JOINT INTERAGENCY FIELD EXPERIMENTATION 25-1

4 – 8 November 2024

Hosted by the Naval Postgraduate School

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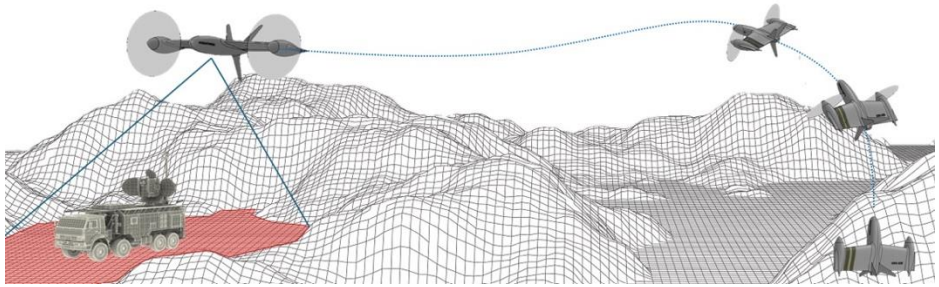
A-04: Automated Flight of Next-Gen Transitioning Micro VTOL UAS



PROJECT INFORMATION

Organization Name:	Knightwerx Inc
Principal Investigator:	Daniel Baumgartner
Technology Readiness Level:	TRL 6: System/subsystem model or prototype demonstration in a relevant environment.
Research Area of Interest:	A) Unmanned Aerial Systems
Funding	Internally

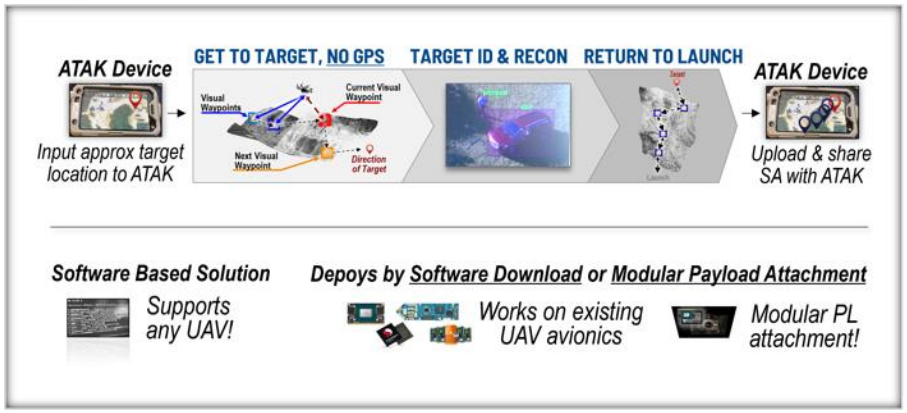
PROPOSED EXPERIMENT OVERVIEW

Knightwerx will conduct a flight test experiment with the company's new KWX ALPHA Micro VTOL aircraft prototype (Group 1) to collect telemetry and flight dynamics data in a relevant environment. This test will increase the TRL of the prototype from 5 to 6 by demonstrating a higher speed and longer endurance Micro UAS than traditional multi-copter and helicopter platforms. The experiment will encompass automatic execution of a pre-planned mission including takeoff, hover, transition to fixed-wing flight, cruise and loiter, transition back to hover, and landing. The data collected will include telemetry to measure flight performance, visual and audible observability from the ground.

SYSTEM DESCRIPTION

The Knightwerx ALPHA prototype is a micro UAS with two rotors which provides precise, efficient propulsion and control in both hover and fixed wing forward
flight.

A-05: UAV Autonomy, GPS-Denied Navigation, Precision Target/Object Relative Maneuver



PROJECT INFORMATION

Organization Name:	Rhoman Aerospace
Principal Investigator:	Thomas Youmans
Technology Readiness Level:	TRL 4: Component and/or breadboard validation in laboratory environment.
Research Area of Interest:	A) Unmanned Aerial Systems
Funding	Both Internally & Federally

PROPOSED EXPERIMENT OVERVIEW

Perform flight tests to characterize and test target/object relative maneuver; perform flights to, gather data for, test, and refine vision-based navigation systems and Alt-PNT solutions.

SYSTEM DESCRIPTION

Rhoman Aerospace supports Air Force, Space Force, and Navy stakeholders with no-emit, vision-based GPS-Denied UAV navigation and autonomy solutions. The technology at the core of our experimentation revolves around visually detection objects and features of a flight area and enacting maneuvers and guidance/navigation relative to various detected features.

