POST FX

2022 Final Report

"Faster Together - Accelerating the S&T Community to the Speed of Innovation"

March 10, 2022
Honolulu, Hawai'i

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Executive Summary

The Pacific Operational Science & Technology (POST) Conference is the United States Indo-Pacific Command's (USINDOPACOM) annual Science and Technology (S&T) conference. The conference brings together policy, military, industry, and academic leadership from the US and its allies and partners to focus on the emerging stability challenges in the Pacific. The theme for POST 2022, "Faster Together – Accelerating the S&T Community to the Speed of Innovation," inspired informed, collective action across the full span of S&T exploitation.

To promote "accelerated innovation" and incite collaborative involvement, the USINDOPACOM Science and Technology Division (J85) conceived the idea of a Field Experimentation (FX) to accompany the traditional conference-information-exchange format employed in past POST events. POST FX 2022 was designed to provide a stage for field demonstrations of technologies that engage USINDOPACOM's allies and partners. In addition to POST exhibitors, vendors that did not present at POST 2022 were invited to present their technologies at POST FX. Vendors included small and local companies, larger corporations, and those employed by USINDOPACOM or other government agencies. POST FX 2022 focused on mission needs expressed by partners in the low-barrier-to-entry field environment to be witnessed by attendees at the POST 2022 conference.

POST FX 2022 was conducted on March 10, 2022, at Bellows Air Force Station (BAFS) in Waimānalo, Oʻahu. Approximately 100 experimenters from 25 different technology vendors and agencies were in attendance, in addition to over 200 international and United States (US) visitors, including the Under Secretary of Defense for Research and Engineering (USD(R&E)).

Feedback onsite and following the event has been highly positive. Experimenters, visitors, and sponsors expressed the desire to extend and improve this event as an important component of POST. This report intends to connect interested readers with POST FX organizers or technology providers for appropriate discussion using the contact information provided. **Challenges identified:** data sharing, protecting the environment, international cooperation, and expanding the use of uncrewed vehicles.

Colonel Tammy Low welcomes participants to the inaugural POST FX. | Image credit: Richard Chen

Participants at POST FX 2022. | Image credit: Richard Chen

Participants at POST FX 2022. | Image credit: Richard Chen

*Bellows AFS Hawaiʻi - site where POST FX 2022 was held.
Image credit: Josh Levy (this page and cover)*

POST Field Experimentation

PURPOSE AND OBJECTIVE

"Accelerating the S&T community to the speed of innovation" will be crucial for stabilizing and securing the Pacific for the foreseeable future. The effects of climate change on coastal populations are already impacting global geopolitics. Government involvement is inevitable as defense stress lines emerge, for example, in response to Humanitarian Assistance and Disaster Relief (HADR) efforts. An objective of POST FX 2022 was the incubation of innovation and technology aligned with the immediate and long-term USINDOPACOM Area Of Responsibility (AOR) needs. Translating innovation through force integration into deployable systems creates the operational power needed to withstand and surmount negative pressures. To extend POST 2022 beyond the conference-information-exchange format, USINDOPACOM recommended that POST FX 2022 participants and technology vendors consider the Pacific solution space to 1) identify the AOR needs before they emerge, 2) accelerate innovation to address these needs, and 3) transition innovation into operational solutions.

With testing in a user-oriented field, experimentation, collaboration, and cooperative development are rational pathways to improve Pacific AOR security progressively. Therefore, for POST 2022, a field experimentation opportunity was created wherein conference discussions could advance towards collaboration and operations.

POST conferences have historically brought Pacific security partners for an in-depth annual review to exchange immediate and future needs information. Adding field experimentation, in the form of POST FX, allows academia, agencies, and industry to promote collaboration and innovation directed towards addressing the needs identified by POST security partners.

POST SECURITY PARTNERS IDENTIFIED THE FOLLOWING CHALLENGES IN 2022:

- Contested logistics
- Operational energy
- Health security
- Pandemic prediction and prevention
- Maritime Domain Awareness (MDA) and Maritime Security
- Illegal, Unreported, and Unregulated (IUU) fishing
- HADR
- Counter Improvised Explosive Devices (IED)
- Border security
- Devastating wildfires prevention, detection, reduction
- Operations in the urban environment

The purpose of POST FX 2022 was to initiate a framework for field experimentation around these challenge areas; promote collaboration between vendors, agencies, and the US and international partners; and bring forth solutions as they emerge. Measures of success for POST FX will be assessed through continuing dialog among participants that focus on specific outcomes initiated (e.g., new collaborations, invitation to join an exercise, technology transition) or by other value indicators to USINDOPACOM and its partners.

TARGET PARTICIPANTS

POST FX target participants are technology providers, including military agencies and academia, that are already involved in supporting USINDOPACOM allies and partners. For the inaugural POST FX 2022 event, a short planning cycle focused on primary outreach to technology vendors participating in the POST 2022 conference. In addition, the National Defense Industrial Association (NDIA), which co-hosted POST 2022 and controlled the conference website, invited exhibitors who were planning to attend the POST 2022 conference to participate. The success and interest generated by POST FX 2022 suggest that there will be widespread interest in conducting future POST FX events. The ultimate goal is for POST FX to become a self-sufficient component of the annual POST conferences.

TARGET AUDIENCE

For the inaugural POST FX 2022 event, ~200 total visitors attended, composed of POST 2022 attendees and others involved in Pacific security (e.g., Hawaiʻi National Guard, US Marine Corps, and local first responders).

Participants at POST FX 2022 | Image credit: Richard Chen

SUPPORTING ORGANIZATIONS

POST FX 2022 was under the operational control of USINDOPACOM J85, with in-kind support from J85, the Office of the Under Secretary of Defense for Research and Engineering (OUSD(R&E)), the United States Central Command (USCENTCOM), and BAFS. The Applied Research Laboratory at the University of Hawaiʻi (ARL at UH) supplied subject matter experts and execution support under contract to USINDOPACOM. NDIA promoted POST FX 2022 and provided registration assistance and bus transportation to and from the event.

LOCATION

Located in Waimānalo, Oʻahu, BAFS mission is to make resilient warfighters and families through unique recreation and training experiences. ARL at UH regularly conducts test and evaluation (T&E) operations involving Uncrewed Aircraft System (UAS) and other emerging technologies in support of the USINDOPACOM and component services at BAFS, helping expand BAFS's functionality as a T&E and innovation station for emerging military technologies. BAFS presents a superb opportunity for T&E activities from initial concept through pre-deployment training with station access and operational requirements scaled to mitigate risk.

BAFS is formally known as Detachment 2, falling under the 18th Force Support Squadron at Kadena Air Base, Japan. The Commander of BAFS is Major Amanda Pelkowski.

BAFS has multiple terrains, including a former active airfield, unpopulated coastline, open fields, deep forest canopy, abandoned cantonment, freshwater streams, and ocean conditions that range from still water to active surf. BAFS airspace is Federal Aviation Administration (FAA) Class G, enabling ARL at UH and contractor UAS operations under Federal Aviation Regulation (FAR) 107, FAA Educational Interpretation, or Certificate of Authorization. Additionally, government-sponsored UAS operators can be authorized under Airspace Access Authorization (AAA). Coordination of air activities with the adjacent Marine Corps Training Area Bellows (MCTAB) range safety officer ensures that BAFS operations are deconflicted with MCTAB operations.

