THE TACTICAL INNOVATION SYMPOSIUM

Technical and Procedural Abstracts

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Edited by
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The Tactical Innovation Symposium

Technical and Procedural Abstracts

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Developed through a joint effort with the West Point Department of Mechanical & Aerospace Engineering, the West Point Center for Applied Engineering, the DEVCOM Catalyst Pathfinder Program, and the West Point Werx Innovation Hub.

We are incredibly excited to present the proceedings of the Fourth Installment of The Tactical Innovation Symposium. This event started in 2023, when we identified that the disruptive tactical innovation officers from across the Department of Defense and their partners from academia and industry needed a venue to collaborate and interact with Cadets at West Point. This year, we took a slightly different approach, encouraging attendees to prepare a one-page report on an ongoing technical project they are building to solve a Soldier problem at the tactical edge or a unique procedure they have developed to enable creative problem-solving within an operational unit.

Despite altering the format of the Symposium, the Institute's mission remains the same – to train and enable the uniquely talented leaders on the front lines of innovation to solve Soldier problems from the bottom up. Tactical Innovation is predicated on these hypotheses:

(1) Soldiers on the front line are the most intimately familiar with the technical problems associated with fighting and winning wars.
(2) Soldiers discover the best ideas to solve their problems but are far removed from the resources required to solve them.
(3) Those traditionally tasked with building products for Soldiers do not get enough interactions with their end users, inadvertently hindering the ability to design products that meet evolving user needs.
(4) The next war will be won by the nation that can most effectively close this gap: enabling Soldiers to solve technical problems at the edge and empowering user- centric design throughout defense research and development.

These hypotheses have been proven true in recent conflicts and therefore further reinforce the value of dedicating talent and resources to innovation labs at operational units. We hope this event and the abstracts within these proceedings will foster new ideas and increase collaboration between operational units, their innovation labs, and their partners in academia and industry.

There is no "one-size-fits-all" answer to Tactical Innovation, but we believe that providing a platform to share best practices and successful projects is the best way to grow our community and ensure the best solutions reach the hands of our warfighters.

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Peer Review Statement:

All submissions were peer-reviewed by experts selected for their experience in the field of tactical innovation. Two independent reviewers reviewed each paper, with assignments evenly distributed and conflicts of interest avoided. Reviewers followed standardized guidance and submitted evaluations via a designated form or email to the editors. In cases of reviewer disagreement, the editors served as the tiebreaker. Papers receiving two negative reviews or a negative tie-break decision were returned to authors for revision and subjected to a final review before acceptance.

Symposium Agenda:

Morning Session
Technical Track

Presentations on innovative solutions generated by Tactical Innovation Labs and partners

0800-0830: Introductions
CPT Chris Aliperti and CPT Chris Flournoy (V) –TII

0830-0855: Modular Drone Case for Airborne Operations
SSG Larry Dockins (V) –Airborne Innovation Lab (82nd)

0855-0920: Subtitle Trained LLM Translator for Partner Networks
1LT Mitchell Deboskey –4ID

0920-0945: Enabling Proliferation of UAS to Partner Forces in The Pacific
CDTs Andrea Riddle, Wade Alford, John Passander and John Macune
USMA CME // 1SFG

0945-1010: Agile Software Operations Automating Heat Map
COL John Bradley (V) and LTC Linda Chung (V) –III Corps // Army Software Factory

1010-1035: Beyond Line-of-Sight Communications
1LT Eston Smith (V) –MCOE The Armor School

1035-1100: C2 Smart
CDT Dakota Slay (V)- I Corps

1100-1125: MIRC
MAJ Andrew Hoffman (V) –Eaglewerx (101st)

1125-1150: Perspectives on Innovation Forward
1LT Brenden Shutt (V) and Randy Emert (V) –Marne Innovation Center (3ID)

1150-1215: Classiflyer
CW3 Justin King –513th MIB

Afternoon Session
Procedural Track

Presentations on how to effectively execute Tactical Innovation

1330-1355: Next Generation Autonomous Warfare
1LT Brandon Cea –1MDTF / 1SFG

1355-1420: Enabling Innovation Forward
CPT Tyler Skidmore –XVIII Airborne Corps

1420-1445: USMA Future Applied Systems Team (FAST)
CDT Jacob Crossman –USMA FAST

1445-1510: Stacey Kessler (V) –Mobilize VISION
Virtual Innovation Support Integration Operations Network (VISION)

1510-1535: 3D Printed Drones
MAJ Andrew Hoffman (V) –Eaglewerx (101st)

1535-1600: AG Bag
CPT Joshua Tawson (V) –Eaglewerx (101st)

1600-1625: CMW
CPT Joshua Tawson (V) –Eaglewerx (101st)

1635-1650: Innovating with Academia: GTRI's Collaboration Approach
Dr. Kyle Blond (V)–Georgia Tech Research Institute

1650-1700: Closing Remarks / Projects Day Intro
CPT Chris Aliperti and CPT Chris Flournoy (V) –

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Modular Drone Case For Enhanced SUAS Deployment In Airborne Operations

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INTRODUCTION: Small Unmanned Aerial Systems (sUAS) provide critical capabilities across reconnaissance, attack, and counter-UAS missions at the tactical edge. However, conventional transport cases are bulky, rigid, and incompatible with rapid deployment scenarios, particularly in airborne operations. These constraints delay force responsiveness and increase the equipment burden on dismounted units. To address this, the Airborne Innovation Lab (AIL) and 82nd Airborne Division developed a lightweight, modular drone case optimized for rucksack integration and immediate employment of mission-configured platforms. Airborne units require a compact, protective, and adaptable solution that supports multiple drone types without reliance on heavy-drop systems or extensive logistics.

DESIGN SPECIFICATIONS: The case is constructed from a vacuum formed - Kydex outer shell exterior with 3D-printed thermoplastic polyurethane (TPU) inserts. The inserts are printed at 7% infill density with a gyroid patterning internal structure that improves flexibility and shock absorption [1]. The system can mount externally to MOLLE-compatible rucksacks and uses interchangeable inserts to accommodate multiple drone platforms, including the Skydio RQ-28, Parrot Anafi, and Black Hornet 4. Platform-specific prototypes demonstrated significant size and weight reductions when compared to existing fielded cases, 81% average reduction in volume and 78% average reduction in weight across the three systems (Fig. 1). These improvements enhance mobility, reduce bulk, and simplify integration into existing loadouts.

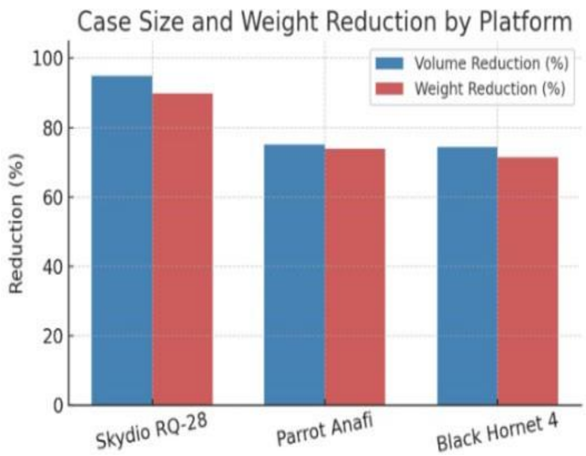

Fig. 1: *Comparative size and weight reductions of drone cases for Skydio, Parrot, and Black Hornet platforms*

EXPERIMENTS AND RESULTS: Initial validation was conducted with 1-504th PIR at the Airborne Innovation Lab. Rucksack-mounted cases were drop-tested from 16 feet to simulate a 22-mph terminal impact. Accelerometer data showed a 37% reduction in peak force, averaging 7.0 Gs [2], well below the failure threshold for most drone electronics. The system was later deployed in multiple live airborne operations at Fort Bragg and during a Joint Readiness Training Center (JRTC) rotation. Units using the modular case achieved organic drone operations 48 hours sooner than other battalions in the brigade, which waited for recovery of air lands equipment. All drones remained fully mission-capable (Fig. 2).

DISCUSSION, FUTURE WORK, & SIGNIFICANCE: This system improves tactical agility and reduces dependence on traditional sustainment timelines by enabling drone deployment immediately upon insertion. Future development will expand platform compatibility and refine form factor based on feedback from continued fielding. The 82nd Airborne Division is working with the Army Research Laboratory (ARL), TACOM, and assessing Defense Logistics Agency (DLA) production feasibility to determine options for scaling. This project won the 82nd Airborne Division's Innovation Drop Zone (IDZ) 4.0 competition and will represent the Division at XVIII Airborne Corps' Dragon's Lair X competition in June.

Fig. 2: *Assembled modular drone case with Skydio RQ-28 inside (foreground), shown next to original tough box.*

REFERENCES:

[1] Warrior Design Depot, Modular SUAS – Drone Case, Printer Information
[2] Warrior Design Depot, Modular SUAS – Drone Case, Drop Da

A Secure, AI-Powered Translation Tool For Enhanced Partner Interoperability

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INTRODUCTION: The modern battlefield demands seamless communication and coordination, particularly in joint and multinational operations. However, the increasing need to communicate with partner forces and share sensitive information presents a significant challenge. Currently, there is no readily available, field-deployable translation solution certified for handling sensitive information. This capability gap severely hinders real-time communication with partner forces. Commercial translation tools cannot be utilized for sensitive information because they transmit and store all translation data to improve their software. This capability gap was glaringly apparent leading up to Pacific Pathways 2025, where language barriers presented significant obstacles to operational efficiency and collaboration. Our team was tasked to create a solution should human translator contracts fail. In an LSCO environment, human translators are not a viable option due to the immediate required scale, security concerns, and the myriad of languages present within complex COCOMs such as INDOPACOM. Most importantly, any LSCO conflict would necessitate partner force participation. This experience underscored the critical need for a secure, scalable, offline translation tool capable of bridging linguistic divides without compromising operational security. This abstract presents a novel, AI-powered translation tool specifically designed to address this challenge and enhance interoperability with partner forces.