A-06: ATAK Live Mapping with UxO Detection

PROJECT INFORMATION

Organization Name:	Greensight
Principal Investigator:	Kennan Arlen
Technology Readiness Level:	TRL 6: System/subsystem model or prototype demonstration in a relevant environment.
Research Area of Interest:	A) Unmanned Aerial Systems
Funding	Federally (Army)

PROPOSED EXPERIMENT OVERVIEW

The ATAK Live Mapper is a software system which provides real-time aerial mapping of a geographic area which is streamed directly from an in-flight to UAV to fighters on the ground. At JIFX GreenSight hopes to test the system's streaming and mapping capabilities as well as the newly integrated objected detection networks to identify and geolocate dummy unexploded ordnance (UxO) targets on the ground.

The tests will consist of pre-planned routes as directed by a local ground control system. Imagery will be stitched directly on the UAV, streamed to a lightweight PC, then forwarded to an ATAK tablet. UxO detection will take place using the live image feed, and be integrated directly onto the ATAK maps. GreenSight will evaluate mission success using metrics including imagery throughput, map update latency, UxO detection accuracy, and mapping quality. We will also invite other JIFX participants to evaluate the system and its effectiveness.

SYSTEM DESCRIPTION

The ATAK Live Mapper builds upon technologies such as simultaneous localization and mapping (SLAM), spatially localized data chunking, and dynamic tiling for the purpose of aerial mapping. The system defines low-memory and algorithmically efficient data formats and standards which are designed to reduce mapping latency and increase the throughput of aerial intelligence.

The system first captures imagery using the in-flight imagery capture and tagging pipeline. That imagery is passed to the live mapping algorithm which produces fresh chunks of mapped intelligence which is then tiled by the dynamic tiling service and served to the ATAK tablet with the installed plugin.

The UxO detection utilizes a YOLO ML network trained on an army provided dataset. The outcomes of these tests will help inform the computational constraints that should be placed on the UAS as well as the communication and computation requirements for hardware on the ground.

A-07: Hybrid Electric Propulsion for Long-Endurance UAVs

PROJECT INFORMATION

Organization Name:	Burgess Aerospace Innovations
Principal Investigator:	Johnathan Burgess
Technology Readiness Level:	TRL 6: System/subsystem model or prototype demonstration in a relevant environment.
Research Area of Interest:	A) Unmanned Aerial Systems
Funding	Internally

PROPOSED EXPERIMENT OVERVIEW

BAI's experiment focuses on advancing the efficiency of its hybrid electric propulsion system for long-endurance UAVs by refining each system component. Building on our expertise in turboelectric and piston engine technologies, we will systematically target and optimize critical components such as power generation, energy storage, and power management. By analyzing the performance of each subsystem, we aim to identify areas for improvement that will lead to overall system efficiency gains.

BAI will measure success through rigorous data collection on component-level performance, comparing pre- and post-experiment metrics for efficiency, power output, and system integration. This experiment will also lay the groundwork for future transitions into hydrogen-based propulsion, as improvements made in this phase will reduce the learning curve for incorporating hydrogen fuel cells in the future.

SYSTEM DESCRIPTION

The core of BAI's system is a hybrid electric propulsion technology designed for long-endurance UAV applications. It integrates traditional power sources, such as turboelectric, rotary, or piston engines, with electric propulsion to create a system that balances endurance with efficiency. By combining different propulsion methods, our system offers a flexible solution that can be adapted for various mission profiles and environmental conditions.

BAI's technology is also designed with future scalability, allowing for potential integration with hydrogen fuel cells. This adaptability ensures that our system remains relevant as propulsion technologies evolve, offering a clear pathway for future UAV performance and sustainability enhancements.

A-09: SA4 - Secure Advanced Aerial Attritable Asset

PROJECT INFORMATION

Organization Name:	GreenSight
Principal Investigator:	Mitch Jones
Technology Readiness Level:	TRL 6: System/subsystem model or prototype demonstration in a relevant environment.
Research Area of Interest:	A) Unmanned Aerial Systems
Funding	Federally (DARPA)

PROPOSED EXPERIMENT OVERVIEW

Takeoff- at takeoff a pilot will be controlling the aircraft. we connect the aircraft to a construction placed on bed of a truck, we accelerate the truck to 80mph, release aircraft, climb to 200ft , the pilot will give ok to for the ground control to take command of the aircraft.
Flight - aircraft will climb to altitude up to 1500ft and fly to waypoints preprogrammed in the range of up to 10km. during this time we are intending to get information of battery consumption, we will also want to do some maneuvers to get information of maximum speed at dash and dive.
Landing- the aircraft will be flown to an agreed upon waypoint and height which will allow the test pilot to have visual of the aircraft and in turn take control and land the aircraft on its belly on a runway.