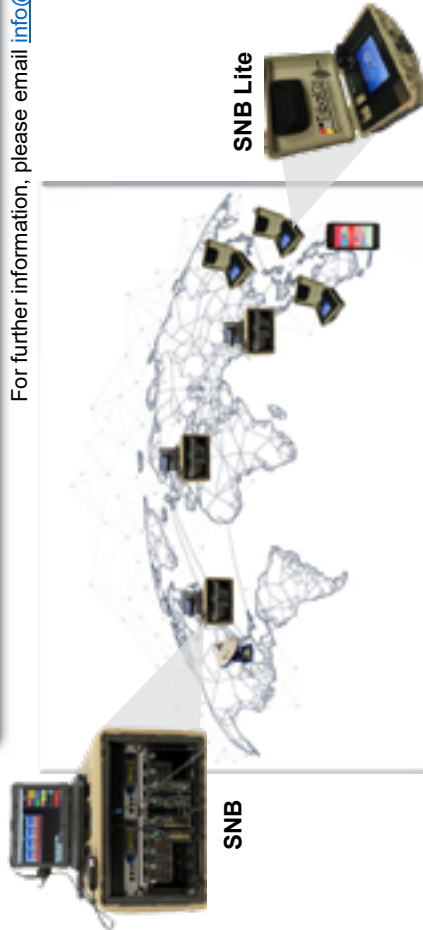*BAFS is located between the Koolau mountain range ... | Image credit: Noah Hafner*

... and the east Oʻahu shoreline | Image credit: Noah Hafner
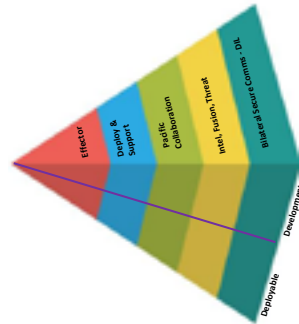
SIPR-NIPR in a Box (SNB)

For further information, please email info@tribalco.com or call (301) 652-8450

Technology Description / Product: SIPR-NIPR in a Box (SNB) is a USCENTCOM program that contains a family of systems (SNB, SNB Lite, secure edge devices and UAS payloads). Tribalco's Signal Fusion Platform™ (SFP™) is the family of products that supports the USCENTCOM SNB program. The SFP™ family of products are secure expeditionary systems that provide seamless, assured, interoperable voice and data communications between U.S. and partner nations across disparate military and commercial communication networks (e.g. SATCOM, radios, cellular, and IP-based networks). The highly configurable SFP™ family of systems feature modular designs and open architectures which provide tailorable solutions to meet diverse mission needs.

Company Information: Tribalco is a global systems integrator and original equipment manufacturer providing C5ISR and survival, rescue, and safety systems to military, intelligence, civilian agency, and commercial customers around the world. Since 2004, Tribalco has developed and deployed operational capabilities leveraging innovative technologies that protect our nation's critical infrastructure from evolving cyber threats and improve our customers' safety, survivability, and mission effectiveness.

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7735 Old Georgetown Road, 12th floor
Bethesda, MD 20814
(301) 652-8450

SNB Lite

SNB provides the foundation for secure interoperable communications for command and control, intelligence, surveillance, reconnaissance, dissemination of data fusion products and ingest of threat information.

Focus Areas:

- Contested logistics and operational energy
- Maritime Domain Awareness (MDA) and Maritime Security
- Humanitarian Assistance Disaster Relief (HADR)
- Counter Improvised Explosive Devices (C-IED)
- Border security
- Operations in the urban environment

SNB

Where do we fit in?

POST FX 2022 Report

SIPR-NIPR in a Box (SNB) is a USCENTCOM program that contains a family of systems (SNB, SNB Lite, secure edge devices and UAS payloads). Tribalco's Signal Fusion Platform™ (SFP™) is the family of products that supports the USCENTCOM SNB program. The SFP™ family of products are secure expeditionary systems that provide seamless, assured, interoperable voice and data communications between U.S. and partner nations across disparate military and commercial communication networks (e.g. SATCOM, radios, cellular, and IP-based networks). Integration of National Security Agency Commercial Solutions for Classified (NSA CSfC) products 1) provide secure data and information sharing across Joint and Partner Nation networks, and 2) extend DISA services (NIPR, SIPR, TS) to secure tactical edge systems and devices. The Software Defined Radios (SDR) module provides real-time radio frequency (RF) situational awareness, RF spectrum diversity for agile communications, Electronic Warfare (EW), and Cyber mission capabilities. Our Cyber Security module provides secure and assured communications with our Secure Transit Through Untrusted Networks (STUN) architecture. Assured Positioning, Navigation and Timing (PNT) capabilities use embedded atomic clocks, GPS SAASM or M-Code receivers. The highly configurable SFP™ family of systems features modular designs and open architectures which provide tailorable solutions to meet diverse mission needs.

Currently, SNB systems are deployed with II Marine Expeditionary Force and Fleet Anti-Terrorism Security Team, Central Command. SNB systems provide secure, assured, resilient communications and PNT capabilities to execute Joint All Domain Operations (JADO) with secure data and information sharing with US and Partner Nations. SNB systems support 1) Joint All Domain Command and Control for decision making 2) Intelligence, Surveillance, Reconnaissance [Task, Collect, Process, Exploit, and Disseminate cycle] 3) Kill Chains for Targeting and Strike.
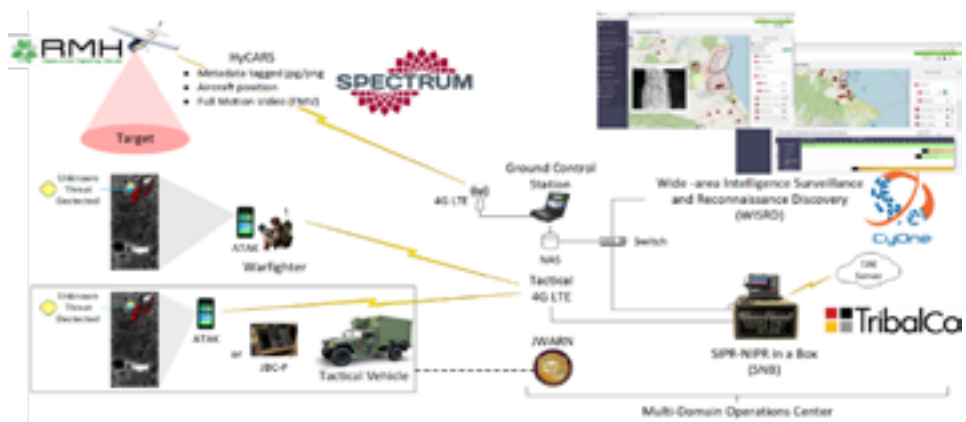
For the inaugural POST 22 Field Experiment, Tribalco collaborated with Spectrum Photonics, CyOne and Resource Mapping Hawaii to perform a live demonstration with 1) airborne hyperspectral collection with on-board processing 2) metadata tagged images, full motion video (FMV), aircraft telemetry ingested into SNB 3) SNB sharing images, FMV, aircraft telemetry to CyOne's Wide area Intelligence Surveillance Reconnaissance Discovery (WISRD) mission planning application 4) SNB dissemination of images, full motion video and aircraft telemetry to multiple Android Tactical Assault Kit (ATAK) smartphones. On Friday, March 11, a live-fly demonstration highlighted airborne hyperspectral collection, on-board processing, and near real-time dissemination of processed hyperspectral images in less than one minute from collection directly to the warfighter via SNB to ATAK.

Tribalco is a global systems integrator and original equipment manufacturer providing C5ISR and survival, rescue, and safety systems to military, intelligence, civilian agencies, and commercial customers around the world. Since 2004, Tribalco has developed and deployed operational capabilities leveraging innovative technologies that protect our nation's critical infrastructure from evolving cyber threats and improve our customers' safety, survivability, and mission effectiveness.