DESIGN SPECIFICATIONS: Our team developed a system that leverages the vast amount of publicly available subtitle data from movies and TV shows to address the need for a secure translation solution. By training a Large Language Model (LLM) on this massive corpus of text and code, we created a powerful translation engine capable of handling a wide range of languages and terminology. This mode is packaged within a user-friendly interface application coded in Python, allowing for intuitive operation and text input. Crucially, the entire system operates entirely air-gapped, meaning it is completely isolated from external networks. This design ensures the security of all translated information, making it suitable for handling sensitive information (pending formal certification). Currently, the model is hosted on laptops with minimal processing power. The model utilizes a user-friendly design centered around push to talk mechanics. This reduces unnecessary lag and provides clear boundaries for the translation software.

EXPERIMENTS AND RESULTS: Initial field testing of our translation tool during Exercise Cobra Gold 2025 yielded promising results. The tool was hosted on laptops and deployed with 2/4 Soldiers to Thailand. I Corps provided additional laptops and facilitated testing throughout their operations. The tool was evaluated for its capability to facilitate real-time communication between US forces and Thai counterparts across a variety of operational contexts. Testing explored the translation tool's ability to improve communication during joint patrols, planning operations, and logistical coordination. Mission requirements reduced the testing scope, providing muddled feedback and limited end user interaction. Further testing is required to fully validate the translation tool's capacity to bridge the communication capability gap.

DISCUSSION, FUTURE WORK & SIGNIFICANCE: We are actively pursuing several avenues for further development and optimization of this translation tool. Our primary effort focuses on adapting and hosting the translation tool on Mission Partner Environment (MPE) networks to streamline communication and data sharing with partner forces across a secure architecture. MPEs are designed for partner communication and data sharing, but do not contain pre-built translation tools to facilitate communication. Our Brigade is testing this concept by hosting the translation model on MPE stacks at an upcoming CPX. Additionally, we are working to expand the language library by training the model on additional language datasets, focusing on languages relevant to key regions of interest. Any DOD entity can train its own translation models for any language with a sufficiently large subtitle database because the software and data repositories utilized to train the model are open source and free. Future iterations of the tool will incorporate end user feedback to further refine the user interface and enhance its functionality. Finally, we hope to echelon tactical employment of this translation tool. We hope to create a self-enclosed, ruggedized translator powered by Raspberry Pi processing units designed for employment at the squad level. This field version will provide immediate translation tools to the warfighter, while

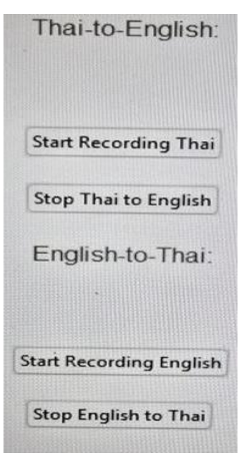

***Figure 1**: user interface for translation tool*

***Figure 2:** translation example based on verbal Thai input interface for translation tool*

more refined and higher-powered versions remain at company, battalion, and brigade headquarters. This project holds significant implications for the future of military operations. By leveraging publicly available data and the power of AI, we have developed a secure and effective solution to a critical operational challenge. Widespread deployment of this translation tool has the potential to significantly enhance interoperability, improve coordination, and strengthen relationships with partner forces across the globe, ultimately contributing to mission success in an increasingly complex and interconnected world.

ACKNOWLEDGMENTS: MAJ James DiNatale and the I CORPS CDAO team were instrumental in coordinating testing during Cobra Gold 2025.

AGILE SOFTWARE OPERATIONS AUTOMATING THE HEATMAP

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INTRODUCTION: The III Armored Corps (III AC) has developed an automated Counterfire HeatMap solution in collaboration with the Army Software Factory (ASWF) to enhance targeting capabilities in Large Scale Combat Operations (LSCO). The traditional manual process of extracting data from the Advanced Field Artillery Tactical Data System (AFATDS) and creating a HeatMap to visualize counterfire acquisition density was outdated and insufficient for the fast-paced operational tempo of LSCO. Notably, the script automates a task that previously required four analysts to work for eight hours and can now be executed with a few clicks once configured. The ArcPy script runs on a task scheduler that produces two outcomes: as a web mapping service published to Command Post Computing Environment (CPCE) prior to relevant battle rhythm events three times a day and as an ArcGIS dashboard that provides a dynamic refresh rate of less than five minutes and provides timely and accurate information to support our operations

The automated solution leverages machine-speed decision-making through the Decide, Detect, Deliver, and Assess (D3A) process, connecting the AFATDS backend database to the ArcGIS Server on the Tactical Server Infrastructure (TSI). This approach enables automated mapping, web mapping service publication, geostatistical analysis, and common operational picture (COP) visualization on the CPCE.

The solution was developed in a rapid, 45-working-day sprint, with a core team of stakeholders from III AC, ASWF, and 75th Field Artillery Brigade (FAB) collaborating to overcome technical challenges. The resulting proof-of-concept can generate a HeatMap on demand, saving human resources and increasing targeting effectiveness and lethality.

DESIGN SPECIFICATIONS:

(1) **Direct connection with AFATDS and JADOCS databases via pgAdmin:** Direct connection to AFATDS and JADOCS backend database for automated data extraction and analysis.
(2) **Automated HeatMap generation:** ArcPy scripts on ArcGIS that generate the HeatMap to

visualize counterfire acquisition density.

(3) **ArcPy scripts to automate WMS publication to CPCE:** Enhanced situational awareness through COP visualization on CPCE.

(4) **GMTI integration via JADOCS:** Leveraging native JADOCS GMTI integration to incorporate Ground Movement Target Indicator (GMTI) data to transform counterfire from a reactive to a proactive capability.

(5) **Direct database connections via ArcGIS Spatial Data Engine to visualize on ArcGIS dashboard:** Leveraging TSI's core services for automated mapping and visualization, web mapping service publication, and geostatistical analysis with dynamic filtering capabilities.

TECHNICAL SPECIFICATIONS:

- System: Automated Counterfire HeatMap proof-of-concept
- Platform: Tactical Server Infrastructure (TSI) ArcGIS geoserver
- Database: AFATDS, JADOCS PostgreSQL database
- Software: ArcGIS (Web), ArcGIS Pro (Desktop)
- Integration: AFATDS (target acquisition), JADOCS (GMTI) data
- Development Time: 45 working days
- Team: III AC, ASWF, 75 FAB

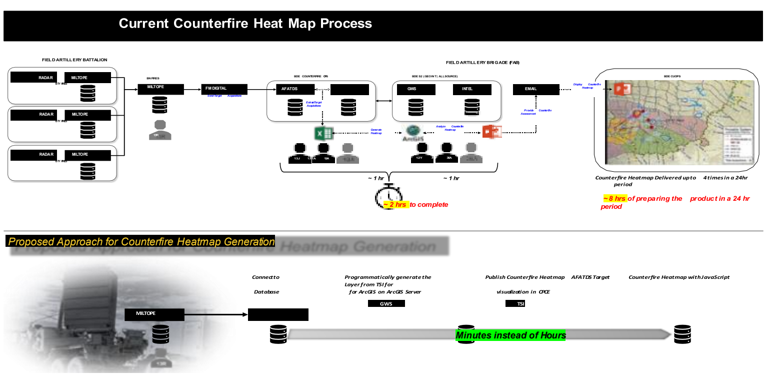

Figure 1*: The current and proposed approach for counterfire heat map production*

Figure 2*: III Corps Counterfire Dashboard Proof- of-Concept*

DISCUSSION, FUTURE WORK & SIGNIFICANCE: The automated Counterfire HeatMap proof-of-concept has the potential to revolutionize counterfire assessments, enhancing decision-making during operations. Future development aims to expand the solution's capabilities by incorporating Air Missile Defense (AMD) data and scaling the system across the entire Army enterprise.

ACKNOWLEDGMENTS: (AFC, ASwF, 75th FAB, MTC, Fires CDID, PM FSC2) Any sources of support or other significant contributions or contributors to the work should be noted here.

REFERENCES: Porritt, T.J., & Roe, C.P. (2019). Aggressive counterfire with ground moving target indicator in large-scale combat operations. *Fires, September-October 2019, Achieving joint, multinational interoperability*, 27. Retrieved from http://sill-www.army.mil/firesbulletin; 1st Cavalry Division MTI CONOP; Wilson, R. (2019, April 17). Effective FIRES TTP against WARSIM. *MilBook.* Retrieved from https://milbook.army.mil

BEYOND LINE-OF-SIGHT ANTENNA

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INTRODUCTION: Conventional Beyond Line-of-Sight (BLOS) systems depend on satellite communications, which exhibit inherent unreliability and prohibitive costs, rendering integration into platoon-level robotics impractical. Adversaries exploit satellite vulnerabilities through signal jamming, cyberattacks, and anti-satellite weaponry. Environmental factors, including dense terrain, urban environments, and extreme weather, further compromise satellite connectivity. The BLOS-A employs a fiber optic tether to extend communications beyond line-of-sight, achieving reliable communications at a fraction of the cost. It facilitates data transmission over fiber optic cables up to 5 km BLOS, with subsequent Line-of-Sight (LOS) relay of 1-3 km to robotic platforms. This innovative approach integrates seamlessly with existing communications infrastructure, circumventing satellite vulnerabilities and enabling the force to rapidly field new capabilities. Legacy communications networks on the 21st-century battlefield lack economical and reliable BLOS capabilities at the tactical level, limiting operational reach and robotic control. Integrating a tethered antenna system will extend these networks' range and resilience, but challenges such as fiber optic complexity, power requirements, and vulnerability to enemy detection must be addressed to ensure seamless and secure connectivity.

DESIGN SPECIFICATIONS: The tethered antenna must be designed for deployment by a robotic system organic to the company level. The efficacy of the tethered antenna is directly proportional to the extent of its deployable range and duration of time for which it can transmit.

These characteristic needs drive the following design specifications:

- Independently generate and store power.
- Deployable by Medium Reconnaissance Drone (MRR).
- Integrate with existing communications infrastructure and control software.
- Attritable (low cost, cannot store sensitive information).

The BLOS-A (Fig.1) is designed around the MPU5 radio enabling use of the Tomahawk Controller [1]. The BLOS- A transmits and receives encrypted data from the Tomahawk controller via USB to fiber-optic converters. The BLOS-A is powered by a combination of solar panels and lithium-polymer batteries allowing up to 30 hours of continuous transmission on batteries alone. The platform has two configurations – one for storage and one for deployment – and is manufactured out of lightweight composites. The center of gravity is located 6.78 in from the ground allowing a maximum deployment slope of 52°.