SYSTEM DESCRIPTION

Fixed wing aircraft that is supposed to carry several types of payloads and be built in large quantities

B-01: Phalanx Shield Multi-Domain Sensor System

PROJECT INFORMATION

Organization Name:	Innovative Algorithms
Principal Investigator:	Jay Chestnut
Technology Readiness Level:	TRL 6: System/subsystem model or prototype demonstration in a relevant environment.
Research Area of Interest:	B) UxS Design, Deployment, Operation, Networking, and Control
Funding	Internally

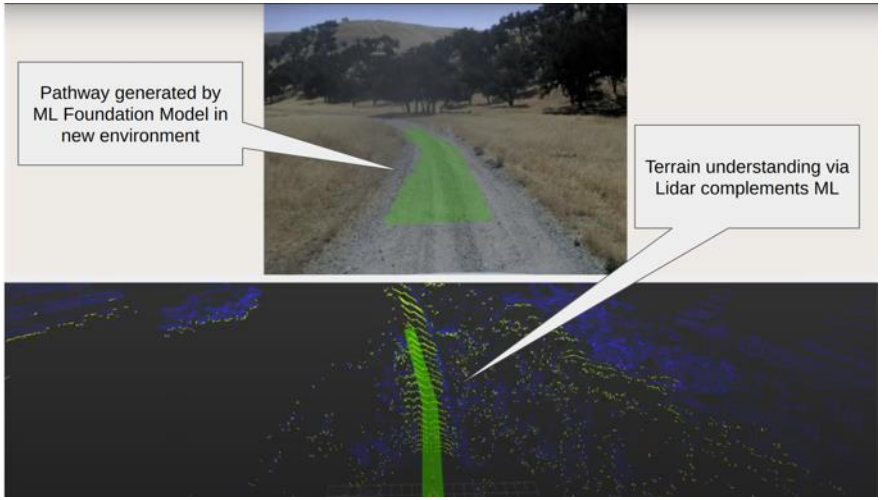
PROPOSED EXPERIMENT OVERVIEW

Innovative Algorithms will be experimenting with the Phalanx Shield multidomain sensor system, testing improved human detection algorithms, RF communication antenna configurations, and equipment prototypes, including a small-unit tactical gateway, and a dispersed counter-UAS detection module

SYSTEM DESCRIPTION

The Phalanx Shield sensor system can be integrated with small UAS and other detection equipment and software

B-02: Development & Assessment of Off-Road Autonomous-Driving and GPS-Denied Mapping Capabilities



PROJECT INFORMATION

Organization Name:	BlueSpace.ai
Principal Investigator:	Jeremy Templeton
Technology Readiness Level:	TRL 6: System/subsystem model or prototype demonstration in a relevant environment.
Research Area of Interest:	B) Unmanned Systems (UxS) Design, Deployment, Operation, Networking and Control
Funding	Internally

PROPOSED EXPERIMENT OVERVIEW

Providing off-road mapping, situational awareness, driver-assist and autonomous driving can reduce risk to the warfighter and provide a force multiplier during deployment

1. Our first experiments will assess new mapping and navigation technology for the warfighter:

* New in-field map reconstruction for mission planning and coordination mapping
* Advanced algorithms for improved navigation accuracy in GPS-denied environments

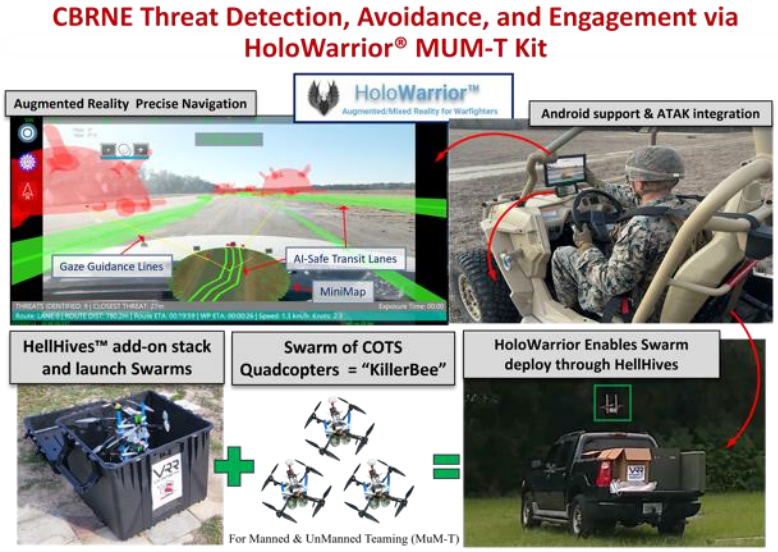
2. Our second experiments will test offroad autonomy algorithms in off-road environments relevant for DOD missions:

* Advanced generative AI models that can understand off-road terrain and predict paths towards a goal state
* Following routes created in the field for resupply and logistics"

SYSTEM DESCRIPTION

* BlueSpace provides off-road autonomy solutions without traditional dependencies on AI, training data, and HD maps
* Our software leverages 4D sensors with our proprietary algorithms based on math and physics to deliver autonomy in any domain
** Industry-leading positioning accuracy (CTE<0.3%) using 4D Lidar/Inertial Odometry in any location on any terrain
** Motion-first perception provides detects and tracks objects with industry-leading motion estimation, no AI necessary
** Safe motion planning that avoids other agents with no training
** Cutting-edge generative AI methods to understand unstructured off-road areas
* Learn more at http://bit.ly/BlueSpaceDemos