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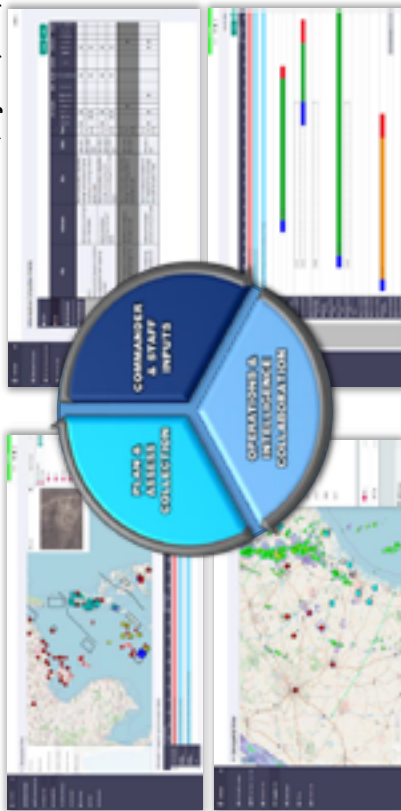Email: info@tribalco.com Phone: (301) 652-8450

WISRD – Wide-Area ISR Discovery

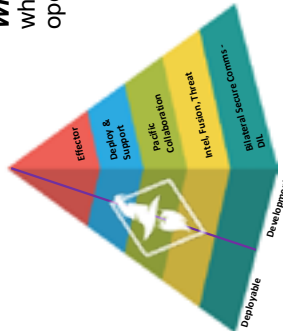## Enterprise Collection Management, Intel-Support to Targeting, & Assessment

Robb Dettmer, CyOne, Inc., [254.368.4466], robb@cyone.com

Technology Description / Product:

Wide-area Intelligence Surveillance and Reconnaissance Discovery (WISRD) is a COTS web-based solution leveraging integrated state-of-the-art open-source applications to enable end-to-end support of the collection management process.

WISRD provides a critical capability for planning, dynamically tasking in real-time, and evaluating the gathered observables and collectibles from ISR Operations. WISRD provides insights across the operational environment for the Warfighter, which was previously a challenge for collection managers at all echelons.

WISRD'S federated services demonstrates the effective integration of the latest in opensource technologies that add efficiencies toward warfighter tasks while retaining the flexibility to utilize both local and cloud-hosted computing resources.

Company Information:

Founded in 2014, **CyOne, Inc.** is a team of highly experienced & trained, software engineers, analysts, technological consultants, & cybersecurity specialists. CyOne has successfully delivered capability for multi-million-dollar efforts for the **Army G2**, **INSCOM**, **ARCYBER**, **JCO**, **& PM IS&A**, and has earned a reputation for its expertise, domain knowledge, professionalism, and ability to deliver products and services to its customers on time and to standard.

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www.cyone.com

Where do we fit in?

WISRD provides the ability to be intelligence-focused when conducting requirements management and operations-focused during mission management:

- Enterprise collection management planning and synchronization across echelons
- Exploit and present sensor and sensor platform data in real time ISO MDO and ISR visualization
- Provides collaborative intel support to targeting
- Optimizes collection management and battle damage assessments

Wide-Area Intelligence Surveillance, and Reconnaissance Discovery, or WISRD, is a Real-time enterprise ISR collection management, synchronization and visualization tool that exploits sensor data from sensor platforms in real time, enables sense-making of knowns and unknowns up and down and across echelons, provides intelligence support to operational decision making and targeting, allows for robust distributed battle damage assessments, and provides for understanding the effectiveness of an established collection strategy.

CyOne's WISRD system started as an internal research and development initiative in 2018 aimed at helping the Army solve its collection management problem. As a discipline, collection management was, and still is, a critical intelligence and operations convergence function that does not have a widely available enterprise software mechanism that optimizes the employment of ISR platforms – all current systems involve disconnected and disaggregated means that may or may not mimic Army and Joint collection management doctrine. As a system WISRD solves this problem by providing the ability to be intelligence-focused when conducting requirements management and operations-focused during mission management, all anchored by the ATO cycle. WISRD allows the collection management team to be the conduit between operations and intelligence, which synchronizes intelligence efforts to meet operational requirements. WISRD seamlessly incorporates IPB outputs and intelligence analysis to develop requirements. This allows collection managers to apply those requirements to a scheme or maneuver to develop an effective collection plan. The collection plan is then assessed at the end of each operational phase and feedback is provided back to collectors. Furthermore, WISRD has built in data ingestion pipes that exploit traditional data conduits such as USMTF and TADIL-J message feeds as well as a host of newly emerging data sources including ISA, Rainmaker, Minerva, and CoTs.
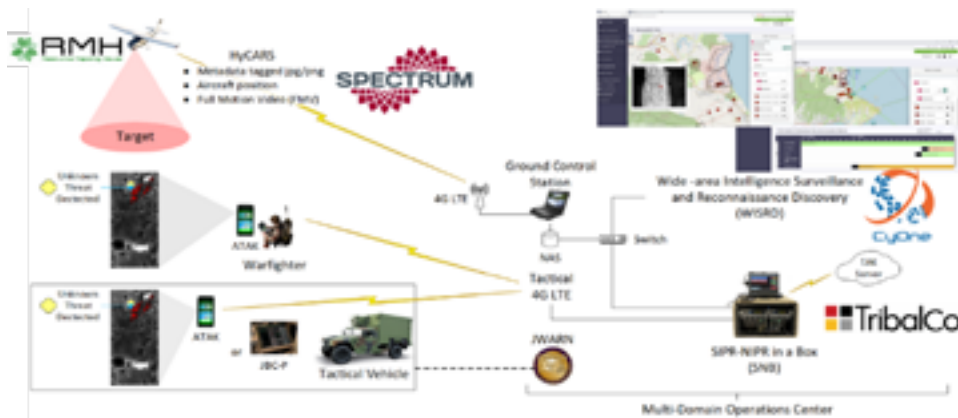
WISRD has served as a critical technology in numerous experiments and exercises in the past, including Cyber Quest since 2018, Cyber Shield and MDO Live since 2018, the Intelligence Battle Lab at Ft. Huachuca, AZ, and the Raven-X series since Spring 2021 which included participation in real-world operations at Forager '21. Furthermore, WISRD is currently partnered with PEO-Arcane Lightning for AI-enabled sensor orchestration and participating in Balikatan, the largest joint and partner nation exercise and operation ever conducted on the Philippine Islands since WWII. WISRD is designed to support the Joint force and All-Domain Operations, is built for hardware agnosticism with its easy-to-use state-of-the-art containerized architecture that can deploy onto anything from an individual laptop to a server and within a cloud environment, and is extremely easy to use.

In the course of its short existence, CyOne, Inc. has been highly successful in delivering capability to support multi-million-dollar Intelligence and Operational initiatives for the Army G2, INSCOM, ARCYBER, JCO, and C5ISR/PM IS&A, and has earned a reputation for its expertise, domain knowledge, professionalism, and ability to deliver products and services to its customers on time and to standard.

CyOne Inc. • Aberdeen Corporate Park 1202 Technology Drive, Suite B • Aberdeen, MD 21001
POC: Kevin Mullis (CEO) • Phone: 703-498-9967 • Email: kevin.mullis@cyone.com
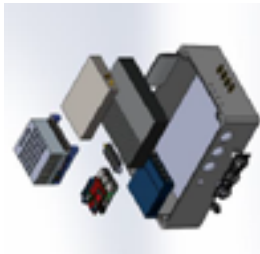
Sensor-in-a-Box (SiaB)
Rapid Expeditionary Security Surveillance Solution (RES3)

Alan Kolackovsky, Booz Allen Hamilton, Kolackovsky_Alan@bah.com

Technology Description / Product:

SiaB employs COTS technology, extending electromagnetic radio frequency, electro-optical/infrared (EO/ IR), full motion video, and threat detection capability through an adaptable, Ground/Air/Surface/multi-platform capable design to resolve gaps in sensors and command and control (C2) for Joint and Partner Forces.

