

CASE STUDY

THE FAAR COHORT

How AAL used a new cohort approach to help LRPF CFT speed capability development and support MDO overmatch with Field Artillery Autonomous Resupply (FAAR) built on commercial technology.

THE PROBLEM

We must be able to sustain a high rate of fire to achieve field artillery overmatch in an MDO contested environment. The Long Range Precision Fires Cross Functional Team (LRPF CFT) is developing an autoloader solution as part of the Extended Range Cannon Artillery (ERCA) program to support that objective. But, even with an autoloader, there remained critical inefficiencies in getting the right ammunition to the right place at the right time.

The Army had not fundamentally changed how it stores, tracks, or transports munitions since WWI. Based on the desired rate of fire for ERCA, the current ammunition resupply system needed greater capacity and efficiency. So LRPF teamed with the Army Applications Laboratory (AAL) to take on the problem together.

The key questions:



Solution Expectations

We have a solution concept in mind, but is it the best approach for our problem? And is it even feasible?



Available Dual-Use Solutions

What is the commercial market already using that we can adopt or adapt to solve this problem?



Finding Qualified Companies

How do we quickly expand beyond the same defense players to uncover these new technology solutions?



Problem-Solution Alignment

Everyone has access to new tech, but how do we get the right new tech to solve this specific problem?

I remember how simple I thought the problem framing process was a year ago. What came out the other end was illuminating in terms of how much I still had to learn. I was blown away by the evaluation of our ammunition process and, in some ways, how amateur it looks to an outsider. **This type of exchange should be happening routinely. We should be fostering that. It's much more powerful.**

BG John Rafferty
Director, Long Range Precision Fires Cross Functional Team

THE HIGHLIGHTS



In a project that ran for a total of nine months, AAL helped LRPF CFT go from a number of competing problems to focusing and solving a specific, priority challenge. Using our Cohort Program model, LRPF received 14 complementary solution concepts from six different companies — through a single program, in only 12 weeks, and with a low-cost upfront investment of just \$4m.

After helping LRPF define a clear problem statement, AAL conducted intensive market intelligence to identify six best-in-breed companies for a 12-week Cohort Program that resulted in collaborative concept presentations demonstrating the art of the possible for the Army.

OUR APPROACH

The commercial market has driven incredible advancements and efficiencies through automation and robotics. We knew the Army could do the same. Our goal was to tap that thinking to uncover a realistic solution concept designed for LRPF's specific needs.



To do that, we built a tailored **Cohort Program** — the first of its kind for the U.S. Army and different from any industry cohort program in the market. This model united a group of commercial experts with LRPF CFT stakeholders to gain better insight and ensure total program alignment, beginning to end.

Hearing about a problem is not the same as seeing it for yourself. So we took the FAAR Cohort into live fire training. They were able to feel, measure, and witness the field artillery resupply problem firsthand. We paired these Soldier touch points with intentional periods of collaboration alongside the LRPF CFT and its SMEs. And we backed it up with guidance, support, and mentoring from the AAL team every step of the way.

How it worked:

The FAAR Cohort program provided \$150k for six highly qualified companies to complete an intense 12-week program, culminating in a concept design presentation to LRPF CFT leaders and SMEs.



Our team conducted **Problem Framing** with LRPF to clarify the problem they wanted to prioritize and help translate it into commercial terms and concepts.



Through our **Innovation Network**, we sourced 88 applications to the Cohort, selecting six participants based on technical merit and commercial viability.



Each of the companies selected was given a distinct part of the problem to address and tasked to work with others in the Cohort for **maximum interoperability**.



The Cohort refined designs with **feedback from LRPF**, delivering several concepts that the CFT immediately pursued and informing future requirements for others.

THE FAAR COHORT COMPANIES



NEW YORK, NY

Actuate developed an inventory management concept to replace Form 581 using computer vision scanning and AI model processing. This closed-loop system will help manage ammunition requests throughout the artillery resupply process.