B-07: CBRNE Threat Detections, Avoidance, and Engagements via HoloWarrior MUM-T kits for vehicles



PROJECT INFORMATION

Organization Name:	VR Rehab Inc
Principal Investigator:	Kevin Hernandez
Technology Readiness Level:	TRL 7: System prototype demonstration in an operational environment.
Research Area of Interest:	B) Unmanned Systems (UxS) Design, Deployment, Operation, Networking and Control
Funding	Federally (DTRA- Army, CBD-Army, MARCORSYSCOM - Navy)

PROPOSED EXPERIMENT OVERVIEW

This experiment will evaluate the HoloWarrior MUM-T kit's capabilities in three distinct stages. The first stage involves precise navigation within a manned vehicle, using AR graphics to avoid invisible CBRNE threats. In the second stage, the vehicle, co-pilot will employ HoloWarrior to launch drones from a HellHive mounted in the truck bed. These drones will perform area scans using emulated CBRNE detectors and then return to the vehicle. The final stage involves launching another drone to simulate the engagement of a detected CBRNE hazard by landing on the target with a payload matching the weight of energetic ammunition. Each stage is designed to validate key operational capabilities, from threat detection to engagement.

SYSTEM DESCRIPTION

The system at the core of this experiment is the HoloWarrior MUM-T kit, an advanced Mixed Reality (MR) platform designed by VRR Inc. to enhance situational awareness and autonomous operations. Central to the system is the HellHive, a ruggedized container that securely stacks multiple quadcopter drones. These drones are integrated with emulated CBRNE detectors and can be launched autonomously from the HellHive. The HoloWarrior interface enables real-time AR overlays, allowing operators to control drones and navigate complex environments with precision. The system's robust design supports automated threat detection, drone deployment, and engagement missions, providing a comprehensive solution for mission-critical operations in challenging environments

B-10: OverDrive Autonomous Uncrewed Ground Vehicle

PROJECT INFORMATION

Organization Name:	Overland AI
Principal Investigator:	Chris Higgins
Technology Readiness Level:	TRL 6: System/subsystem model or prototype demonstration in a relevant environment.
Research Area of Interest:	B) Unmanned Systems (UxS) Design, Deployment, Operation, Networking and Control
Funding	Federal (DARPA, DIU, PdM Robotic Combat Vehicle, Marine Corps Systems Command, Army Applications Lab, Army Research Lab

PROPOSED EXPERIMENT OVERVIEW

The objective of OverDrive's ground autonomy software experiment is to provide a relevant environment to assess effectiveness and impact on identified warfighter requirements. The scope of the assessment event will be bounded by a focus on assessing technical maturity in an operationally relevant environment.

Resupply is requested from a staging location to a specific building within a small village. An initial route is planned that utilizes well-defined road to the goal location. Operator will use map-based interface to accomplish initial resupply objective, using satellite imagery to plan high-speed route to target location. During execution, operator will dynamically replan route based on surrogate intelligence information to traverse cross-country to target location.

While navigating, intelligence reports that the North-East route is unsafe due to adversary actions. The operator dynamically re-tasks the robot to take a cross-country route to reach resupply destination. The vehicle continues off-road to approach destination from the West.

SYSTEM DESCRIPTION

OverDrive software enables ground vehicles to autonomously move in rugged and contested environments, on and off-road, at speeds of 20-35+ mph. OverDrive uses machine learning to understand the terrain and make driving decisions in real-time. For this experiment, we would demonstrate OverDrive on a Polaris RZR and Textron M5.

The OverDrive autonomy software stack uses data from on-board stereo cameras and LIDAR to build a semantic understanding of the terrain, as well as deep neural networks to accurately predict elevation changes and occluded spaces blocked from the direct view of the sensors. These outputs are paired with data from wheel encoders and inertial measurement units measuring how the vehicle is moving over the terrain to create a "cost map" representing areas of higher and lower cost. The system then uses an autonomous decision-making algorithm to determine how best to move through areas of higher and lower cost to its destination.

B-14: Transfer Learning for Vessel Detection in Different Environments

PROJECT INFORMATION

Organization Name:	Naval Postgraduate School
Principal Investigator:	Sean Kragelund
Technology Readiness Level:	TRL 3: Analytical and experimental critical function and/or characteristic proof of concept
Research Area of Interest:	B) Unmanned Systems (UxS) Design, Deployment, Operation, Networking and Control
Funding	Federally

PROPOSED EXPERIMENT OVERVIEW

This experiment will use an unmanned surface vessel (USV) to collect in-water camera imagery of other vessels in various lighting conditions. This dataset will be used to validate a vessel-detection convolutional neural network (CNN) trained on synthetic imagery.