- Modular small form factor enables specialized platform configuration and integration.
- Scalable integrated edge processing, ML/AI application integration framework for resilience.
- Cyber offensive/defensive support options
- Modular open architecture approach enables integration with future and legacy government systems and programs of records.

Company Information:

Booz Allen Hamilton founded in 1914 with Headquarters in McLean, VA provides management and technology consulting, engineering, analytics, digital solutions, mission operations, and cyber expertise to U.S. and international governments, major corporations, and not-for-profit organizations. Booz Allen has supported Information, Electronic and Cyber Warfare, Electromagnetic Spectrum Operations and Battlespace Management with direct hands-on and experience with DoD EM spectrum environments.

Booz Allen Hamilton Navy and Marine Corps San Diego based C5ISR Platform, Payloads, and Solution team provides rapid prototyping, engineering services, integration and testing in support of NIWC Pacific and MARFORPAC Fleet Experimentation/ Demonstrations.

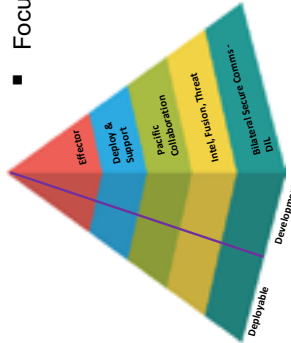Booz | Allen | Hamilton
100 YEARS

NDIA

Current information and electronic threat detection systems are restricted in range, mobility and prone to interference and jamming. Booz Allen Sensor in a Box (SiaB) enhances information and electronic warfare capabilities, increasing delivery of sensor detection to key leaders and critical decision makers.

Where do we fit in?

- Focus Areas:
  - Information and Electronic Warfare (IW/EW)
  - Maritime Domain Awareness (MDA) and Maritime Security
  - Intelligence Surveillance and Reconnaissance (ISR)
  - Humanitarian Assistance Disaster Relief (HADR)
  - Force Protection, Border Security, Coastal Surveillance, Littoral Operations, and Very Shallow Water (VSW)

Effector
Deploy & Support
Pacific Collaboration
Intel, Fusion, Threat
Bilateral Secure Comms- DIL

Development
Deployable

Booz Allen demonstrated the ***Sensor-in-a-Box (SiaB)*** capability hosted on an 8' unmanned surface vessel (USV) platform operating in San Diego Bay and remotely controlled from over 2,600 miles in Hawaii during the 2022 POST FX Event. The team demonstrated the graphical data fusion capabilities of an integrated Nearshore Unified Tactical Response (NUTR) C2 system with video and RF data received from SiaB sensors. SiaB is a modular, scalable, platform agnostic, multi-mission hardware/software capability currently designed in four (4) form-factor configurations for deployment in hosted environments: 1) stand-alone, self-contained "integrated" unit, 2) vehicle-installed, 3) fixed/ stationary remote location, and 4) USV module. SiaB is designed to rapidly integrate ISR/EW sensors and tactical comms to provide expeditionary warfighters and operational leaders real-time sensing, scanning, ML/AI augmented edge computing, processing, and analysis of critical information while enabling Operational Command Information Dominance objectives.

SiaB USV variant is Technology Readiness Level (TRL) 8. Booz Allen demonstrated operational readiness at the 2021 Naval Integration in Contested Environments (NICE) Advanced Naval Technology Exercise (ANTX) and 2021 USSOCOM Technical Experimentation (TE) 22-1 Event at Naval Amphibious Base (NAB). Booz Allen is equipped to rapidly produce LRIP units using its 50,000 sq ft quality controlled (AS9100 / ISO9001) Manufacturing Facility in Panama City Beach, FL.

SiaB is designed and tested to integrate with DoD systems and Program of Records such as Expeditionary Security Command Central (ESCC), Near-shore Unified Tactical Response (NUTR), and Trailer Sensor Platform (TSP). SiaB sensor data is distributed over any TCP/IP-based wireless comms link to the NUTR Graphical Data Fusion System (GDFS) C2 for location correlation on a geographical map overlay and is fused with other sensor data (AIS, radar, thermal, etc.) for target trajectory, speed, range, and visual identification.

SiaB aligns with expeditionary and operational missions to provide critical real-time access and control of tactical edge remote sensor capabilities and distributed information sharing across Multi-Domain Operations (MDO), Distributed Maritime Operations (DMO), Expeditionary Advanced Base Operations (EABO), Littoral Operations in Contested Environments (LOCE) and long-endurance persistent ISR, clandestine maritime Beyond Line of Sight/Over-the-Horizon, ML/AI, sensor, and tactical edge operations. Booz Allen SiaB FSR team provides operator training and onsite/remote maintenance. SiaB is built with low-cost COTS components to meet sustainability and supportability requirements. Its modular open software and hardware architecture with AES 256-encryption for data-at-rest supports a path towards cyber hardening and IA accreditation.

Our next step in technology innovation is to further develop the Electromagnetic Spectrum/Radio Frequency (EMS/ RF) SIGINT collection capability of SiaB into the Booz Allen-developed R.AI.DIO™ Signal Processing Software Development Kit (SDK). The R.AI.DIOTM model employs neural networks for on-board processing and pattern recognition for signal classification and compressed sensing to optimize link bandwidth for data transmission and minimize RF emissions for Low Probability of Detection (LPD).

Booz Allen Hamilton, founded in 1914 with Headquarters McLean, VA, provides management and technology consulting, engineering, analytics, digital solutions, mission operations, and cyber expertise to U.S. and international governments, major corporations, and not-for-profit organizations across 29,200 employees worldwide. Booz Allen supports Information, Electronic and Cyber Warfare, Electromagnetic Spectrum Operations and Battlespace Management with experience in DoD EM spectrum environments.

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AMPD (Additive Manufacturing w/ Predictive maintenance and Dynamic inventory for Contested Logistics

Technology Description / Product:

- Implementing Additive Manufacturing along with AI/ML into our predictive sustainment model will improve readiness with Unit-level data capture/sharing and mitigate supply chain risks
- Typical system consists of:
  - CL1720 3-D Printing System
    - High Temperature Extrusion and 1 cu. ft. build volume
    - Integrated High-Performance Computer
  - Fully integrated ML Knowledge Graph (Tiger AI Platform)
  - 3-D Scanner
  - Unit-Level Knowledge Capture Program

Points of Contact:

- Dan Helton, Director, Mission Solutions Group
  Email: dhelton@msg.us.com
- Joal Watts, VP, Hui Huliau
  Email: Joal.Watts@h2gov.com
- Tim Johnson, Chief Growth Officer, Kairos Inc.
  Email: Timothy.Johnson@kairosinc.net

Where do we fit in?

- Focus Area: Contested Logistics
  - Additive Manufacturing has been demonstrated to improve mission readiness and dramatically reduce inventory needed for deployment
  - Provides ability to manufacture critical or one-off parts / tools during unplanned challenges
  - Low-cost systems and training support potential employment
  - Hub and Spoke model enables remote units to scan parts and have manufactured and delivered rapidly

Introductory Paragraph: The objective of our AM/3D Technology Platform is to improve warfighter mission readiness by mitigating supply chain risks associated with repair part sustainment by reducing lead times, increasing operational readiness, and providing agile manufacturing for a more responsive and advanced warfighter at the tactical edge. By integrating Additive Manufacturing (AM) with Artificial Intelligence (AI), our AM/3D Platform delivers Predictive sustainment with Dynamic inventory for improved mission readiness not only in a normal state, but especially within a contested logistics environment. Our AM/3D Technology Platform consists of an intelligent machine learning system that improves readiness through local maintenance knowledge capture and sharing; improves response capability across various supply chain conditions; provides human-informed local additive manufacturing, with added force multiplication value of sharing local solutions with the larger enterprise; and provides a model to capture, implement, and share maintenance insight for maintenance operations planning.