The performance specifications are as follows:

- **Weight:** 9.8 lbs (with batteries and fiber-optic spool)
- **Dimensions:** 15x15x14 in collapsed, 28x28x18 in deployed
- **Power:** 180 in^2 Solar 25Wh Max, 300Wh 4S 2P LiPo
- **Fiber-optic:** 9/125µm Single Mode, 10 Gb/S Max, 5kM Max Tx range.

The BLOS-A is made of 6 different subsystems. These include the Tomahawk controller, fiber-optic Tx and Rx, MPU5, electrical, structural, and pneumatic. The legs of the BLOS-A are telescoping carbon fiber tubes deployed by a pneumatic system. The pneumatic system is rated to 100 psi with all four legs deploying at pressures as low as 35 psi in bench top testing. The electrical system is controlled by a customized micro Battery Management System (BMS) allowing the platform to either be plugged into a standard 120V outlet or charge by solar. The fiber-optic transceiver and receiver are Commercial Off the Shelf (COTS) products that have

Figure 1. *Computer Aided Design (CAD) rendering of BLOS-A in collapsed configuration*

successfully transmitted data over 1 km of fiber-optic in initial testing. To reliably deploy fiber-optic from the BLOS-A, a benchtop Computer Numerically Controlled (CNC) lathe was built and programmed to accurately and repeatedly spool fiber optic onto a removable component of the BLOS-A. The structure of the BLOS-A is manufactured from aluminum and carbon fiber.

EXPERIMENTS: The BLOS-A is currently being manufactured with individual tests on subsystems conducted along the way. Experiments on the employment of the platform have not been conducted.

DISCUSSION, FUTURE WORK & SIGNIFICANCE: The CAD model and calculated performance specifications establish theoretical capabilities, guiding plausible employment concepts and strategies. These concepts are to include electromagnetic signature dislocation, and extension of an advertised robotic platforms range BLOS by 5km. Live experimentation with a working prototype is expected to begin as early as 1 May 2025. Produced at scale, the BLOS-A has the ability to rapidly extend the range and reliability of robotic communication utilizing existing communications infrastructure. It will enable robotic platforms to conduct missions they would otherwise be incapable of and increase the survivability of robotic operators by dislocating their electromagnetic (EM) signature. Future implications of the BLOS-A incorporate FM communications to extend its capabilities to all communications at the tactical level.

REFERENCES: [1] *AeroVironment, Inc.*
https://www.tomahawkrobotics.com/products/controllers. Accessed 14 April 2025.

C2-SMART LEVERAGING DATAOPS TO AUTOMATE RUNNING ESTIMATES AT SCALE

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INTRODUCTION: “If you know the enemy and know yourself, your victory will not stand in doubt” [1]. Today, Army commanders must often assume, instead of knowing, the critical munitions their Soldiers possess because the logistics and fires running estimates are built with stove-piped and analog reporting systems, delaying critical munitions visibility until the information is irrelevant (Fig 1).

Currently, the Army approaches this challenge with broad assumptions, elaborate workarounds, and non-standardized intensive manual processes which require hundreds of man-hours for each echelon to receive, process, aggregate, and submit munitions statuses to higher headquarters. Accepted reporting times expand exponentially the further one gets from the “on-the-ground” truth. Instead of being armed with actual knowledge, commanders rely on intuition and hunches or massive logistical tails, a potentially unsupportable luxury in future conflicts.

How do tactical Army commanders track critical munitions (rocket and tube artillery) in near real-time from the Corps rear boundary to target servicing when the Army heavily relies on a manual, paper issue, receipt, and consumption reporting system that requires up to 168 hours to provide knowledge of “the truth”?

DESIGN SPECIFICATIONS: Utilizing DataOps and DevSecOps best practices and tools, within an agile delivery framework, develop and deploy modular, hardware agnostic data products informed by current and future data producing systems including plugins, application programming interfaces (APIs), and artificial intelligence (AI) to inform the fires and logistics running estimates about critical munitions in a modular, reusable way by creating, managing, and securing near real-time chain-of-custody, position- attributable, and consumption data from the Corps- rear boundary to the firing battalion (Fig. 2) [2].

EXPERIMENTS AND RESULTS: I Corps has developed an AFATDS API (AMT) and a TAK plug-in (TRAKR:LOG) to produce automated, accurate data feeds [2]. AMT reads AFTADS' fire-mission messages generating a granular near real-time consumption report for each artillery piece. AMT was tested at PCC-4, YS-87, and WFX 25-2. TRAKR:LOG provides convoy planning and execution on handheld devices, providing chain-of-custody and position-attributable data for munitions transported between the Corps rear boundary and firing battalions. TRAKR:LOG was tested at YS-87. These tests validated the approach and the need for further testing and refinement.

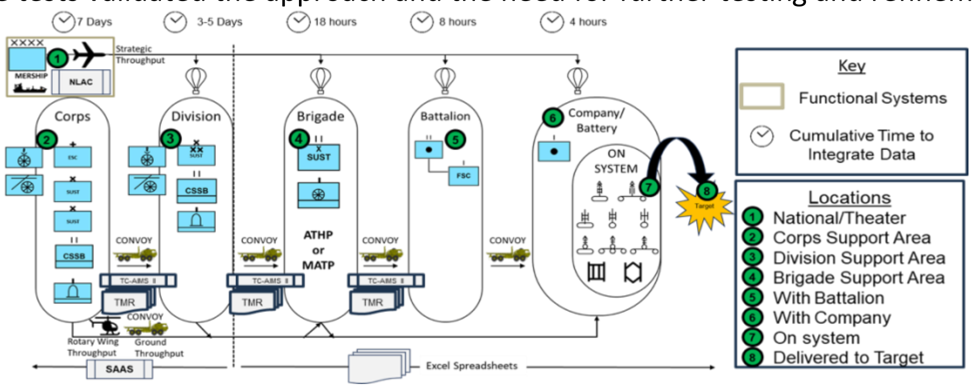

Figure 1: Current analog tracking system with cumulative data aggregation and integration times by echelon.

DISCUSSION, FUTURE WORK & SIGNIFICANCE: I Corps partnered with DARPA to develop a TAK chat capability to enable Soldiers to digitally report granular hand-counts and statuses (LOGSTAT). I Corps is also pushing on with DARPA to transition the data from these applications into modular data products on a tactical data platform (C2-SMART) that will bring AMT, TRAKR:LOG and future data streams together. C2-SMART collates the data for: what artillery units have been issued, fired, claim to have on-hand, and automatically flag discrepancies between these data streams for action. C2-SMART also informs the common operating picture by making the data products available to other systems. I Corps intends to build and validate C2-SMART's capabilities in future Warfighters.

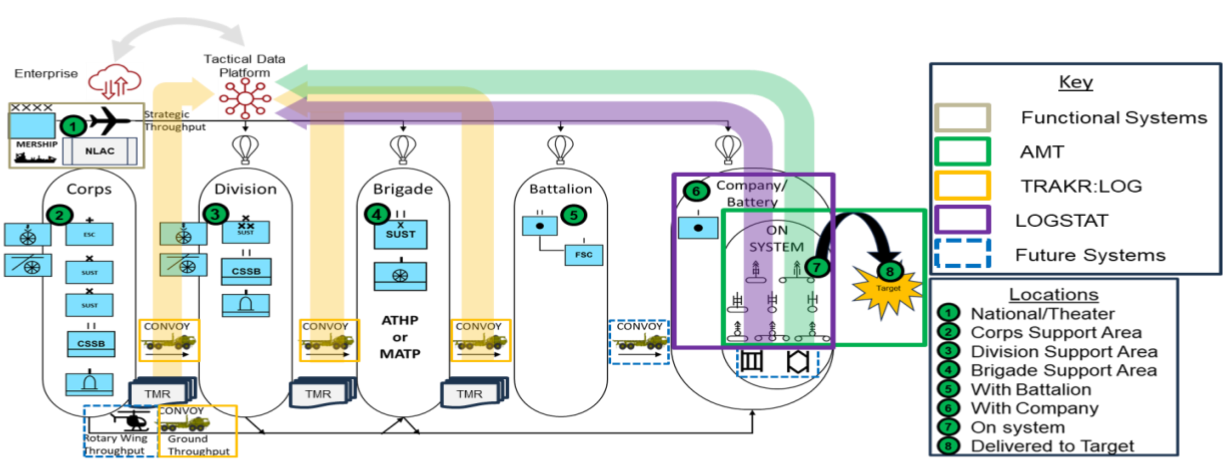

Figure 2: Desired future state, multiple integrated systems organized in modular open architecture that enables near real-time visibility and AI operations on structured data.

ACKNOWLEDGMENTS: MAJ James DiNatale, I Corps, Data Integrations and Innovations; SFC Richard Fuentes, I Corps, Data Integrations and Innovations; Daniel Wroten, Supporting Effort

REFERENCES: [1] Sun Tzu, *The Art of War*; [2] https://gitlab.d2ilabs.org/d2i/c2-smart.

Mobile Installation And Removal Cart (MIRC)

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INTRODUCTION: 2-17 Cavalry of the 101st Combat Aviation Brigade proposed a mission for the AH-64E Apache Attack Helicopter. The idea was to take an Apache and load one of the wing stores with a Reduced Crashworthy External Fuel System (RCEF) to give it extended range with a larger fuel capacity. An empty RCEF weighs approximately 290 lbs. The unit would travel a distance to a Forward Arming/Refueling Point (FARP) and land at a pad where maintainers would be waiting. The idea to remove the RCEF pod and replace it with a Hellfire Missile Launcher (HML). The maintainers on the pad would then arm and refuel the aircraft and allow the unit to conduct their mission with a full load of armaments without sacrificing a wing store for the external fuel source. The issue with this theory is the removal and installation of an RCEF pod. The current system is time-consuming and tends to become damaged from normal operation. Transporting the pod after removal was also an issue as four maintainers were required to lift and move the pod in its provided cradle. This issue would mean the aircraft would stay parked on a pad in a possibly hostile area for an extended period, a risk that needed to be mitigated.