SYSTEM DESCRIPTION

This NPS thesis applies transfer learning to a vessel-detection model which was previously trained with daylight imagery to enable night-time vessel detection with a commercial-off-the-shelf low-light camera.

B-15: Maritime Domain Awareness Using Autonomous Vessels at Scale

PROJECT INFORMATION

Organization Name:	HavocAI
Principal Investigator:	Paul Lwin
Technology Readiness Level:	TRL 6: System/subsystem model or prototype demonstration in a relevant environment.
Research Area of Interest:	B) Unmanned Systems (UxS) Design, Deployment, Operation, Networking and Control
Funding	Internally

PROPOSED EXPERIMENT OVERVIEW

Assess the ability of a team of 2-3 warfighters to assemble, deploy, supervise, and recover 5-10 real HavocAI Rampage USVs with 1000s of simulated "digital twin" USVs conducting maritime domain awareness missions. A team of 2-3 end-users (preferably NPS students) will assemble 5-10 Rampage USVs. They will then deploy them in the real world. They will then attempt to supervise up to 1000 simulated Rampage USVs interacting with the real USVs in a LVC-type environment. The task will be to search a large maritime area effectively and intercept a maritime vessel of interest. Metrics that will be used to assess the experiment will include time, operator workload ratings, and effectiveness in finding and intercepting the target.

SYSTEM DESCRIPTION

HavocAI develops a scalable maritime autonomy platform with the goal of producing, deploying, and operating 1000s of autonomous surface vessels in the Pacific. Our baseline Rampage USVs cost $80,000 and we have the capability to build 10 USVs a day. HavocOS is the software framework that is integrated on the USVs that enables the USVs to conduct autonomous and collaborative missions. HavocControl is a human-machine interface designed to allow one human operator to supervise 1000s of autonomous assets. HavocCloud is a communication system allows the USVs to communicate with each other and with C2. Since founding in Jan 24, HavocAI has built 12 fully autonomous and collaborative USVs. They executed real-world missions, such as contested logistics, persistent ISR, and find/fix/intercept missions, at Silent Swarm.

C-01: Natural Fiber Composites Ballistic Resilience Testing

PROJECT INFORMATION

Organization Name:	Applied Bioplastics
Principal Investigator:	Alex Blum
Technology Readiness Level:	TRL 6: System/subsystem model or prototype demonstration in a relevant environment.
Research Area of Interest:	C) Countering Unmanned Systems
Funding	Internal

PROPOSED EXPERIMENT OVERVIEW

We have produced an inexpensive composite material ($5/sqft) that has proven in small tests to be resistant to shrapnel at 63 Joules or 500m/s. We would like to experiment with larger and faster explosive attacks, like FPV drone attacks. This material is meant to clad a Containerized Housing Unit and protect it from aerial or mortar attack. We need help with slow motion recording, ballistic characteristic testing, and spalling testing. We will attend JIFX 25-1 as observers to prepare for future experimentation efforts.

SYSTEM DESCRIPTION

We've developed a natural fiber composite with very high linear and tensile strength using proprietary bonding chemicals that create bond at the atomic level enabling superior characteristics to many types of cladding.

C-02: Atolla Tech Lidar-based C-UAS Detection

PROJECT INFORMATION

Organization Name:	Atolla Tech
Principal Investigator:	Sonia Dagan
Technology Readiness Level:	TRL 4: Component and/or breadboard validation in laboratory environment.
Research Area of Interest:	C) Countering Unmanned Systems
Funding	Federally (Air Force, National Science Foundation)

PROPOSED EXPERIMENT OVERVIEW

Atolla has succesfully validated our technology to detect and classify insects in the agricultural setting. We are adapting this technology to detect and classify UAS for DoD and commercial use cases. Our goal at JFX is to is to passively conduct data collection on the UAS in attendance to continue to build out database that informs our AI/ML classification models.

SYSTEM DESCRIPTION

Atolla's Counter-Unmanned Aerial System (C-UAS) solution offers advanced expeditionary sensor capabilities that enhance force protection and perimeter security in contested environments. The technology provides real-time, high-fidelity detection and identification of hovering or flying UAS using a compact, eye-safe lidar sensor and sophisticated ML algorithms. The lidar-based solution creates an electronic signature based on the drone propellers for identification of UAS, much like sonar can create an acoustic fingerprint for submarines. Unlike typical lidars that use 3D point clouds and image processing techniques to identify, our method of using pattern recognition algorithms of discrete data points, reduces the processing times significantly and makes identification using lidar possible in msec.