Subsequent Paragraph(s)

• **Is technology ready for use today?** The AM/3D Technology Platform (i.e., KAIROS CL1720 3-D System) is currently being used in supporting SOCOM Family of Special Operation Vehicles (FOSOV) at a Field Technical Unit (FTU) in Kuwait, with plans to add more CL1720 systems to other FTU locations later this year. Additionally, KAIROS uses the 3-D printer system for other commercial work, such as medical and autonomous vehicle applications.

• **How much testing has it undergone to document operational readiness?** Over the past 7 years, KAIROS has developed, tested, and revised their AM system platform. This has entailed thousands of hours of run time and the development of model variants, such as the larger scale CL3450 and the tactical version of the CL1720 that is ruggedized and transit case packable.

• **How quickly can multiple units be produced?** KAIROS designs and builds systems to meet specific organizational and/or mission sustainment requirements (build envelope scale) and deployment requirements (power/thermal management). The Commercial Off the Shelf (COTS) version of our AM/3D Technology Platform has an estimated build and burn-in testing time of 30 days.

• **Can the technology be integrated into a tactical network?** Each AM system comes with a high-performance rack mounted computer that features Windows operating system and 1 TB of storage space for storing 3-D model inventories or interfacing with other systems. Because a computer is built in to the 3-D printer system, it can be used standalone or cyber hardened for network use.

• **Are there platforms with which is it well suited for integration?** Also, maintenance/sustainment software integrations can be made such as the Navy Data Environment (NDE)—a centralized database and web-based application used to manage Navy Modernization, Maintenance, Logistics, and Workload & Performance—or the Army Logistics Information Systems framework.

• **How does it align with operational missions?** How does it align with sustainment? Our AM/3D Technology Platform provides predictive sustainment and dynamic inventory capabilities to improve mission readiness by mitigating supply chain risks associated with repair part sustainment by reducing lead times and increasing operational readiness. In a constrained logistics environment, this enables high frequency failure items to be manufactured on demand and provides an agile, quick reaction capability at the tactical edge. In a contested logistics environment, this enables continued sustainment of systems to keep missions operational.

• **What are next steps for technological innovation?** KAIROS has a patent pending system incorporated into our AM/3D Technology Platform that enables the system to perform Non-Destructive Evaluation (NDE) of the part in real-time during the manufacturing cycle and detect any structural irregularities, permitting a level of quality assurance in the field that has never before been achieved. Our AM/3D knowledge capture system also empowers mission planning to have deeper insight into what Class IX parts are required, further reducing risk.

Concluding Paragraph: KAIROS, Inc., is a Woman-Owned Small Business (WOSB) providing Life Cycle Program Management), Engineering, Cyber Security, IT Service Management, Logistics, and Additive Manufacturing support services focused on optimizing customers' mission objectives and organizational program performance through proven quality methodologies, ethical practices and customer satisfaction. For the delivery of our AM/3D Technology Platform we have partnered with MSG who provides subject matter expertise in AI and Machine Learning (ML) development, and H2.Gov (Native Hawaiian Owned Company) provides subject matter expertise in logistics and sustainment.

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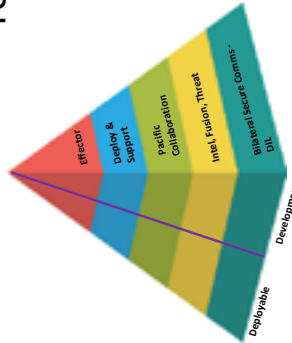Joal Watts   joal.watts@h2gov.com

CARBON NEGATIVE SYSTEMS

Technology Description / Product:

HEMP BRICK AND HEMPCRETE
PLANT BASED BUILDING TECHNOLOGY
RESTORATIVE AND NATURAL CARBON NEGATIVE DISRUPTER

- CARBON SEQUESTRATION
- NON-TOXIC LIVING SPACES
- SOIL REMEDIATION
- AFFORDABLE BUILDING
- MOLD, TERMITE, FIRE RESISTENT MATERIAL
- THERMAL ENERGY EFFICIENCY

Company Information:
ALCHEMY CONSULTING & PROJECT MANAGEMENT

CHAR MATILA (585)635-9263

MISSION: TO ALIGN HEALTHY, SUSTAINABLE, & RESPONSIBLE BUILDING TECHNOLOGY WITH REMOTE AND URBAN DEVELOPEMENT

HEMPBLOCKUSA

BIOSYS

CRAFT 8 VENTURES, INC.

VICAT

NDIA

VIEILLE matériaux

Where do we fit in?

FOCUS: **PACIFIC COLLABORATION**

- Humanitarian Assistance Disaster Relief (HADR)
- Devastating wildfires (prevention and low-cost solutions)
- Operations in the urban environment
- Health security and COVID/pandemic

Effector
Deploy & Support
Pacific Collaboration
Intel, Fusion, Threat
Bilateral Secure Comms - DIL
Development
Deployable

Alchemy Consulting & Project Management LLC

Hempcrete and HempBlock Technology is a low-tech, high-innovation carbon negative construction material. 100% renewable building material with thermal and ballistic properties that is easy to maintain. Typically used to construct residential and commercial buildings. Years of industry testing and thousands of projects have further validated the positive impacts of building with hemp.

Manufacturing of **HempBlock Hawaii** is scheduled to begin April 2023 with the first manufacturing facility on Oahu providing high volume outputs in prefab blocks for immediate deployment. HempBlock and Hempcrete materials are currently available with lead times of 8-10 weeks on average. **Alchemy Consulting & Project Management LLC** is taking the next steps in developing mobile processing units to aid disaster recovery of remote areas as well as cold storage transport packaging.

Alchemy Consulting & Project Management LLC

Newly developed to provide carbon negative sustainable building solutions to the pacific region. Located on the island of Oahu specializing in sustainable building. Alchemy Consulting has two fulltime employees and over a dozen strategic partners throughout the Pacific and Europe.

Contact:

Char Matila – Founder
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(585) 635 - 9263
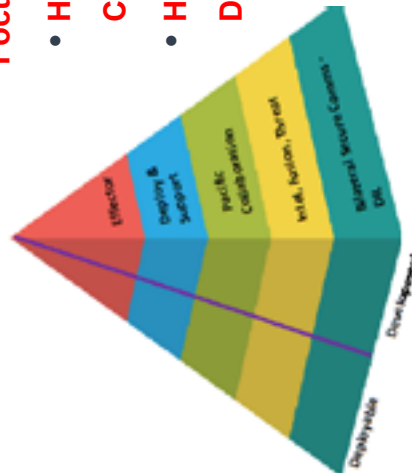
ASSURE-100 Rapid COVID-19 Tests

Ian Kitajima | Oceanit Laboratories Inc | 808.531.3017 | ikitajima@oceanit.com

Technology Description / Product:

- **US FDA EUA received 28 February 2022**
- 89% sensitivity, 100% specificity (true neg).
- Rapid antigen test, returns results in minutes
- Simple swab test with no complex equipment necessary
- Defense Logistic Agency (DLA) sponsored
- Detects Delta and Omicron variants
- **Taking orders now!** 10M per month initial capacity

**Company Information:**

Oceanit Laboratories
The Oceanit Center
828 Fort St. Mall. Suite 600
Honolulu, HI 96813
Phone: 808-531-3017
www.oceanit.com
**POCs: Glen Nakafuji, gnakafuji@oceanit.com
or Ian Kitajima, ikitajima@oceanit.com**

Where do we fit in?

