAL ATO approval chain to allow AAL to sponsor industry solutions that have no identified transition partner at the time of contract award.

Develop and publish a Cybersecurity for Industry document that educates companies on the publicly available DoW Cybersecurity implementation guidance.

Determine criteria for control assessment risk acceptance for AAL IATTs. Identify all other gaps for successful rapid authorization of industry solutions by AAL.

While the Department of War and other Services are making process improvements that will make getting an ATO easier, pain points for cost, time, and government sponsorship prior to gaining access to a program of record sponsorship still remain. This inherently hampers small companies from truly engaging with, or experimenting with, the DoW without significant risk incurred on the company.

## ENGAGING INDUSTRY

Industry engagement is one of the best ways for AAL to identify solutions to problems the Army knows it needs to solve, as well as those it didn't even know it had. Being able to engage with industry solvers is necessary to the AAL mission of pivoting commercial technology to military use cases. AAL's and the Army's presence at targeted industry events is critical to amplify the Army's technology needs to industry and to scout emerging companies.

Due to government travel restrictions in 2025, AAL was limited in the industry conferences it could attend, which resulted in our team only attending five events for the year. Despite the restrictions AAL still managed to engage with an average of 22 companies and three investors per month through our office hours program and local industry events.

We also began hosting AAL 101 virtual webinars where industry gets their first look at how easy it could be working with the Army and other DoW orgs. These efforts reassured industry that the Army was present and active in their space and was ready to listen, act, and build on their innovative solutions.

AAL anticipates returning to a more regular schedule of attendance at key events in 2026, while maintaining our office hours program and regularly scheduled webinars.



# LESSONS LEARNED & RECOMMENDATIONS

## AGILE CONTRACTING

It is well known that the Army's procurement process can be lengthy and cumbersome. The Army Applications Laboratory uses a variety of techniques to access emerging technologies and rapidly bring companies on contract with the government. AAL has three complementary approaches: working with experienced acquisition professionals that leverage existing authorities to write new contracts quickly using traditional methods, partnering across the Army innovation ecosystem to identify award-ready solutions and pre-existing contracts, and applying innovative contracting methods to speed up time to award. Together, these strategies reduce time to contract, streamline procurement processes, and increase the Army's ability to scale new capabilities quickly.

AAL's speed starts with its in-house acquisition team of former warranted contracting officers, project leads, and engineers specializing in research, development, testing, and evaluation. The team conducts targeted market research, designs tailored acquisition strategies, and uses existing contract vehicles and agreements to shorten procurement timelines.



AAL is also able to use contracting vehicles from organizations across the DoW including Army FUZE (which includes xTech Search and SBIR), Army PAEs, CDAO, the Defense Innovation Unit, the Marine Corps Warfighting Lab, AFWERX, the Operational Energy Capability Improvement Fund, Rapid Sustainment Offices, and others. For example, collaboration with xTech Search enabled AAL to get 37 companies to a demonstration event months faster than if 37 individual FAR based contracts were written. AAL also leveraged already existing OTAs to more rapidly put companies on contract as compared to creating new awards. AAL utilizes its own solicitation mechanisms that include our Broad Agency Announcement and T2COM's DevX Autonomy Marketplace which can be used to rapidly identify new, competition ready solutions. These connections reduce uncertainty, minimize duplication, and reduce the time it takes to move technology from discovery to contract.

Additionally, AAL leverages proven solvers from sister Services. The most common mechanism for this are SBIR Phase III awards which lets companies further develop, test, or field their technology developed under the SBIR program. Using SBIR Phase III awards cuts weeks to months out of the contracting process, but unfortunately, not all contracting officers are familiar with the mechanism - this leads to hesitancy using the mechanism, and increased time to award. The NDAA for FY26 authorized \$8.4M to train contracting officers on how to better utilize SBIR Phase III authorities. This will hopefully increase familiarity with the mechanism and ultimately speed capability to Soldiers.



## INTERNATIONAL PARTNERS

The civil innovation base of the US and our Allies is a strategic advantage over our adversaries. The need for a robust allied civil innovation base pushes the US to make itself more accessible to non-traditional companies from both US and partner nations. As allied partners establish innovation organizations similar to AAL, sharing knowledge and lessons learned are crucial to developing the strategic advantage against adversaries. Through continued international engagements, AAL can serve as an example for how engaging non-traditional industry leads to quicker modernization and increasing lethality for joint forces.

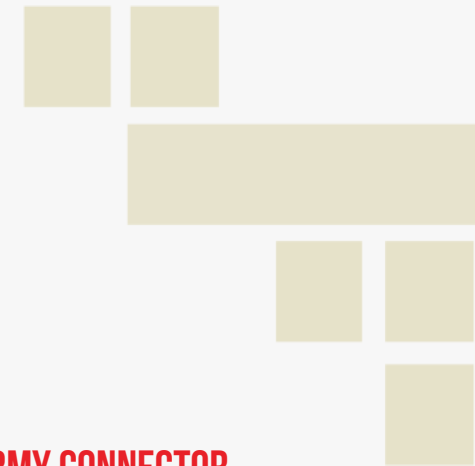
In the past year, AAL conducted several international engagements to increase collaboration amongst partner nations and discuss recommendations for sourcing new technologies. T2COM/AAL participated in an initial planning conference for Operation Arctic Strike, which will occur in late 2026 and is a competition to test and evaluate unmanned and associated systems in an arctic operational environment. AAL will continue to provide insight on how to work with non-traditional vendors to the Arctic Strike planners.