C-03: VESA – Counter UxS

PROJECT INFORMATION

Organization Name:	Empirical Systems Aerospace, Inc. (ESAero)
Principal Investigator:	Braden Henderson
Technology Readiness Level:	TRL 7: System prototype demonstration in an operational environment.
Research Area of Interest:	C) Countering Unmanned Systems
Funding	Internally

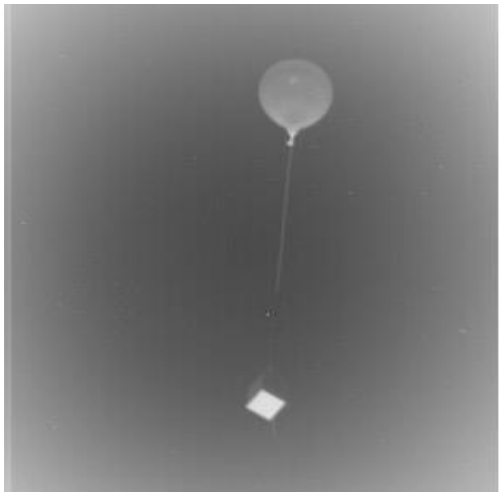
PROPOSED EXPERIMENT OVERVIEW

ESAero aims to experiment with its VESA counter-UxS in its C-UAS configuration. During this experiment, VESA will takeoff vertically, transition to high-speed forward flight (75-100 kts), detect and track a UAS target in the air, approach the target without intercepting, and return to the launch point with a vertical landing. Key data to be collected include flight speed, vision system tracking range, inert effect arming status, endurance, and range.

SYSTEM DESCRIPTION

VESA (Versatile Expeditionary Strike Aircraft) is a 3-in-1 multioperation counter-UxS. VESA's initial 3-in-1 capabilities are to include counter-UAS, loitering munition effects, and ISR (Intelligence, Surveillance, and Reconnaissance). VESA is designed to be configurable for these different missions while remaining within a backpackable formfactor. Although VESA is a backpackable VTOL system, its novel design allows it transition to forward flight with a top speed over 85 kts and host a payload up to 2 lbs. Additionally, the system is equipped with onboard vision processing to enable target recognition, object tracking, and terminal maneuvers.

C-11: Detecting Surrogate Platforms (DSP) 2.0



PROJECT INFORMATION

Organization Name:	Naval Air Warfare Center Weapons Division (NAWCWD)/ Joint Electronic Advanced Technology (JEAT)
Principal Investigator:	Richard Busse
Technology Readiness Level:	TRL 6: System/subsystem model or prototype demonstration in a relevant environment.
Research Area of Interest:	C) Countering Unmanned Systems
Funding	Federal (OSD)

PROPOSED EXPERIMENT OVERVIEW

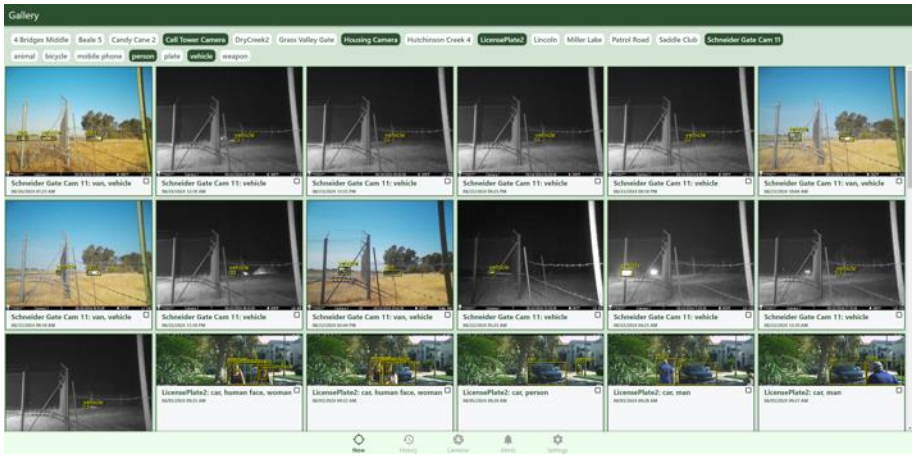
Research Questions (RQ):
1. Can staring (fixed focal plane) EO/IR cameras be used to find-fix UAP surrogate targets at tactically relevant ranges?
2. Can a cell-phone based camera with AI-based automatic target recognition and threat reporting contribute to UAP detection and characterization?
Experiment Design

SYSTEM DESCRIPTION

RQ 1: We will employ two EO/IR systems: • QmagiQ Dual Band Camera System (MWIR/LWIR Focal Plane Array): – Utilizes a 320 by 240 Type 2 Strained Layer Superlattice (T2SLS) FPA – Employs a single focal plane array – Switches bands between frames • Cyan Systems CS-3 – 0.7µm - 5 µm – 1920 x 1080 format – 5 µm pixel pitch – 250mm lens