DESIGN SPECIFICATIONS: The Mobile Installation and Removal Cart (MIRC) is a simple reinforced frame with bracket plates on both sides. The bracket plates allow for installation of removable

MIRC version 3 prototype with aluminum frame, lifting/lowering straps, and RCEF cradle.

strap winch systems. The strap winches act as lifters which facilitate the removal and installation of the pod from the cart. They can be moved from one side of the cart to the other based on the side of the aircraft on which the RCEF pod is installed. The cart frame is built around the issued cradle that accompanies each RCEF pod. The cradle has two halves, a top and bottom, that are used for storage. The bottom half of the cradle can be installed into the cart frame. The straps for the winch system route over the cradle and hook to their own original transport handles. Tightening the winches will raise the straps, while loosening the winches will lower the strap. This tightening and loosening allow for the RCEF pod to be raised and lowered to and from the cradle installed on the cart.

MIRC version 3 loaded with RCEP (front): AH-64 Apache helicopter wing loaded with Hellfire missile pod (rear).

EXPERIMENTS AND RESULTS: The MIRC experimentation was conducted within the 101st CAB and its organic AH-64 aircraft and maintainers, alongside EagleWerx engineers and project managers. Each iteration produced information that yielded several improvements of the original prototype. The initial test to remove the RCEF using standard equipment based on the technical manual recommended a safe number of personnel (4) was anywhere between 60 and 90 minutes. A few months later, the final testing resulted in removing the RCEF using the MIRC and two Soldiers. The time was reduced to less than two minutes, and the risk of injury to personnel was virtually eliminated. At that time, there was enough data to support producing multiple MIRCs for fielding utilizing Allied Trade sections within the 101st Division.

DISCUSSION, FUTURE WORK & SIGNIFICANCE: Since its initial success, MIRC was transitioned to the 101st DSB Allied Trades section to build multiple prototypes and fielded to the 101st CAB prior to deployment to CENTCOM. Further changes are expected upon data collection post-deployment. The files and schematics are available in the Warrior Design Depot. The Army website and the Army Times have published articles discussing its potential impact to the AH-64's combat projection and Army aviation operations if deployed at scale.

ACKNOWLEDGMENTS: 101st CAB (Wings of Destiny), 2-17 ACS (Out Front), Civil Military Innovation Institute (CMI2), EagleWerx Applied Tactical Innovation Center (ATIC), the Army Times, Army.mil.

TACTICAL INNOVATION IN A FORWARD ENVIRONMENT: OPERATIONAL INSIGHTS FROM THE 3RD INFANTRY DIVISION

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INTRODUCTION: The Marne Innovation Center at the 3rd Infantry Division (3ID) receives advanced technology development (6.3) funding through the Army Research Lab's Catalyst-Pathfinder program. It comprises of a Soldier makerspace at Fort Stewart, GA, and a mobile immediate-need engineering resource (MINER) which enables forward innovation during operational deployments. The Marne Innovation Center endorses a Soldier-led innovation model that allows 3ID Soldiers to own the tactical innovation process: problem identification, solution development, and solution integration. The 3ID Soldiers receive support from a hybrid Soldier-civilian team aligned with the Marne Innovation Center, which facilitates the prototype development process by providing project-aligned training, guidance, funding, equipment, and advocacy. Since establishing the Marne Innovation Center in 2021, 3ID executed forward innovation during the United States European Command (EUCOM) deployments of both 2ABCT in FY24 and 1ABCT in FY25.

CAPABILITY GAP: 1ABCT, 3ID's response to Russia's 2022 invasion of Ukraine and its subsequent deployment to EUCOM identified a gap in the brigade combat team's organic capability to innovate in a forward environment. 3ID Soldiers lacked an effective innovation mechanism at the brigade level to support the rapid prototyping of Soldier-borne innovative solutions. 3ID's lack of organic innovation capability is potentially detrimental. Soon into the war, Ukraine prioritized a decentralized acquisitions process that leans on a distributed forward innovation capability to rapidly identify and fill capability gaps with prototype solutions [1]. These organizational adaptations helped to reverse the gains of an overwhelming Russian military and to rapidly integrate emerging technologies at the tactical level to gain an asymmetric advantage over Russian forces [2]. The most essential component for innovation according to analysis of the Russo- Ukrainian War is personnel [2]. Soldiers of all ranks and MOSs frequently possess the intellect and operational understanding needed to seek out and leverage available technologies to adapt/enhance their unit's warfighting ability. The missing component in U.S. Army ABCTs, needed to replicate Ukraine's success in innovation, is a deliberate mechanism at the tactical level to enable the rapid development and proliferation of innovative Soldier solutions in a forward environment.

PROCEDURE SPECIFICATIONS: Documented below are the insights gained from 3ID's experiences in conducting forward innovation.

- **Echelon:** The brigade is the optimal echelon for employing a MINER due to the availability of organic military resources and its relatively contained geographic area of responsibility in large-scale combat operations (LSCO).
- **Top-Down Buy-In:** The brigade commander must advocate for the employment of the MINER to accelerate awareness and prioritization of innovation efforts with the brigade, and to ensure subordinate commander buy-in for forward innovation.
- **Mobile Makerspace (MINER):** For an ABCT, a sufficient makerspace facility is a 20-foot expandable container with two 3D modeling workstations, five 3D printers, a digital electronics workstation, and an assortment of basic manufacturing and drafting tools. The facility must have adequate materiel storage and a controlled print environment: <30% humidity and 72- 78°F. The facility achieves these conditions through a window-mounted AC unit, portable heaters, and dehumidifiers, all powered by the container's dedicated 30kW generator. The facility must be transportable via a palletized load system (PLS) or similar organic logistics platform and must be ruggedized/durable enough to operate in austere environments.
- **Location:** The MINER must be co-located with a combined arms battalion (or IBCT equivalent) to ensure availability to the warfighter. Co-location with a brigade (or higher) headquarters creates a perceived and geographic barrier between the innovation resource and the primary client: the Soldier. The MINER should also be reasonably available to the brigade support battalion (BSB) and enabler units (UAS, EW, Allied Trades, Fires) to ensure the availability of innovation resources to Soldiers operating in emerging domains of warfare and whose mission impacts the brigade.
- **Facility Manager:** The civilian engineer or technician responsible for the MINER. The manager is the on-site subject matter expert (SME) and the facility's purchase authority. Managers must be proficient in prototyping and Soldier instruction.
- **Innovation Officer/NCO Support:** The facility manager's counterpart who is committed to the forward innovation mission, responsible for guiding the Soldier through the innovation design process and leading innovation project integration.
- **Unit Liaisons**: battalion-level liaisons provide swift and necessary operational context to the forward innovation team.
- **Purchasing:** An essential aspect of 3ID's innovation initiative is its expedient and streamlined purchasing process in support of Soldier innovation projects through a decentralized consortium of commercial vendors. This process reduces purchase timelines from weeks to days and is an operational center of gravity which enables the rapid development of Soldier solutions.
- **Preparations:** Before deployment, it is essential to establish a shared understanding

between the innovation and the unit stakeholders regarding the responsibilities, available resources, support requirements, and innovation priorities surrounding the forward innovation initiative. Deliberate preparations significantly reduce friction and delays early in the deployment.

- **Innovation Measures of Performance (MOPs):** (1) The duration between problem sourcing and the development of an initial minimum-viable-product (MVP); objective value is less than 10 days ; (2) the proportion of prototypes integrated within unit operations that yield a net positive impact on the unit's ability to complete its mission; objective value is >80% ; (3) the quantity of prototypes scaled beyond the initial prototype and original Soldier stakeholder; objective value is more than two during an operational rotation or >30% of all projects sourced during the deployment.

REFERENCES: [1] Bondar et al. (2025), CSIS, [2] Jones et al. (2023), CSIS.

CLASSIFLYER: A COUNTER-UAS EARLY WARNING TOOL

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INTRODUCTION: Adversarial Unmanned Aerial Systems (UAS) continue to present growing challenges in contemporary conflict zones. Signals Intelligence (SIGINT) analysts in CENTCOM regularly face difficulties rapidly identifying these UAS threats using sensor data. Traditionally, analysts cross-reference sensor inputs manually against historical data, a process that is both time-consuming and prone to delays. The result is slower dissemination of critical intelligence and early warning to frontline units. Stated bluntly, analysts need a faster and more reliable method to classify large (Type 3) adversarial drones based on sensor data, significantly reducing delays from detection to actionable intelligence.

DESIGN SPECIFICATIONS: ClassiFlyer is a JWICS-hosted, Python-based Streamlit web application integrated with a backend hosted on Amazon Web Services (AWS) SageMaker utilizing a K-Nearest Neighbors (KNN) clustering machine learning algorithm. Sensor inputs from Air Vigilance platforms are copied and pasted into the frontend by SIGINT analysts and processed rapidly for accurate classification. The intuitive user interface simplifies interactions, enabling swift and accurate identification without significant training requirements. AWS provided by Army Cloud Computing Service Provider (AC2SP) hosting ensures efficient, scalable processing suitable for operational demands, and guards against catastrophic loss of data.

EXPERIMENTS AND RESULTS: Initially, our approach focused on using an unsupervised clustering algorithm on the raw sensor data and then relying on SIGINT analysts to create labels from these clusters. It was functional, but the results were mixed. During this process we learned that SIGINT

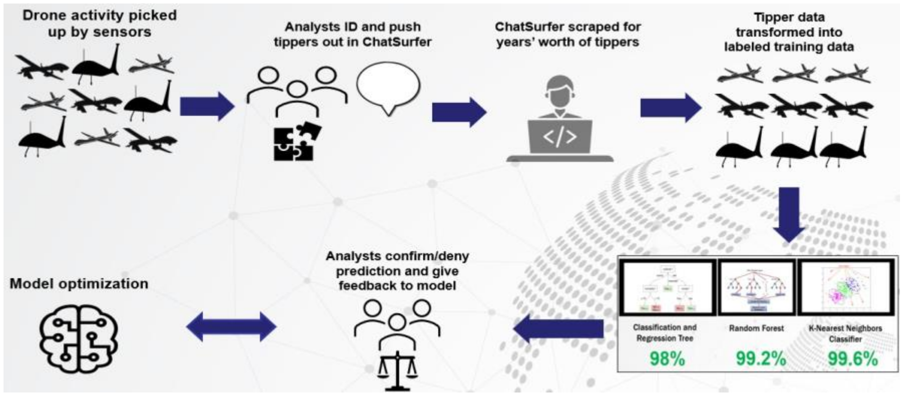

Figure: *ClassiFlyer data and training pipeline*

analysts send their early warning reports to specific JWICS channels on ChatSurfer, and that these reports contain all the characteristics needed to identify the platforms. Utilizing the ChatSurfer API, we scraped three years' worth of previous SIGINT reporting, extracted the parameters from each report, and overlaid it on the raw sensor data to generate a labeled training dataset. We then pitted three different supervised clustering algorithms against one another to rank their accuracy. Subsequent operational testing demonstrated ClassiFlyer's effectiveness, achieving a classification accuracy rate of 99.6%. Implementation significantly reduced the time from sensor detection to actionable intelligence, decreasing average classification time from approximately 15 minutes per event to mere seconds. This streamlined process has saved the 513th Air Vigilance over 800 hours annually, allowing analysts to redirect their efforts toward mission-critical decision-making tasks rather than manual data verification. See Figure for the full pipeline breakdown.