Dr. Perley also spoke on a panel at the Royal United Services Institute (RUSI) Landwarfare Conference, which focused on building ecosystems of non-traditional companies and investors to solve military problems. She shared AAL's experiences, lessons learned, and benefits of establishing AAL-like organizations in other countries. Coordinating with partner militaries on establishing these types of innovation hubs allows for greater cooperation to address a wider range of threats.



## AAL IS AN ARMY CONNECTOR

As part of AAL's role in helping companies to learn to work with the Army, AAL often gets asked to help source information or connections for portfolio companies working on a contract for other Army stakeholders. After confirming the company has a need to know, AAL can facilitate access to information and people. This not only benefits the company by removing roadblocks, it helps assemble a broader community of interest around the capability than can help ease its transition into the Army. It also helps speed up solution development and ensures there is no unintentional duplication of effort occurring.



# TERMS & ACRONYMS

**ABK:** Autonomous Bridging Kit

**AC:** Armaments Center

**ACC:** Army Contracting Command

**AFSRB:** US Army Fuze Safety Review Board

**AO:** Authorizing Official

**AODR:** Authorizing Official Designated Representative

**ARMORS:** Augmented Reality Maintainer-Operator Relay System

**ATEC:** Army Test and Evaluation Center

**ATF:** The Bureau of Alcohol, Tobacco, Firearms and Explosives

**ATO:** Authority to Operate

**ATO-C:** Authority to Operate with Conditions

**AvMC:** Aviation and Missile Center

**BAA:** Broad Agency Announcement

**C5ISR:** Command, Control, Communications, Computers, Cyber, Intelligence, Surveillance and Reconnaissance

**CALFEX:** combined arms live-fire exercise

**CDAO:** Chief Digital and Artificial Intelligence Office

**CDID:** Capabilities Development Integration Directorate

**CFT:** Cross-Functional Team

**CHESS:** Computer Hardware Enterprise Software and Solutions

**CL:** Contested Logistics

**CMMC:** Cybersecurity Maturity Model Certification

**CCS:** Close Combat Systems

**CS/CSS:** Combat Support, Combat Services Support

**C-sUAS:** Counter small Unmanned Aerial Systems

**CRADA:** Cooperative Research and Development Agreement

**DEVCOM:** US Army Combat Capabilities Development Command

**DIU:** Defense Innovation Unit

**DoW:** Department of War

**DPMS:** Diver Performance Monitoring System

**DTSO:** Deep Terrain Shaping of Obstacles

**eMASS:** Enterprise Mission Assurance

**Support Service**

**ERDC:** Engineer Research and Development Center

**FAA:** Federal Aviation Administration

**FAR/DFARS:** Federal Acquisition Regulation, Defense Federal Acquisition Regulation Supplement

**FARP:** Forward Arming and Refueling Point

**FBLP:** Formation Based Layered Protection

**FCD:** Future Capabilities Directorates

**FLOT:** Forward Line of Troops

**FVL:** Future Vertical Lift

**GPM:** Gallons per Minute

**GFE:** Government Furnished Equipment

**GSO:** Government Selecting Official

**G-TEAD:** Global Tactical Edge Acquisition Directorate

**GVSC:** Ground Vehicle Systems Center

**H2F:** Holistic Health and Fitness

**H2FMS:** Holistic Health and Fitness

**Management**

**HERO:** Helicopter Expedited Refueling Operations

**HMI-F:** Human-Machine Integrated Formations

**H-VTOL:** Heavy Vertical Takeoff and Landing

**IATTs:** Interim Authorities to Test

**IRAD:** Independent Research and Development

**IRB:** Improved Ribbon Bridge

**ISM:** Industrial, Scientific and Medical

**ISSM:** Information Systems Security Manager

**JETRP:** Joint Emerging Technology Review Panel

**JIOP:** Joint Innovation Outpost

**JPEO:** Joint Program Executive Office

**LE:** Launched Effects

**Low-SWaP:** Low Size, Weight, and Power

**MARCORSYSCOM:** Marine Corps System Command

**MARV-EL:** Marine Aerial Resupply Vehicle - Expeditionary Logistics

**MIL-STD:** Military Standard

**MRBC:** Multi-Role Bridge Company

**MSPIX:** Maneuver Support and Protection Integration Experiments

**NETCOM:** US Army Network Enterprise Technology Command

**NGC2:** Next Generation Command and Control

**NIST:** National Institute of Standards and Technology

**PAE:** Portfolio Acquisition Executive

**PEO:** Program Executive Office

**PIT:** Pathway for Innovation and Technology

**PM:** Program Manager (job title) or Project Manager (DoW department type)

**RBO:** Remote Breaching of Obstacles

**R&D:** Research and Development

**RDT&E:** Research, Development, Test, and Evaluation

**RFI:** Request for Information

**RMF:** Risk Management Framework

**RTC:** Redstone Test Center

**RUSI:** Royal United Services Institute

**SBIR:** Small Business Innovation Research

**S&T:** Science and Technology

**SME:** Subject Matter Expert

**SOF AT&L:** Special Operations Forces Acquisition, Technology, and Logistics

**STX:** Situational Training Exercises

**SWaP-C:** Size, Weight, Power and Cost

**SWFT:** Software Fast Tracking

**TACMS:** Army Tactical Missile System

**TAGM:** Tactical Aviation and Ground Munitions

**TiC:** Transformation in Contact

**TRL:** Technology Readiness Level

**USASOC:** US Army Special Operations Command

**UAS:** Unmanned Aerial Systems

**USAES:** United States Army Engineer School

**USMC:** United States Marine Corps

**UX:** User Experience

**VC:** Venture Capitalist



U.S. ARMY