RQ 2: Team from MITRE will test their CARPE Dronvm system on targets of opportunity. This is a smartphone application. • Computer Visioning, AI, ML to detect threat • Smartphone sensors to determine user location • Smartphone sensors to estimate drone location o GPS Location o Compass to determine phone orientation o Compass orientation to correlate with others or deconflict targets o Accelerometers to determine angle phone is being held at • Triangulation if more than one smartphone being used within physical and time proximity

F-01: ZombieCam One austere surveilance with AI



PROJECT INFORMATION

Organization Name:	Chiral Software, Inc.
Principal Investigator:	Eric Hollander
Technology Readiness Level:	TRL 7: System prototype demonstration in an operational environment.
Research Area of Interest:	F) Intelligence, Surveillance, and Reconnaissance (ISR)
Funding	Federally (AFWERX)

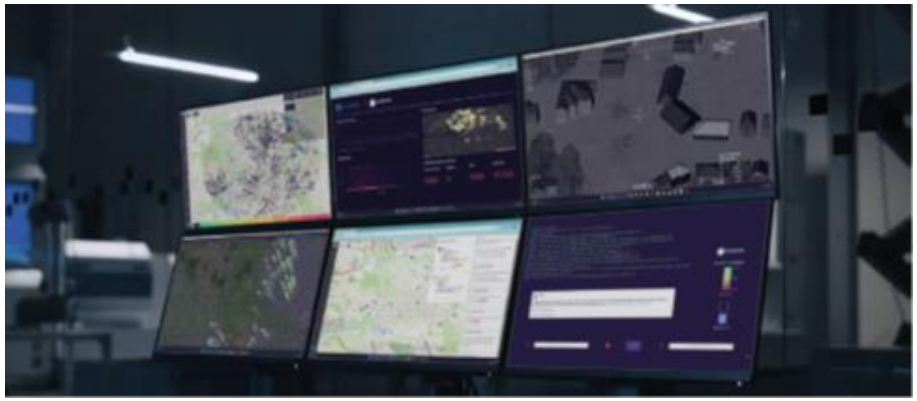
PROPOSED EXPERIMENT OVERVIEW

Our ZombieCam One sensors are designed for rapid deployment in austere locations, but we have not had an opportunity to do a realistic test of this. The experiment will be to set up several ZombieCam One units on the perimeter, link them in to whatever ad hoc network is available, and access them from a variety of user devices. A secondary goal of the experiment is to see how various expeditionary devices other vendors have might be able to access ZombieCam and see if there are changes we need to make to the technology to enable access. Finally, we are interested in the power sources which are practical in an expeditionary environment, both for the deployed sensors and the portable server unit, and if our server software can run on other vendors' portable servers. We expect to learn a lot from this experiment.

SYSTEM DESCRIPTION

ZombieCam consists of software which runs on a server, and a set of compact, rugged sensor units (cameras) which are deployed to conduct surveillance. The server software should run on any available portable server hardware. We will bring a unit to run on (an embedded NVidia computer) but we expect the same software should run on other vendors' vehicle-mounted systems. The ZombieCam One sensors connect by RF to a network to reach this server, and are powered by small (40 W) solar panels and DeWalt drill batteries. This system is designed for austere use and flexible deployment, including flexible power sources and network connections. It is designed to give Special Operations Forces the ability to rapidly secure an austere base by providing day and night intelligent surveillance.

G-06: Hadean - AI-powered Spatial Computing Platform



PROJECT INFORMATION

Organization Name:	Stucan Solutions Corp
Principal Investigator:	Stuart Taylor
Technology Readiness Level:	TRL 8: Actual system completed and qualified through test and demonstration.
Research Area of Interest:	G) Situational Awareness
Funding	Federal (UK DSTL MOD, UK Army)

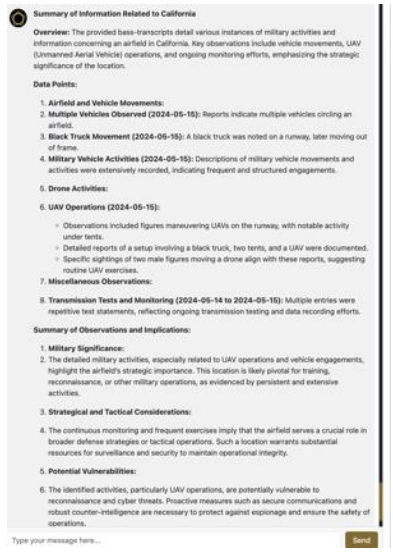
PROPOSED EXPERIMENT OVERVIEW

We intend to integrate 2 or more inputs from live data systems (industry partners contributing to the JIFX experiment) with COPERS and a 'synthetic wrap' of the exercise, augmenting the scenario with AI-enabled simulated elements to interact with and amplify the scale and complexity of the exercise. We will then export this data in realtime using an in situ 4G communications network to a cloud-hosted instance of our spatial engine and use it to provide a realtime common operating picture using 2D and 3D visualizations to both analysts on the ground in Camp Roberts and on to commanders at distributed headquarters, as appropriate within the resources and confines of the experiment. We will also provide a 2D or 3D birds eye and first person view of any simulated or physically reporting troop or element in the battlespace.