Focus Areas:

- **Health security and COVID/Pandemic**
- **Humanitarian Assistance Disaster Relief (HADR)**

ASSURE-100 Rapid COVID-19 Test
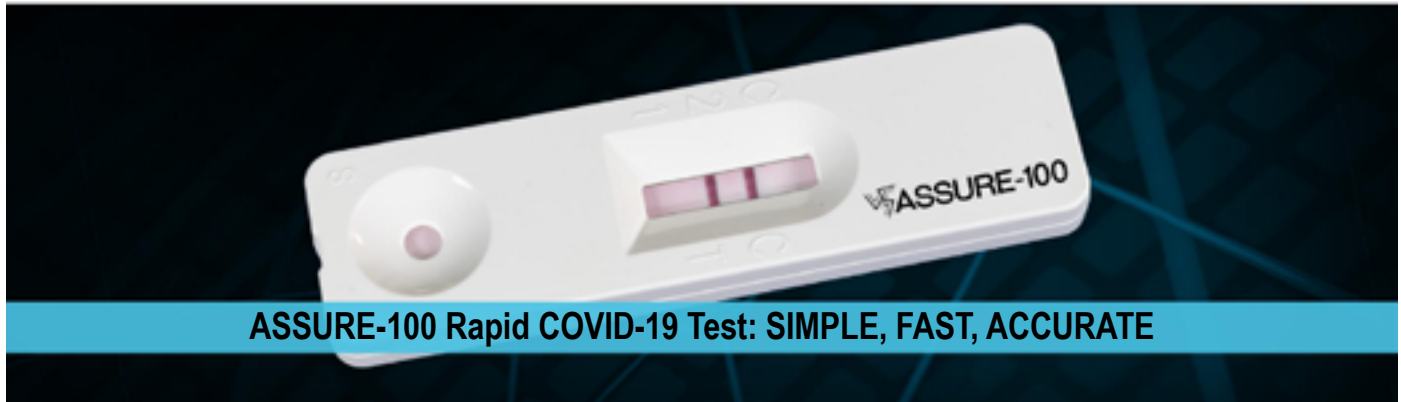
ASSURE-100 Rapid COVID-19 Test: SIMPLE, FAST, ACCURATE

The ASSURE-100 Rapid COVID-19 Test conveniently delivers an accurate and reliable COVID-19 diagnosis in 20 minutes. It is a point-of-care tool that detects SARS-CoV-2 antigens directly from shallow nasal swab specimens and is visually read, not requiring any instrumentation. ASSURE-100 is simple, fast, accurate and affordable, enabling regular interval testing for COVID-19 infectiousness. Rapid, regular testing will enable a safe reopening for schools, businesses and the world.

ASSURE-100 was designed by scientists and engineers in Hawaii and is distributed worldwide.

✓ SIMPLE – Swab, mix, pour. ASSURE-100 kits are easy to use: simply swab, mix the swabbed specimens in ASSURE buffer solution, pour into the LFA and wait for your results to appear.

✓ FAST – Test provides accurate and reliable results within 20 minutes, allowing for the COVID-19 testing of symptomatic patients within the first eight days of symptoms.

✓ ACCURATE – ASSURE-100 has a sensitivity (PPA) of 89% and specificity (NPA) of 100% and demonstrated similar performance and can detect all variants of COVID-19.

About Oceanit

Founded in 1985 in Honolulu, Hawaii, Oceanit has earned a world-class reputation for breakthrough science & technology, sustainable engineering, and disruptive innovation built upon our values of Curiosity, Community, and Ohana.

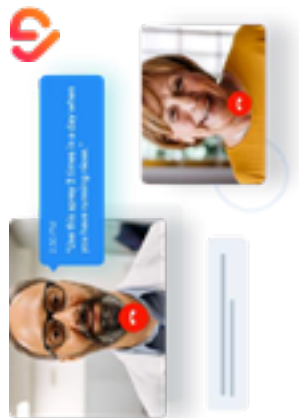*Oceanit Foundry LLC is a subsidiary company of Oceanit Labs, Inc.*

CONTACT INFORMATION:
Email: info@assure-test.com | https://assure-test.com/ | Phone Number: +1 (855) 929-6011 | © 2022 Oceanit Foundry

RingMD Telemedicine - Rural Healthcare Access Facilitator

Justin Fulcher, Co-Founder, 857-343-2046, justin@ring.md

RingMD is a telehealth platform that ensures patients of all backgrounds are connected with doctors for live consultations via video call and a-sync communication.

RingMD's platform includes data and performance analytics to provide real-time insights into dozens of variables.

Where do we fit in?

Technology Description / Product:

- RingMD can set up and deploy new telemedicine applications for our clients in as little as 72 hours. Our application is specifically developed for rural connectivity and bandwidth
- Advanced healthcare workflows from documentation, e-prescription, lab integration and population health analytics to empower Indo-Pacom Partners
- RingMD security designation as FedRAMP Moderate (P-ATO)

Capabilities of the Technology:

- AI application with the ability to integrate with a remote monitoring device
- Fully integrated platform with complete services and functionalities
- Performance analysis of health professionals utilizing the platform
- Gap detection and forecast modeling

Focus Areas:

- **Pacific Collaboration:** partnerships and prior customers in India, Philippines, Singapore, Thailand, Vietnam and Indonesia
- **Deployable:** National-Level Implementation with Government of India at scale, deployed for more than 5 years.
- **Humanitarian Assistance and Disaster Relief:** Proven system that has played various roles in humanitarian assistance and disaster relief from the Indo-Pacific to OCONUS - acute virtual healthcare and humanitarian assistance in response to Covid-19 Pandemic, hurricanes and other disaster relief scenarios.

Company Information:

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Charleston, SC 29403

Justin Fulcher, Co-Founder
(857) 343-2046
justin@ring.md

Varun Arora, SVP of Partnerships
varun@ring.md

RingMD is proven telemedicine technology for health security used by government clients to facilitate telehealth access in remote locations, via secure messaging and encrypted video, with capabilities for humanitarian assistance, disaster relief, defense and intelligence gathering.

RingMDs application includes predictive analytics that can effectively pick up on chatter from doctor patient interactions and identify pandemic/endemic disease trends along with biological and chemical threats whilst remaining fully compliant with the highest levels of US Department of Defense cybersecurity standards. The technology also has features of biometrics control for ID verification. Biometrics capabilities can assist in combat zones for soldier identification and disaster recovery efforts. This application has unique defense and intelligence gathering capabilities.

Our application is specifically developed for rural connectivity and low bandwidth making it ideal for remote locations, combat scenarios and natural disasters. No special hardware is required for the application; off the shelf smart phones, tablets and laptops suffice. The modular telemedicine technology integrates with 300+ devices for robust remote patient monitoring and established health information record systems.

RingMD's platform is currently compliant with FedRAMP Moderate. We are cyber hardened, collaborating with https://www.cisa.gov/ to defend against any state-sponsored cyber-attacks.

RingMD has partnerships and prior customers in multiple nations highlighted by a national disaster relief deployment within 72 hours in Latin America and a national-level implementation with the Government of India, deployed now for more than 5 years and serving 880 million Indian citizens.

RingMD is headquartered in Charleston, South Carolina, and has been operational for over 7 years. Our technology has been deployed for United States government programs such as Indian Health Services, serving every Native American tribe throughout the country.

RingMD is interested in partnering with foreign and domestic government agencies to serve their requirements for telemedicine, provide care in remote locations and combat zones, and for strategic analysis (intelligence) with our unique predictive and biometric capabilities.

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varun@ring.md
www.ring.md

Velos Rotors: Low-Cost All-Weather Group-2 UAV Helicopter

Michael Seal   Velos Rotors   Michael.seal@velos-rotors.com   www.velosuav.com

Technology Description / Product:

VelosV3 is a Low Cost - All-Weather Group 2 UAV that supports a fully redundant twin engine design with IP65 certification. It is especially suited for mission-critical missions where flight duration and expensive equipment (payload) are highly important. Velos UAV has a redundant drivetrain and ability to fly longer than any competitive product in its class. It possesses an airworthiness certificate from EuroUSC and the United States FAA certification office has approved MG Velos 100 airworthiness, with certification expected in 2023.