DISCUSSION, FUTURE WORK & SIGNIFICANCE: ClassiFlyer is currently operational, providing tangible improvements in responsiveness and efficiency within tactical environments. Future development will focus on enhancing data integration capabilities and expanding the adaptability of the user interface to incorporate emerging sensor technologies. Broader deployment across additional units and theaters could further standardize and enhance tactical capabilities. This advancement could substantially improve operational responsiveness, directly influencing battlefield outcomes and strategic decision-making. Air Vigilance sensors are all the same regardless of which theaters they are in. The UAS within those theaters will vary, but the output will not. While ClassiFlyer is currently fine-tuned only on the CENTCOM AOR, it should hypothetically be possible to train this algorithm on PACOM, EUCOM, or SOUTHCOM AORs provided the same base reporting is available to serve as training data.

ACKNOWLEDGMENTS: The development of ClassiFlyer would not have been possible without the efforts of CW2 Ben MacDonald, CPT John Stockdale, CPT Charlson Ro, CPT Sarah Starr, and CPT Diana Ochoa

NEXT-GENERATION AUTONOMOUS WARFARE: A UNIFIED APPROACH TO MASS-SCALE UNMANNED AIRCRAFT SYSTEMS (UAS) OPERATIONS

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INTRODUCTION: The People's Liberation Army (PLA) and, to a lesser extent, Russian forces have shifted the cost-exchange ratio in favor of defense by fielding dense, layered Integrated Air Defense Systems (IADS), rendering exquisite platforms vulnerable and unsustainable for Large-Scale Combat Operations (LSCO). In response, the U.S. Army adopted Multi-Domain Operations (MDO) to converge kinetic and non-kinetic effects (KE/NKE), establishing five MDTFs and the Cyber-Space-Special Operations Forces (SOF) Triad to operationalize this concept. However, the theory of dynamically targeting time-sensitive, non-compliant threats has outpaced the reality of current sensing architectures and available magazine depth.

In response to a growing number of non-cooperative maritime targets and a timeline that continues to shift left, Indo-Pacific Command (INDOPACOM) units of action have adopted a triage-driven approach to acquisition and manufacturing—prioritizing scalable mass over exquisite capability. **Warfighters operating in INDOPACOM require an autonomous, scalable strike solution that can survive dense IADS networks, function in a Denied, Degraded, and Disrupted Space Operational Environment (D3SOE), and be produced at scale under compressed timelines**. We designed a forward-producible High-Altitude Launched Effect (HALE) system equipped with Alternative Position, Navigation, and Timing (APNT) terminal guidance optimized for One-Way Attack (OWA) saturation tactics that impose asymmetric cost on adversary IADs. The resulting tactical imperative is to deliver autonomous, attrition-tolerant effects under D3SOE. We present a validated framework centered on mass-produced, forward-deployable HALE platforms weaponeered to overwhelm adversary defenses through tempo, volume, and saturation.

DESIGN SPECIFICATIONS: The systems-based approach combines proven, mass-manufactured HALE systems across varied planforms–including Tyr Heimdall, Sierra Nevada Corporation (SNC) Ronin, and Aerostar NS3 with the U.S. Army Artificial Intelligence Integration Center's (AI2C) Peregrine Autonomous Terminal Guidance System. Peregrine, capable of running on edge-compute devices such as NVIDIA Jetsons, enables visual targeting and APNT terminal engagement, enhancing survivability in D3SOE. Each platform adheres to a Modular Open Systems Approach (MOSA), enabling rapid payload integration, multi-mission configuration, and cross-platform interoperability while maintaining a unit cost below $10,000. Manufacturing is sustained by a distributed edge production network with quality assurance protocols developed in partnership with Oak Ridge National Laboratory (ORNL). The architecture is optimized for field-driven iteration, incorporating operator feedback and Generative Adversarial Network (GAN)-based model refinement to rapidly adapt against evolving threat environments.

This architecture supports a closed weaponeering loop, in which production, survivability modeling, and effect-based targeting are integrated to inform iterative platform refinement and mission planning. The system is being operationalized across INDOPACOM through collaboration with 1st SFG (placement and access), 1st MDTF (targeting apparatus, resourced through Pacific Multi-Domain Training and Experimentation Capability (PMTEC) and Accelerate the Procurement and Fielding of Innovative Technologies (APFIT)), 25th Infantry Division (25ID) (logistical scale), 5th Air Support Operations Squadron (5ASOS) (joint air integration), and Special Operations Command Pacific (SOCPAC) (support via Warfighting Lab Incentive Fund (WLIF)). This approach reflects a technical response to validated operational capability gaps, concepts, targeting realities, and logistics constraints that define the LSCO fires.

EXPERIMENTS AND RESULTS: A custom Monte Carlo simulation developed in Python modeled UAS survivability across multi-wave OWAs against representative IADS configurations, including the HHQ-9, HHQ-16, and Close-In Weapon System (CIWS) variants. The simulation accounted for radar detection, environmental attrition, and missile engagement modeling under contested conditions. Initial wave analysis showed a 42% survivability rate, increasing to 65% by the second wave due to sensor overload and adversary magazine depletion. CIWS nodes reached saturation within the first two waves, validating the core principle of tactical volume and tempo as a cost-imposition mechanism. Model variables included probability of kill (P(kill)), radar dwell time, radar cross-section (RCS) manipulation via formation tactics, and reload timelines. All parameter selections and threat system behaviors were informed by threat models and technical references that gained concurrence across communities of interest. Key parameters were stress-tested through sensitivity analysis to assess robustness across threat densities and engagement scenarios.

DISCUSSION, FUTURE WORK, & SIGNIFICANCE: This approach reframes survivability as a function of persistence rather than protection. By leveraging attrition-tolerant mass and continuous iteration, the force generates asymmetric advantage at a fraction of traditional system cost. Near-term development is focused on refining autonomous algorithms, high-altitude deployment protocols, and integration into regional concepts of operation (CONOPs) across INDOPACOM. Cadets from the U.S. Military Academy's Aerospace Engineering major can employ the platform as a senior capstone project-reinforcing the value of design-education cycles in shaping future warfighters. This framework offers a repeatable, adaptable model for the impending D3SOE conflict where supply chains are contested. It bridges strategy and engineering to deliver a scalable, effects-driven warfighting capability built for the realities of MDO and LSCO.

ACKNOWLEDGMENTS: We thank the 1st MDTF, AI2C, ORNL, and our SOF partners for their support and operational insights.

REFERENCES: Available upon request.

OUTLINING FORWARD INNOVATION AS AN ARMY REQUIREMENT

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INTRODUCTION: The purpose of the U.S. Army's innovation efforts is to empower the warfighter to win the nation's wars. A force prepared to adapt in the face of uncertainty serves as a hedge against unexpected changes in the character of war [1]. Moreover, the necessity to develop systems that both encourage innovation at the tactical level and can rapidly adopt innovations in tactics, techniques, technologies, procedures, and operating concepts is validated by contemporary [2] and modern [3] history. The Army accordingly empowers and encourages grassroots Soldier innovation with the Tactical Innovation ecosystem, consisting of dozens of units collaborating with U.S. Army DEVCOM's Catalyst-Pathfinder program and the Civil-Military Innovation Institute (CMI2) to provide Soldiers with laboratories equipped with fabrication equipment and software development capabilities. These "makerspaces" are overseen by full-time civilian and military staff to both operate this equipment and provide oversight, mentorship, and support to turn Soldier problems into battlefield solutions [4]. However, the rapid pace of modern battlefield innovation necessitates an expeditionary innovation capacity to solve Soldier problems and field new equipment in a deployed environment. It is not enough to rely on existing slow acquisitions processes. The also Army cannot rely on stateside makerspaces when technology may be outdated by the time it reaches the front [5] and where ubiquitous sensors, reconnaissance, and long-range precision fires contest logistical capabilities [6]. Units must have the organic capacity to innovate and solve problems with rudimentary technical solutions while deployed, a capability gap which must be closed. To this end, the expeditionary ability to rapidly innovate and quickly provide new capabilities to the point of need, at scale–herein called "Forward Innovation"–must become an Army Requirement.

PROCEDURE SPECIFICATIONS: A "Requirement" is a statement validated by Service Components or the Joint Staff as a "[testable or measurable] product or operational process or function" that the Army *must* be able to do based on the current operating environment [7]. For example, the need for vehicles resistant to IEDs in Afghanistan became a requirement that framed acquisitions portfolios and guided industry development to meet this capability gap [8]. Ironically, "Forward Innovation" must become a requirement because requirements often take years to write, and the process the defense industry and acquisitions communities use to meet requirements takes years after that. Such a slow process in fielding new technology would be fatal in fast-paced modern combat. For this reason, the "Forward Innovation" Requirement is envisioned as a forward-deployable mobile makerspace staffed by Division Innovation Officers, non-commissioned officers (NCOs), and subject matter experts that is closely networked with Corps Innovation Officers, regional innovation labs, sustainment commands, the existing Army innovation and modernization enterprise, and outside partners in academia and industry. Mobile makerspaces will gather problems from frontline troops and serve as the conduit among Soldiers, their leadership, and the Army innovation ecosystem. Makerspace capabilities must be comparable to existing tactical labs, including but not limited to 3D printing, metallurgical equipment, fabrication technology, and a software/data component, keeping them on the cutting edge if a hardware or software solution is needed.