AUSTIN, TX

Aptronik developed critical concepts for Class V material handling using multiple robotic arms on the outside of the current resupply vehicle, gantry system, and unmanned ground vehicles. These arms can lift two 97lb projectiles at once.



PITTSBURGH, PA

CR Tactical developed multiple concepts that allow the Army to integrate several capabilities — a de-palletizing gantry, a modified resupply vehicle, an on-board Ammo Vision System (AVS), and a Cannon Ammo Management System (CAMS).



SAN FRANCISCO, CA

Hivemapper developed concepts for their Object AI technology to generate near real-time, georegistered 3D maps with change detection. Pulled from any video source, this enables autonomy of the full resupply system within a GPS-denied environment.



PITTSBURGH, PA

Neya Systems expanded the capability concepts for their perception, machine learning, navigation, and mission planning technologies. These enhancements enable autonomous resupply in a "tactical last-mile" off-road environment.



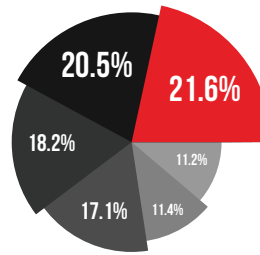
DETROIT, MI

Pratt Miller Defense developed concept modifications of the EMAV platform that they were previously developing with Army and Marine Corps customers. These platforms increase the daily lift capabilities for off-road transport of Class V resupply.

THE RESULTS

The solution concepts delivered by the FAAR Cohort significantly reduce the burden on the Class V ammo logistics train, speed the rate of ammo throughput, and reduce physical strain on Soldiers. By incrementally increasing autonomous resupply using these concepts, LRPF CFT can provide just-in-time delivery of 155mm ammo to resupply ERCA and support field artillery overmatch.

In addition, the problem statements and concepts developed with LRPF CFT through this program help Army stakeholders from the Sustainment CDID to PM Self-Propelled Howitzer Systems (SPHS). This effort informs the development of future requirements and addresses risks, issues, and opportunities in the Materiel Solution Analysis (MSA) and Technology Maturation and Risk Reduction (TMRR) phases of the Acquisition lifecycle.



By sourcing from companies with expertise ranging from robotics to mixed reality, LRPF gained new ways of thinking about (and solving) the artillery resupply problem.

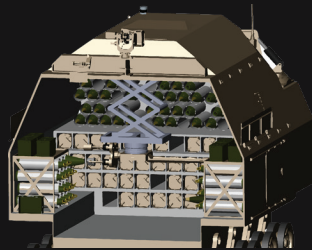


With a 90% increase in rate of engagement between problem owners and solvers, compared to the conventional process, we informed a higher number of viable, fit-to-purpose solutions.

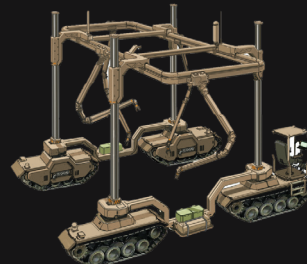
SOLUTION SNAPSHOT



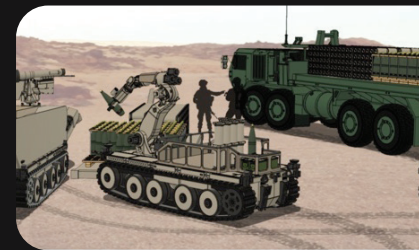
EMAV // Pratt Miller Defense proposed modifications of their existing Expeditionary Modular Autonomous Vehicle (EMAV) to supplement the current resupply vehicle and increase overall Class V throughput for ERCA.



FUZE-SETTER // CR Tactical developed an automated fuzing system that removes the shipping lug from a shell, inspects the fuze well, manipulates a secondary charge (if present), and properly installs a fuze.



GANRTY // This deployable robotic unpacking station can process Class V supply into individual items by stripping away dunnage and packing material. It was designed by CR Tactical and features robotic arms from Aptronik.