Aircraft	Group 2
Gross Take Off Weight	55 lb.
Useful Load	1 to 22 lbs.
Rotor Diameter	6.4 ft
Range	20-55 nm
Endurance	30-90 mins

Company Information:

Velos Rotors is focused on changing the way aircraft is built and operated. Our vision is to build the best flying machines in the market and advance the state of the art in terms of performance, reliability and safety.

Michael Seal, Chief Executive Officer
- 360.929.4172 // michael.seal@velos-rotors.com

Aris Kolokythas R&D Director
- aris@velos-rotors.com

Locations: Wilmington, DE & Xylokastro, Greece

www.velosuav.com

Where do we fit in?

- Velos Rotors UAV can facilitate operations in the following environments:
  - Contested logistics and operational energy
  - Maritime Domain Awareness (MDA) and Maritime Security
  - Illegal, unreported and unregulated fishing
  - Humanitarian Assistance Disaster Relief (HADR)
  - Counter Improvised Explosive Devices (C-IED)
  - Border Security
  - Devastating wildfires (prevention and low-cost solutions)
  - Operations in the urban environment

VelosV3 is a Low Cost - All-Weather Group 2 UAV that supports a fully redundant twin engine Aircraft with IP65 certification. It is especially suited for mission-critical missions where flight duration and expensive equipment (payload) are highly important. Velos UAV has a redundant drivetrain and ability to fly longer than any competitive product in its class. It possesses an airworthiness certificate from EuroUSC and the United States FAA certification office has approved MG Velos 100 airworthiness, with certification expected in 2023.

• The VelosV3 is in low-rate production and aircraft are being delivered within the international market. The VelosV3 has gone through extensive flight testing over the last 5 years and recently passed an extensive ground test that included 457 runs and 1000 hours of simulated aircraft loads. We can deliver 10 aircraft per month for the first 90 days subsequently, as demand requires, and we have manufacturing capacity for 25 aircraft per month. https://www.youtube.com/watch?v=JiptYRZxRTg

• Can the technology be integrated into a tactical network? Yes, VelosV3 has integrated and delivered this capability to a foreign Coast Guard that coupled Silvis radio and a Trillium EO/IR gimbal. Are there other sensors or platforms with which is it well suited for integration? Yes, Critical Cargo (Blood/Bullets/Comms), additionally LIDAR, hyperspectral and SIGINT.

• How does it align with operational missions? The VelosV3 is two man deployable and simple to operate and maintain. Additionally, the aircraft has significant advantages when operating in rain and high wind.

• Is the technology cyber hardened? Limited.

• What are next steps for technological innovation? Autonomous operations to include auto-charging, hydrogen fuel cells, and 1000 hours zero maintenance.

Concluding Paragraph

Velos Rotors is focused on changing the way aircraft are built and operated. Our vision is to build the best flying machines in the market and advance the state of the art in terms of performance, reliability, and safety.

• Michael Seal, Chief Executive Officer 360.929.4172 michael.seal@velos-rotors.com

• Hollywood, MD and Xylokastro, Greece

MissionGO Critical Cargo Delivery

Ryan Henderson   MissionGO   rhenderson@missiongo.io

Technology Description / Product:

Setting a new standard for advanced logistics and inspection performance, the Type Certified MGV 100 will unlock the full potential of unmanned aircraft operations. The MGV 100 is utilized to survey infrastructure assets safely and capture better inspection artifacts in less time, offer an expedited and secure transportation solution, and carry high-value sensors and cameras to provide better quality data and faster results.

The MGV 100 is an all-electric rotorcraft sUAS with MTOW of 55lbs, 22lb payload capacity and up to 90 minutes of endurance.
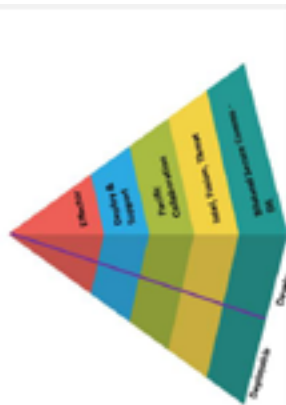
Company Information:

MissionGO is the leading provider of unmanned aircraft system (UAS) flight services for medical cargo delivery, infrastructure inspections and UAS training. Formed by the professionals responsible for the first successful organ transplant delivered by UAS, MissionGO has continued to make history completing multiple organ and critical medical cargo deliveries across the U.S. Our aviation expertise uniquely positions MissionGO to lead the largest utility inspections program in the U.S. for wildfire mitigation, and in standing up over 35 UAS public safety programs. MissionGO is in process to become the first company with a certified aircraft, the MGV 100 rotorcraft UAS, and Part 135 operator's license to offer a fully autonomous UAS cargo delivery solution as a scalable and commercially available service for our health and commercial partners to improve and heal lives.

Where do we fit in?

- Focus Areas:
  - Contested logistics and operational energy
  - Health security and COVID/Pandemic
  - Maritime Domain Awareness (MDA) and Maritime Security
  - Illegal, unreported and unregulated fishing,
  - Humanitarian Assistance Disaster Relief (HADR)
  - Counter Improvised Explosive Devices (C-IED)
  - Border security
  - Devastating wildfires (Prevention and Low-cost Solutions)
  - Operations in the urban environment

MGV100
Proven Capability & Performance
Presented by MissionGO

The MGV100 is an unmanned single rotor helicopter designed with redundancy and reliability in mind. Operations and maintenance training can be completed in as little as 8 hours, so upkeep and complexity have both been minimized. The MGV100 is currently being demonstrated in the commercial market delivering critical medical cargo, such as human organs and blood, at various locations across the country. In parallel, the unmanned system is undergoing Type Certification for special airworthiness class with the FAA. Type Certification will greatly broaden current regulatory restrictions to include flying beyond visual line of sight and over people.

Flying at a cruise speed of 33mph, the MGV100 can deliver payloads of 15lbs a distance of up to 10 miles. With a lighter payload, the delivery service area increases to 30 miles. Utilizing the design and agility of a single rotor helicopter, the aircraft can easily sustain flight in heavy winds and adverse conditions. Various command and control (C2) and sensor combinations are available based on mission requirements. This system easily integrates with existing tactical networks utilizing cyber-hardened architecture such as Silvus Technologies and Persistent Systems. A two-person team can deploy the helicopter in as little as 15 minutes. Units are ready for production on demand at a rate of up to 50 per month.

About MissionGO:

MissionGO is setting a new standard for next-generation transportation logistics. By leveraging unmanned aircraft systems (UAS), MissionGO delivers improved reliability, reduced costs, and increased transparency to benefit multiple sectors, including healthcare and critical infrastructure. Learn more at www.missiongo.io.

MissionGO
1703 S Clinton Street
Baltimore, MD 21224
410.390.0500
MissionGO.io

// GLOBAL LEADER IN UAS

Topo – Bathymetric LiDAR for Maritime Domain Awareness (MDA) and Security
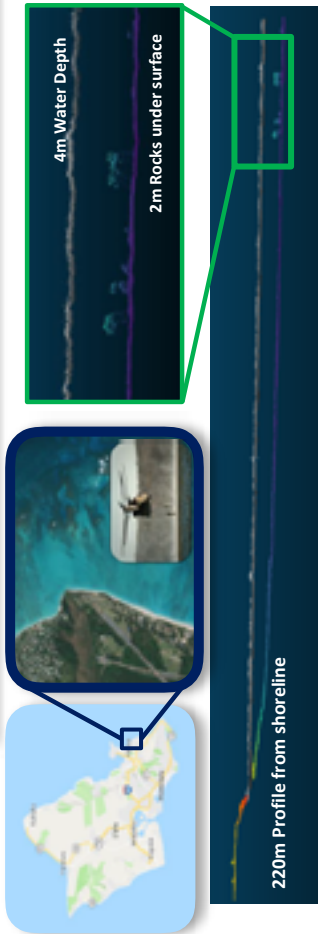
Technology Description / Product:

Nearshore operations necessitate high resolution geospatial intelligence data be integrated in near-realtime to support warfighter mission requirements.