IMPLEMENTATION AND RESULTS: These capabilities would merely be an advanced version of what the 3rd Infantry Division accomplished with the Mobile Immediate Need Engineer Resource (MINER). The MINER is a mobile innovation makerspace that deployed twice to U.S. European Command (EUCOM) for unit rotations, validating of the utility of "Forward Innovation." The MINER sourced 13 projects from one deployment, including systems that separated the engine from the transmission on a Paladin without overhead-lift capability, and provided advantageous line of sight (LOS) in detecting and defeating sUAS targets [9]. These advancements are striking considering that the MINER is relatively inexpensive (~$150,000). The MINER kept a Paladin fully mission-capable and offered protection from small unmanned aerial systems (sUAS) where little existed. It is not hard to imagine how these solutions could be the difference between defeat and victory in combat. Additionally, consider this against the alternative: changing the Army contract for the Paladin system could cost thousands of man-hours and millions of dollars–time and money the MINER saved.

DISCUSSION, FUTURE WORK & SIGNIFICANCE: The intent of "Forward Innovation" would not be to replace or work around existing acquisitions or modernization processes, but to quickly develop "good enough" equipment at the point of need, while simultaneously feeding Soldier problems to the broader innovation and industry community for further study and iteration. On that note, the solutions for "Forward Innovation" outlined here are not meant to be prescriptive or exhaustive, merely a starting point for further refinement by the broader community of interest through the requirements process. Further work must be done to integrate this capability into existing staff processes, as well as plan for its inclusion and operation in a large-scale combat operations context. Combat Training Center (CTC) rotations provide the perfect venue for such experimentation.

ACKNOWLEDGMENTS: The actual work to prove that the concept discussed here can work in a deployed environment was conducted by 3rd Infantry Division's Marne Innovation Center; special thanks to Chris Aliperti, Mallory Moore, and Brenden Shutt for providing their extensive input to this article and making their analyses of the MINER available to me.

REFERENCES: [1] Livieratos (2022), Rumsfeld (2001); [2] Hoffman et al. (2009), Meyer (2007), Wahlman (2015); [3] Antal (2023), Hester, Doyle and Defton (2024), Krepinevich (2024); [4]

Armstrong et al. (2024), Cogbill (2018), Harrison, Rao and Mulloth (2018), Solsbury (2023); [5] Petraeus and Roberts (2023); [6] Brose (2020); [7] *AcqNotes*, https://acqnotes.com/acqnote/tasks/requirement-types, (n.d.); [8] Gansler, Lucyshyn and Varettoni (2010); [9] *Marne Innovation Center* (2024).

THE USMA FUTURE APPLIED SYSTEMS TEAM: A HUB FOR PROTOTYPE TESTING

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INTRODUCTION: To innovate at the pace needed for the next Large Scale Combat Operation, the Army needs a hub that connects U.S. Army Forces Command (FORSCOM), researchers, innovation labs, and operators. The United States Military Academy (USMA) Future Applied Systems Team (FAST) works to fulfill this purpose. The FAST is a platoon-sized element of cadets supported by a collaborative team of staff and faculty from the Department of Electrical Engineering and Computer Science (EECS) and the Robotics Research Center (RRC). As a group of Cadets from various majors and class years operating under USMA's academic umbrella, the FAST is uniquely unconstrained by traditional FORSCOM training cycles and approval processes. This enables rapid system prototyping, field testing, and Tactics, Techniques, and Procedures (TTP) creation. As the FAST gains additional institutional support and partners, we hope that it becomes a first-rate environment for prototype testing and TTP generation, and that it becomes a model for tech-enabled leader development.

PROCEDURE SPECIFICATIONS: The FAST operates with two priorities: teaching Cadets to conduct tech-augmented dismounted infantry operations and designing/executing situational and field training exercises (STX/FTX) in conjunction with partners from academia and FORSCOM. The FAST currently operates as a platoon-sized element with three infantry squads and a fourth squad dedicated to the employment of autonomous systems. To build knowledge and team cohesion, FAST hosts weekly meetings to teach members relevant skills as well as develop and refine TTPs and SOPs. The FAST also organizes FTXs and STXs nearly every other weekend during the academic year. Each exercise is designed to improve team members, train a piece of technology, and/or reinforce a traditional skill or tech-specific countermeasure. One example of this was a

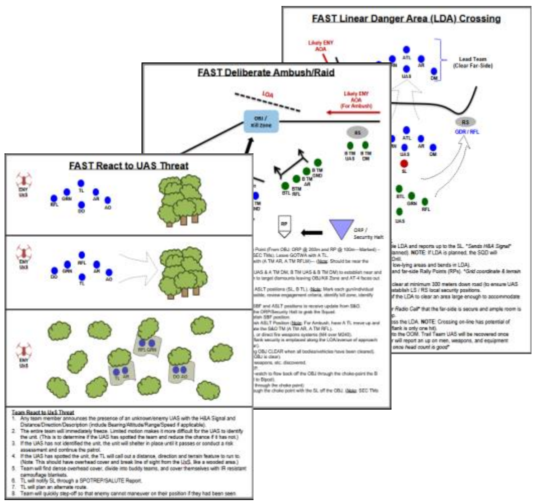

Fig. *Examples of new drills and alterations to old drills created by the FAST. Source: FAST TACSOP*

cadet-designed nighttime raid exercise that FAST used to test lowlight Skydio X2D performance and efficacy of a Robotics Research Center-designed grenade dropper, but also to practice Battle Drill 6, M50 ProMask employment, and movement under NODS. Another example is an RRC and NASA-designed mass casualty (MASCAL) STX, used to trial an AI triaging system and medical resupply drone, but also to practice react-to-UAS and casualty collection point TTPs. Such exercises provide relevant training to Cadet participants and useful data points for researchers.

While the FAST primarily accomplishes its mission through in-person training exercises, senior members pursue additional functions. Select members advise various USMA capstone projects, providing field testing opportunities, using field-oriented expertise, and allowing for interested FAST members to continue researching and refining these projects after the completion of the capstone. Another capability of the FAST is the ability to organize virtual exercises through a heavily modified version of Arma3. This serves as a convenient, low-cost alternative which allows the FAST to test the tactical utility of technology in a simulated, highly customizable environment.

IMPLEMENTATION AND RESULTS: Current FAST capability goals include the ability for cadets to operate comfortably with future-baseline systems such as ATAK and Silvus mesh network radios, plus UAS (Skydio X2D and Hoverfly) and UGV (Spot, Ghost Vision 60, Warthog) assets. Additionally, the FAST aims to allow civilian partners and researchers the opportunity to experience a field environment and understand the constraints placed on their prototypes by both the real world and the warfighter. In Academic Year 2025 alone, the FAST conducted 11 different exercises with 19 partners from USMA, the Army, and research labs. The most tangible result, iterated upon after every FTX/STX, is a robust FAST TACSOP which includes nearly 100 pages of best practices. It is available upon request to members of the TII community.

DISCUSSION, FUTURE WORK & SIGNIFICANCE: The FAST is working to enable more exercises and cross-training opportunities. This will require continued coordination with the USMA administration, Army partners, and researchers. This coordination is enabled through high-visibility events such as the USMA Human-Robot Teaming Exercise (HuRTx) and the Tactical Innovation Symposium. FAST maintains an extensive networks of partners, including the entirety of the Joint Force, much of the Intelligence Community, members of the interagency, and representatives of industry and academia. In the near future, FAST cadets are slated to advise on UAS operations at JRTC and Robin Sage, audit the RUSIC UAS programs at JFKSWCS, and work with industry leading companies such as Anduril Industries. Ultimately, the benchmark for FAST's success will be the infusion of military-ready technology, field-tested tactics, and tech-competent leaders into the Army.

Virtual Innovation Support Integration Operation Network (VISION)

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INTRODUCTION: At Mobilize, we recognize that in today's environment of strategic competition the Department of Defense (DoD) faces an urgent need to accelerate its ability to leverage data for impactful, strategic outcomes. Yet, the current system remains hampered by outdated processes, rigid acquisition pathways, and isolated efforts that inhibit the potential for seamless connection and collaboration. Like many large organizations, DoD grapples with these challenges; however, its unique mission to deter conflict and maintain technological superiority demands a foundational level of connectivity and visibility across portfolios and departments to enable rapid, data-driven decision-making.

The National Security Strategy has emphasized the importance of "better integrating data and analytic tools to support decision-making." Achieving this objective requires connecting the entirety of the innovation pipeline—a pipeline that currently faces obstacles in linking end-user demand signals to development efforts and external resources. Without technology solutions designed to bridge capability gaps and align development with implementation, DoD risks falling short of the speed necessary to meet future challenges. **At Mobilize, our mission is to address this need by building tools that foster connectivity, streamline workflows, and drive actionable insights across the defense innovation ecosystem.**

PROCEDURE SPECIFICATIONS: VISION is a first-of-its-kind ML-powered, secure collaboration platform designed to expedite innovation and deliver results. With over 9,000 joint users and over 4,500 initiatives and projects, VISION uses centralized data to make connections that allow users and organizations to innovate more efficiently by reducing duplication of effort and promoting faster adoption of replicable solutions internally and with commercial partners for DoD. The platform enables end-to-end project management, funds tracking, strategic alignment, and impact reporting—while offering advanced discovery tools, real-time collaboration, and secure, role-based access across the innovation ecosystem.

VISION provides leadership at all levels with radical transparency and oversight, enabling visibility of the entire innovation and development pipeline. VISION allows leadership to make data-informed decisions, identifying and prioritizing relevant initiatives and projects to advance and allocate resources while synchronizing portfolios and investments across strategic priorities.

IMPLEMENTATION AND RESULTS: VISION has demonstrated significant impact across DoD, with over 4,500 projects being actively tracked across the Air Force, Space Force, Army, and Navy. Within the Air Force, VISION is a required tool for accessing Squadron Innovation Funds, a $32 million annual budget dedicated to unit-level innovation. Additionally, multiple major commands within the Air Force have formally designated VISION as the standard platform for tracking innovative efforts, reinforcing its role as an enterprise-wide enabler.