EMV++ // The EMV from Pratt Miller will be outfitted with an Aptronik robotic arm and custom applique kits to autonomously support larger as well as heavier projectile charge sets and increase rounds fired per day.

FAAR COHORT CONOPS // The Cohort Program model facilitates collaboration between participating companies, creating an environment for organic innovation. By positioning companies as united solvers against a defined problem, rather than competitors for an award, we develop interoperable solutions to optimize total CONOPS.



THE CONCLUSION

Outdated processes lead to outdated capabilities. Army leaders understand this; that's why AFC was formed, and that's why AAL exists. But Army leaders aren't interested in process for the sake of process. They want to find what works with the confidence that any new solutions can be funded, transitioned, and sustained.

Finding the best solutions and testing new processes takes time. And it takes a fundamentally different risk profile than the Army has historically embraced. But we can't afford not to evolve, and we need to do it fast. That starts by being willing to try something different.

Our Cohort Program is designed to open the aperture so we can uncover new insights and new solutions. By connecting concepts from a broad range of solvers with the right people and organizations in the Army, we can put fewer people in harm's way, save taxpayer dollars, and respond to threats faster.

As CFTs work to deliver against Army modernization priorities, AAL is here to help. By working together, we can bring the Army out of the industrial age and into the information age.

Whether developing a concept, building a prototype, or validating a solution, our Cohort Model approach provides four key benefits to the Army:

1

Removes Unnecessary Limitations

We take off the blinders to get the most from commercial solvers. Rather than forcing solutions to fit requirements, they're not bound by anything other than the problem.

2

Boosts Cross Functional Teams

No one thrives in a vacuum. We maximize CFTs by bringing them together with solvers throughout the process to share knowledge and solve the problem as a team.

3

Reduces Program Risk

By collaborating with companies, we determine upfront if solutions are achievable and sustainable. That means groundbreaking innovation with less risk and less waste.

4

Drives Exponential Value

Rather than spending millions on one solution that may not work, we validate new ideas that can solve multiple problems and scale into other solutions across the Army.

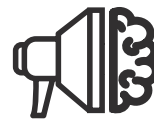
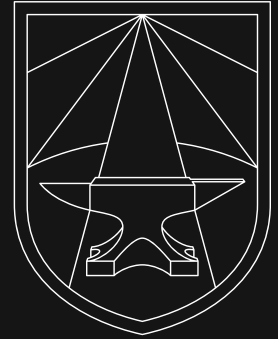
This amazing experience helped me think more about the whole enterprise, my job, and what AFC is supposed to do. What if we have routine periods of collaborating that were more serious than just monitoring the contract... that were actually about solving the problem?

I don't feel pressured by it. I feel obligated to help this succeed as one of the principles behind Army Futures Command.

There are a lot of people who have only done things one way. **We have an obligation to the team — to the Army — to make this work.** Oh, and by the way, it's actually good stuff that'll help us and our program.

BG John Rafferty

Director, Long Range Precision Fires Cross Functional Team



Why not use SBIR?

We did that, too. While the FAAR Cohort focused on new solution design, AAL championed the Army's first Direct to Phase II (DP2) SBIR to find more mature resupply solutions, with three companies receiving the \$1.1m awards in March 2020.



Why use partners?

Asking someone to rethink how they've always done things is tough. It can be hard to see the forest for the trees. So we partner with commercial experts who have done this before and can translate that experience to help the Army.

To learn more about this scalable Cohort Program approach or to investigate customizing this model to meet your top priorities, contact our team at cohorts@aal.army.

ABOUT THE ARMY APPLICATIONS LABORATORY

We're not a laboratory in the traditional sense of the word. As the U.S. Army's innovation unit, we don't make things — we make things possible. The Army Applications Laboratory (AAL) is fundamentally reshaping how the Army works with industry to reunite American innovation and national security. Together, we question *why* and deliver *what if*. Learn how we do it at aal.army.