SYSTEM DESCRIPTION

Hadean's AI-powered spatial computing Platform agnostically integrates and orchestrates data in realtime into a multi-domain/-system/-level common operating picture. Integration of new and existing capabilities will be done using industry standards like DIS and HLA. For those that do not utilize those models, we provide third party support via API for direct integration or bridging of data formats like the XML found in CivTak/ATAK. As the data is presented to the Platform, it can be converted into formats that meet the needs of the environment, such as GPS, Cartesian, MGRS and other coordinate systems dynamically. The focus of integration is to be agnostic to data formats and provide an openly extensible structure to enable modern and legacy application capabilities within the game and visualization engines for the synthetic wrap to add training value and context to enable contextual AI informed decision-making and capability development.

M-01: Narrative Intelligence: Actionable Insights for Information Operations



PROJECT INFORMATION

Organization Name:	Clara Copilot
Principal Investigator:	Alex Moffitt
Technology Readiness Level:	TRL 4: Component and/or breadboard validation in laboratory environment.
Research Area of Interest:	M) Precision strike, Non-Lethal Weapons, Information Operations
Funding	Internally

PROPOSED EXPERIMENT OVERVIEW

Clara Copilot proposes using its web-based application to revolutionize how narrative intelligence is exchanged in a diverse and challenging information environment. Clara Copilot identifies biases and vulnerabilities and provides actionable recommendations from publicly and commercially available information to decision-makers for modern military information operations.

We will engage with the DoD stakeholders and Technology evaluators for end-user feedback to show them how they can operate through the integration of advanced technologies and information systems to enhance situational awareness, decision-making, and operational effectiveness.

SYSTEM DESCRIPTION

Clara transforms publicly and commercially available information in real-time into actionable insights so that military leaders can effectively implement strategies for tactical engagement leveraging Artificial Intelligence signal processing.

Clara leverages Large Language Models, Retrieval Augmented Generation (RAG), and Prompt Engineering to transform open-source data in real-time into prioritized, actionable, predictive insights, ensuring rapid, informed decision-making, and a proactive adaptive strategy. Clara's commercialization potential showcases a commitment to building a future where AI is a fundamental pillar of organizations, enhancing human capabilities, and ensuring a more prosperous, safer, and more stable world.

M-02: Thermal Optic Steel Target Heater

PROJECT INFORMATION

Organization Name:	Targeting Solutions USA
Principal Investigator:	Anthony Miele
Technology Readiness Level:	TRL 8: Actual system completed and qualified through test and demonstration.
Research Area of Interest:	M) Precision strike, Non-Lethal Weapons, Information Operations
Funding	Internal

PROPOSED EXPERIMENT OVERVIEW

The purpose of the experiment is to determine if a commonly used AR500 steel ballistic target is capable of representing the thermal profile of a human being, for "x" period of time, while under thermal optic observation. The measurements include using thermal optics to determine if the steel target presents thermal contrast, using an IR thermometer to measure and record the starting temperature and ending temperature at different locations on the target, measuring and recording the ambient temperature of the environment, measuring and recording the temperature of a human being while in the same environment, measuring and recording the length of time that heat can be sustained with the equipment being utilized.

SYSTEM DESCRIPTION

Targeting Solutions LLC has developed the Predator Innovative Thermal Targeting System (PITTS), a heating system designed to heat steel ballistic targets in order to simulate human thermal signatures for training purposes. This system consists of a heating element with adhesive attachment capabilities, a user friendly wiring system, and a battery.

M-03: Tactile Human Machine Interface Device for Situational Awareness and Hazard Alerts

PROJECT INFORMATION

Organization Name:	Neurocom
Principal Investigator:	Alexander Rosenbaum
Technology Readiness Level:	TRL 4: Component and/or breadboard validation in laboratory environment.
Research Area of Interest:	M) Precision strike, Non-Lethal Weapons, Information Operations
Funding	Internally

PROPOSED EXPERIMENT OVERVIEW

Neurocom will demonstrate a wearable device designed to assist the user in target identification of physical locations marked with COT data in the ATAK platform, as well as navigation around marked objects. Wearers of the device will be prompted to identify targets, find headings, or navigate around an area. We intend to collaborate with other groups to show how Neurocom's technology can enhance situational awareness for ground forces operating in the area of operation of sensing apparatus.

SYSTEM DESCRIPTION

Neurocom's tactile augmentation system, TAG system, is a helmet mounted haptic interface. The device creates vibration patterns on the wearer's head that provide information about the direction and distance to a COT data point. This allows the wearer to passively receive location information while keeping their eyes, ears, and hands free to focus on their duties.