The platform's user base spans from headquarters teams to grassroots innovators, ensuring broad adoption and engagement across all levels of the defense ecosystem. VISION has successfully facilitated cross-service collaboration, enabling joint efforts that would otherwise remain siloed. Notably, over 20 commanders from various commands have collectively funded an internal government tool, showcasing the platform's ability to drive strategic investment decisions. By reducing duplication of effort and streamlining workflows, VISION has already saved DoD an estimated $220 million+, demonstrating its value in optimizing resources and accelerating innovation.

DISCUSSION, FUTURE WORK & SIGNIFICANCE: As VISION continues to evolve, its future capabilities are designed to further enhance collaboration, streamline processes, and leverage emerging technologies to drive efficiency across DoD. Expanding core functionalities such as the Problem/Requirement-Solution Application will enable VISION not only to track innovation but also to actively facilitate problem-solving by aligning capability gaps with emerging solutions. With anticipated user expansion across joint and interagency partners, and increased automation of administrative workflows, VISION is positioned to generate even greater time and resource savings—potentially accelerating adoption cycles and reducing innovation timelines at scale. Additionally, enhanced data integration will allow VISION to provide deeper insights and improve decision-making across the enterprise.

Artificial Intelligence and Machine Learning (AI/ML) will play a pivotal role in shaping the next phase of VISION. By implementing RAG-enabled large language models, federated learning, and AI-driven initiative guidance, VISION will streamline data entry, enhance knowledge retrieval, and enable smarter resource allocation. These advancements will significantly reduce duplication of effort while accelerating the pace of innovation. The introduction of custom AI-driven reporting, predictive risk assessments, and dynamic dashboards will ensure that decision-makers have real-time, actionable insights tailored to their mission needs. Ultimately, these enhancements solidify VISION as a foundational tool for defense innovation—one that not only improves efficiency but also strengthens DoD's ability to maintain technological superiority in an era of strategic competition.

REFERENCES: [1] https://www.mobilizevision.com/ [2] https://vision.il4.afwerx.dso.mil.

3D-Printed Drones

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INTRODUCTION: In early 2024, when the U.S. Army announced plans to phase out the RQ-7 Shadow and RQ-11 Raven, the Black Hornet 3 was the only unmanned aerial system (UAS) left in the 101st maneuver brigades. This squad–level drone fell short of the Intelligence, Surveillance, Reconnaissance (ISR) capabilities needed for future conflicts. Further, the Chief of Staff's Transformation in Contact initiative demanded an immediate solution for Soldiers across the 101st Airborne Division. The 101st ABN DIV (AASLT) adopted EagleMAV, an NDAA-compliant 3D-printed short-range reconnaissance drone, to mitigate risks from divesting the Raven and Shadow UAS. Designed to close the short-range reconnaissance (SRR) drone gap at battalion and below, the drone had to be buildable and repairable by a Soldier. Through a partnership with the Catalyst Pathfinder Program, Fort Campbell's EagleWerx, 5th SFG (A), EchoMAV, and the 101st ABN DIV (AASLT), a Soldier's idea evolved into the full fielding of 100 EagleMAV drones.

Senior leadership identified several key advantages over traditional procurement: cost, timeline improvements, internal production, and repair capabilities. A conservative estimate places Army-wide fielding of SRR tranche 2 at 2028. Further, Blue List SRR systems are, on average, twice as expensive as EagleMAV. With EagleMAV, the 101st was able to achieve sufficient SRR density across its remaining maneuver brigades within five months and within the Division's budget. The EagleMAV is 3D-printed using Division internal equipment and assembled by Soldiers. Traditional SRR and MRR have lengthy repair timelines unsuitable for future conflicts. Multi-month wait times drove the 101st to pursue a solution that its Division Sustainment Brigade can easily print, and that Soldiers can repair. Finally, the NDAA compliance is vital to meet Army requirements and spur domestic manufacturing.

PROCEDURE SPECIFICATIONS: The first step in accomplishing this mission was taking the idea from start to finish in the Catalyst Pathfinder Program. This program is available at multiple Army installations. At Fort Campbell, EagleWerx is the center for all things innovation and manages these types of initiatives. Upon submission of the idea at EagleWerx, an innovation officer (project manager) and member of the Civil Military Innovation Institute (CMI2) took control of the project. Based on the level of expertise required and the project timeline, EagleWerx decided to use an industry partner to design and build a prototype of the 3D printed drone. EchoMAV, a company out of Knoxville, Tennessee, took on the six-month seed project in which the Catalyst Pathfinder Program out of the Army Research Labs paid for all research and development of the drone. With regular feedback during the seed phase, the final product was ready at the end of these six months.

After presenting this drone to the 101st ABN DIV (AASLT) commander, MG Sylvia requested that 100 of these drones be issued to Soldiers no later than the February Division Training Exercise, Operation LETHAL EAGLE (OLE). This gave EagleWerx and members of the division staff less than four months to complete the procurement, 3D printing, and assembly of and training on 100 EagleMAV drones. Because every acquisition method for innovation is unique, this project required a new and specific process for implementation.

EagleWerx immediately began working with Army Legal and Contracting Command to create a plan of action. After developing an understanding of the difficulties of sole source contracting and the extended duration of contract competition, it was decided to utilize traditional procurement methods, specifically, the Defence Logistics Agency (DLA). The mission took place in four phases: procurement, 3D printing, assembly, and training.

IMPLEMENTATION AND RESULTS: Procurement required an exception to policy (ETP) including an ETP to purchase non-Blue UAS parts. It also required EchoMAV to list its product in DLA using an intermediary prime vendor. The 101st utilized a government purchase card to buy the filament for 3D printers and Division funds to purchase the internal components from EchoMAV in DLA. 3D printing required every Allied Trades section in the Logistics Support Battalions to 3D print constantly for four weeks. Assembly took place over one week in a classroom setting with EchoMAV leading. The Soldier Operator was also the Soldier who assembled the drone. This was to aid in troubleshooting and better understanding of the equipment. Training took place in the field over two weeks. The first week consisted of EchoMAV training 15 NCO trainers, followed by a week of training the remainder of the operators.

Training was the greatest weakness of this process. If more time was available, a preferred method would be ten-person cohorts to receive training over one-week intervals.

DISCUSSION, FUTURE WORK & SIGNIFICANCE: The process of a Soldier's idea turning into a procured and utilized piece of equipment is the goal of the Catalyst Pathfinder and Innovation Programs across the Army. Repetition of this process will help ease the bureaucratic pains which slow it down.

ASSISTANT MACHINE GUNNER'S BAG

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INTRODUCTION: Assistant gunners in light infantry units have the task of carrying 400 rounds of 7.62 mm ammunition, an 18" x 14" folded tripod, and a spare barrel, as well as their sustainment for up to three days of food, water, and clothing. The weight displacement as well as equipment requirements makes it very challenging to pack their ruck in an ergonomic and efficient manner. In particular, the rounds and tripod need to be quickly accessed. There is added difficulty when rounds land on the ground; dirty rounds jam the weapon system and compromise mission success.

In early 2022, multiple Soldiers from 2-506th Infantry Battalion came to EagleWerx and submitted the idea for an assistant gunner (AG) specific rucksack which would organize their ammunition, tripod, and other equipment. Over the next two years, over 10 iterations of prototypes underwent experimentation, resulting in an assistant machine gunner bag that attaches to the program of record MOLLE 4K frame and is now available for units throughout the Army to purchase at their Base Supply Center (BSC).

PROCEDURE SPECIFICATIONS: Taking a Soldier's idea from white board to satisfactory end product is no easy feat. The Army innovation ecosystem has been working to this end for over five years. In this case, the procedure followed the avenue of submitting the idea to EagleWerx, Fort Campbell's Applied Tactical Innovation Center, working on prototypes in house, followed by hiring an industry partner to prototype once the complexity grew. Upon multiple iterations of prototypes with this industry partner, ATS Tactical, the final product transitioned to all BSCs throughout the 18th Airborne Corps and is testing with the Next Generation Squad Weapon–Automatic Rifle (NGSW-AR) program for inclusion in the Additional Authorized items List (AAL).

The Army Research Labs Catalyst Pathfinder Program paid for the prototyping both in house and with the industry partner. The contractors executing this program, from the Civil Military Innovation Institute (CMI2), coordinated all interactions with the industry performer while the Innovation Officers at EagleWerx coordinated Soldier experimentation and feedback. Each iteration of experimentation was accompanied by surveys for end users to fill out with specific feedback on design features and practical application to ensure the final design met the Soldier's needs.

Once Soldiers were satisfied with the final product, EagleWerx began reaching out to program offices to gauge interest on transitioning to a program of record. The Soldier Enhancement Program by PEO Soldier was identified as a promising avenue, btu he product was not initially accepted. After displaying the product at multiple military conferences, however, the program manager for NGSW-AR saw great promise. At this time, the AG bag is undergoing formal testing with PM NGSW-AR for hopeful addition to the Additional Authorized Load (AAL). Addition to the AAL is set to trigger an NSN creation for the AG bag, making it even easier for Soldiers to order the bags.

To pursue multiple transition pathways,, EagleWerx simultaneously contacted Lions Club International, the contractor for base supply stores in 18th Airborne Corps. Surprisingly quickly, the relationship between ATS Tactical and LCI allowed the bag to be available for pre-order and purchase at all base supply stores in the 18th Abn Corps. For any innovation products that have a manufacturer, this is a fast method to allow procurement even without a National Stock Number (NSN).

IMPLEMENTATION AND RESULTS: Working with an industry partner allowed for rapid transition and implementation of this product. The diligent efforts to get surveys and data points throughout experimentation also improved the likelihood of success. A multitude of units outside of the 101st experimented with the AG Bag, including Special Forces units, 82nd Airborne Division, 25th Infantry Division, and 2nd Calvary Regiment(2CR). The bags supported operations at JRTC, JMRC, NTC, and during multiple division field training exercises.

DISCUSSION, FUTURE WORK & SIGNIFICANCE: This purpose-built bag sparked ideas in engineer and artillery Soldiers to request also creative ways to carry their equipment. EagleWerx is working on a series of light-fight system ensembles that rapidly transition from long movement to fighting for 13 different Military Occupational Specialties (MOS). While there is no requirement aligned to these products, EagleWerx proved that it is possible to get a Soldier's idea from initiation to end user en lieu of using traditional acquisition methods.

COLLECTION MANAGEMENT WORKSPACE (CMW) ABSTRACT

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INTRODUCTION: In 2024, a Military Intelligence Officer in the 101st Airborne Division, 1LT Jordan Lawson, recognized a critical need within the Intelligence Community (IC): to eliminate the cumbersome process of building Intelligence Collection Matrices and Intelligence Collection Sync Matrices in PowerPoint and Excel. This laborious task, burdened by constant revisions and manual analysis, led to cognitive fatigue among analysts, hindering their ability to deliver timely and insightful intelligence. 1LT Lawson submitted this challenge to the EagleWerx Applied Tactical Innovation Center, sparking the development of a revolutionary solution: the Collection Management Workspace.

This purpose-built software transcends the limitations of traditional methods, automating the creation of matrices and freeing analysts to focus on higher-level analysis. The Collection Management Workspace provides statistically backed insights derived from observed data, enabling more informed and effective decision-making. Moreover, the software acts as a planning and briefing tool for the collection manager, allowing for intuitive correction and presentation of information.

The true power of the Collection Management Workspace lies in its ability to marry seamlessly the scheme of fires with the scheme of collection. By visually integrating these two critical elements, commanders gain a real-time, comprehensive understanding of what intelligence is being gathered, by which assets, and where those efforts align with planned operations. This innovative approach promises to revolutionize intelligence collection management, empowering analysts and providing commanders with the actionable intelligence necessary for decisive action.

PROCEDURE SPECIFICATIONS: The first step to accomplishing this mission was taking the idea from start to finish in the Catalyst Pathfinder Program. This program is available at multiple Army installations. At Fort Campbell, EagleWerx is the Center for all things innovation and manages these types of initiatives. Upon submission of the idea at EagleWerx, an innovation officer (project manager) and member of the Civil Military Innovation Institute (CMI2) took control of the project. EagleWerx leveraged its in-house software development lab, including one Army Specialist and two CMI2 interns, to produce a stand-alone, database-less application that operates off a config file loading system for ease of use and data management. Crucial to development were continuous Soldier Touchpoints with end users to get regular and robust feedback to the developers.

To transition the program onto SIPR, the entire program was first designed in accordance with DOD STIGs (Security Technical Implementation Guides) to maintain an active program certification as well as security compliance. Prior to introducing the program into a SIPR environment, ACAS (Assure Compliance Assessment Solution) scans needed to be completed to assess potential vulnerabilities within the program. Because there is zero communication over the network from the program, it is effectively a blank slate until it is filled out, reducing the risk of vulnerabilities. Additionally, the information within is not sensitive to any degree until the user injects the data into the program. Next, the G6 Network Manager had to provision the software over the network by making it available in the SIPR software center. Throughout the entire process there were frequent touchpoints with cARMY, a cloud ecosystem, established by the Enterprise Cloud Management Agency (ECMA) to streamline cloud adoption across the Army. to approve a code signing certificate enabling the machine to trust the software program.

IMPLEMENTATION AND RESULTS: The Collection Management Workspace now resides on SIPR and is available for direct provision to units by way of onboarding to their SIPR software center. Data collection indicated that this method was far superior to the previously used methods via Excel and PowerPoint, reducing product creation from multiple hours to a mere ten minutes on average. Coupled with the analytic capabilities, this product was a decisive step in the right direction for collection management. As it stands, this product will work well for collection managers at the battalion, brigade, and division level. One key item to note is that this product is meant to be stand-alone and therefore does not operate as a collaborative space at all. All interaction with the program is isolated to the one instance on the machine. To share the products created, a file must be exported and sent to peers who wish to view the same plan, or a snapshot can be taken to be sent elsewhere. Real-time collaboration and mapping will be addressed via the AIDP (Army Intelligence Data Platform) counterpart in production as of March 2025.

DISCUSSION, FUTURE WORK & SIGNIFICANCE: A traditional FORSCOM unit has never produced software from ideation to transition in six months and successfully deployed the solution to SIPR. The completion of this initiative promises to pave the way for more units to do the same and enable uniformed Army developers to build bridges toward creating effective solutions for tactical needs at the edge. Going forward, the CMW will be reproduced in AIDP and operate as a requirement answer for the IC.

INNOVATING WITH ACADEMIA: GTRI'S COLLABORATION APPROACH

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The Georgia Tech Research Institute (GTRI) is committed to accelerating the development and fielding of innovative capabilities to address emerging threats and meet Soldier needs. By fostering regionally-aligned partnerships with leading academic institutions in Georgia and incorporating Soldier feedback into applied research and development (R&D), GTRI aims to enhance Army readiness and combat effectiveness.

As a designated University Affiliated Research Center (UARC) by the Department of Defense (DoD), GTRI operates under a special mandate that demands the highest levels of integrity and objectivity. This status enables GTRI to access sensitive and proprietary government and supplier data and engage in unique collaborative opportunities not available to traditional DoD contractors. The UARC designation is essential for maintaining government trust and ensuring that GTRI's efforts directly support national defense priorities as illustrated in the Figure.

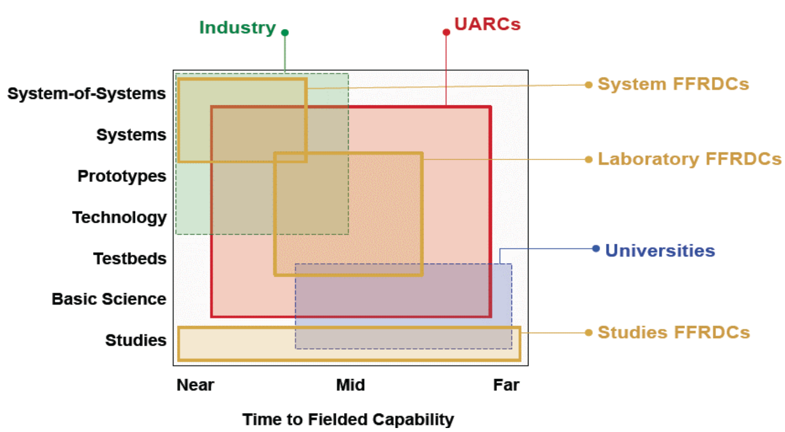

Figure: *GTRI UARC Operating Space*

Through collaborative efforts that address challenges faced by warfighters at the tactical level, this initiative delivers cutting-edge technology solutions tailored to real-world operational needs. Its structured approach ensures that Soldier-driven innovations are translated into deployable capabilities within 6-18 months, providing a rapid return on investment for the U.S. Army.

One notable success from the collaboration between GTRI and the 3rd Infantry Division's (3ID) Marne Innovation and Technology Center is the Mold Conditions Awareness Tool (MCAT). This device detects conditions conducive to mold growth in barracks and other potentially unoccupied facilities during deployments, helping protect Soldiers' personal belongings and Army equipment. 3ID Soldiers developed a prototype sensor to evaluate the concept, which was then scaled up for mass production by the research team. As a result, new sensors have been installed in over 3,000 rooms and will be evaluated during the upcoming summer season. If successful, MCAT could be implemented more broadly across Army facilities, significantly mitigating mold-related risks.

The GTRI-3ID partnership addresses critical Soldier-identified problems raised by "Dawg-faced Soldiers" at Fort Stewart and Wright Army Airfield. By converting these challenges into actionable solutions, the initiative directly supports DoD and national security objectives. Moreover, the program strengthens local R&D infrastructure through close collaboration among 3ID, Soldiers, and research teams.

This comprehensive approach to fostering R&D relationships ensures long-term benefits to Army capability development and reinforces the nation's defense posture.

Through its innovative partnership with 3ID, GTRI exemplifies its commitment to tactical innovation and the rapid deployment of mission-ready solutions. GTRI's unique UARC status enhances its ability to integrate sensitive data and collaborate effectively with government and supplier stakeholders. This initiative demonstrates the power of incorporating Soldier feedback into R&D efforts—enhancing Army readiness while building enduring relationships with regional research assets.

Call for Papers

I am pleased to invite you to the 4th Tactical Innovation Symposium at the United States Military Academy on April 23, 2025!

This event provides an opportunity for the Tactical Innovation community to collaborate, present, and publish best practices or ongoing projects. Below are event details and a new opportunity to submit an abstract for presentation and publication at the Symposium.

The Tactical Innovation Symposium has grown into one of the largest semi-annual gatherings of Soldiers, Airmen, Sailors, Marines, Researchers, and others committed to solving technical challenges at the tactical edge. Our last event in December was a massive success, with representatives from nearly every branch and component of the DoD sharing their cutting-edge work. The intellectual capital generated at this conference is immensely valuable and deserves wider dissemination to enhance our mission of enabling Soldiers to solve problems at the edge. Moreover, the incredible talents presenting their work deserve greater recognition.

To support this, the Tactical Innovation Institute and the USMA Department of Civil and Mechanical Engineering are partnering with the West Point Press to produce a peer-reviewed proceedings publication from this Spring's Symposium!

We invite you to submit a one-page abstract (templates attached) for publication following the Symposium and a peer-review process. All accepted abstracts will be presented at the event, but we encourage attendance even if you do not plan to submit an abstract or present!

We are particularly interested in submissions in the following categories, though other ideas are welcome:

1. Technical
Transitioning technical projects from innovation labs often depends on disseminating products for replication by sister organizations. Additionally, few mechanisms exist to formally recognize innovative work. Publishing a short paper on a project facilitates dissemination and provides scholarly credit to the innovator.
For these submissions, provide a technical overview of a project or product you are working on and are prepared to share with the community. The project may be at any stage, from concept to production. Your one-page abstract may include a link to supplemental materials, and you will have the opportunity to present in more detail at the Symposium.

2. Procedural
Many of you have developed creative ways to navigate and disrupt existing processes, building highly successful organizations despite limited resources. We invite you to share an operational challenge you have overcome, a process you've developed, or a best practice that can help other tactical innovation officers grow and learn. These ideas may be specific to your theater of operations or DoD branch. Submissions should be one-page abstracts but may include a link to supplemental information, with additional details presented at the Symposium.

Submission Deadline
📅 Abstracts are due by April 14 at 23:59 EST
📧 Submit to: tacticalinnovationinstitute@gmail.com

You have accomplished remarkable things in forging this tactical innovation effort, and your work deserves to be amplified and properly credited. We look forward to welcoming you back to West Point—whether to present your own work, collaborate with peers, or learn from the groundbreaking projects of fellow innovation officers and Cadets.

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