We provide 3-D point cloud data from a miniaturized topo-bathy LiDAR sensor capable of mapping shallow water bathymetry, underwater objects and sea surface heights at unprecedented cm-level resolution.

Applications include ingress and egress operations, MCM, and UXO detection and mitigation for Maritime Domain Awareness (MDA), and Maritime Security

Utility of technology:
- Find, locate, & identify underwater hazards
- Reduced uncertainty, increased safety, improved situational awareness

Company Information:

ASTRALiTe Inc. is a provider of unique LiDAR sensors and products. It manufactures the world's first UAV compatible 2-in-1 Topo-Bathy scanning LiDAR system: **ASTRALiTe EDGE**™ capable of collecting high density point clouds at cm-level resolution. Commercial applications include riverine and near-shore environments for surveying, change detection, and infrastructure inspection.

ASTRALiTe is a subsidiary of Atmospheric & Space Technology Research Associates, LLC, (dba **Orion Space Solutions**, orionspace.com), a technology development company that provides miniaturized sensors and technical expertise for complex space physics disciplines - including modeling capabilities and data analytics - and is a leader in the development of Small Satellites.

4m Water Depth

2m Rocks under surface

220m Profile from shoreline

- Military operations require precise geospatial knowledge
- Shallow water hazards are often undetectable (see jump training example above)
- Shallow regions are dynamic & real-time assessment is critical

Where do we fit in?

- Focus Areas:
  - Maritime Domain Awareness (MDA) and Maritime Security
  - Intelligence Surveillance and Reconnaissance (ISR)
  - Force Protection, Border Security, Coastal Surveillance, Littoral Operations, and Very Shallow Water (VSW)

Effector

Deploy & Support

Pacific Collaboration

Intel, Fusion, Threat

Bilateral Secure Comms - DIL

Deployable

Development

Gerald Thompson, ASTRALiTe, Inc., contact@astralite.net, or Gerald.Thompson@orionspace.com

Topo – Bathymetric LiDAR for Maritime Domain Awareness (MDA) and Security

The convergence of rapidly advancing technologies in LiDAR and autonomously operated small, unmanned aircraft systems (sUAS) has opened up the possibility for new remote-sensing approaches to observe the littoral zone for tactical operations.

ASTRALiTe, Inc. has developed an ultra-lightweight scanning topo-bathymetric LiDAR system (5 kg) for mounting on small unmanned aerial systems (sUAS) to retrieve detailed geospatial intelligence (> 100 pts/m2) of shallow-water littoral zones. The LiDAR has unprecedented capability in 3-D mapping of littoral-zone bathymetry with centimeter-level precision in waters shallower than 10 meters. The system provides next-generation capability for day-or-night operations for applications like unexploded-ordnance (UXO) detection, mine countermeasure operations, near-shore mapping and surveying, target morphometry, and hydrologic mapping of waterways for ingress/egress routes. This innovative technology is sold commercially in the coastal and riverine surveying markets as a 2-in-1 topo-bathymetric LiDAR system called ASTRALiTe EDGE™.

• The technology has been customized for US Army Corp of Engineers (USACE – ERDC) and demonstrated to NAVO and the Navy Fleet Survey Team (FST).

• A related project to validate the ability to detect UXO for the ESTCP program will be demonstrated spring 2022 at the Panama City Test Bed.

• ASTRALiTe was a Phase II performer on the UK MOD Map-the-Gap DSTL program. Field demonstrations performed February 2022 demonstrated the capability for mapping wet riverine crossings, including determining crossing distance, bank heights, slope, channel bathymetric depths, and object detection in near-real-time. The lidar was combined with other sensors on an ISS Aerospace hydrogen fueled drone including ground penetrating radar (GPR), various camera systems for automatic water-edge sensing, and EO/IR sensors.

• Military operations require precise geospatial knowledge: Shallow water hazards are often undetectable, and shallow regions are dynamic and real-time assessment is critical. This makes the ASTRALiTe LiDAR technology directly relevant to fulfilling Mission requirements (see Quad Chart examples).

• ASTRALiTe is capable of producing 10s of units in a 4–6 month lead time, dependent on the current global electronics supply chain issues.

• Future combinations of technologies under development include EO/IR and hyperspectral camera integration, fully autonomous data exfiltration and AI/ML assisted classification of the 3-D point cloud.

ASTRALiTe Inc. is a provider of unique LiDAR sensors and products. It manufactures the world's first UAV compatible 2-in-1 Topo-Bathy scanning LiDAR system: ASTRALiTe EDGETM, capable of collecting high density point clouds at cm-level resolution. Commercial applications include riverine and near-shore environments for surveying, change detection, and infrastructure inspection.

ASTRALiTe is a subsidiary of Atmospheric & Space Technology Research Associates, LLC, (dba Orion Space Solutions, orionspace.com), a technology development company that provides miniaturized sensors and technical expertise for complex space physics disciplines - including modeling capabilities and data analytics - and is a leader in the development of Small Satellites.

Sandoval Custom Creations Inc. (SCCI)
## Covert ISR and Analytics

SCCI is demonstrating ISR sensors and video surveillance hardware/software integration RAPTOR to provide a single pane of glass information solution to present multiple analytic modalities to the end user.

Where do we fit in?

Why this Technology is Needed

- RAPTOR leverages a variety of analytic Software Development Kits (SDK's) from a variety of vendors. These SDK's run at the Edge or on a hosted server in a data center or cloud and will process a live RTSP stream from a camera sensor, generating a detection based on the analytic type.

- This technology could aid DoD logistics with airport/seaport control, in-transit visibility, forward operating base security and access control, etc. RAPTOR uses technology to help humans do what only humans can do...make *intelligent data-driven decisions*.

Demonstration Objectives
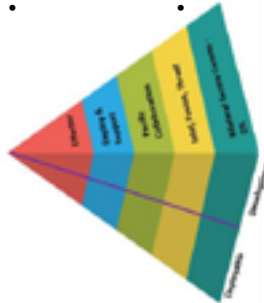
- Demonstrate to DoD SCCI's video surveillance, edge-based processing, and analytics currently in use by Federal Law Enforcement.
  - Additional funding could develop algorithms to meet DoD Contested Logistics problem sets.
- We will demonstrate currently available analytic capabilities: Facial Recognition, Aircraft Tail Number Reader, License Plate Reader, Boat Detection, Pedestrian Detection, etc.
  - ~TRL 7 - Currently in use with USG customer.

Additional Information

- RAPTOR reduces the need for the end user to view multiple monitors and video streams manually.
- RAPTOR visualizes the data and at the same time makes all the data that is gathered by the analytics recordable, reportable, searchable, and alarmable.
- Point of Contact:
  - Greg Lengyel, Maj Gen, USAF (Ret)
  - greg@sccicovert.com
  - 719-505-2887

SANDOVAL CUSTOM CREATIONS INC.
INTEGRITY, INNOVATION, LOYALTY, QUALITY
AND WORLD-CLASS CUSTOMER SUPPORT

The Rapid Tactical Operations and Reconnaissance (RAPTOR) Platform, a video surveillance hardware/software integration developed by Sandoval Custom Creations, Inc. (SCCI), provides a single-pane-of-glass information solution to present multiple analytic modalities to the end user. RAPTOR can leverage a variety of analytic Software Development Kits (SDKs) from almost any vendor. These SDKs run "at the Edge" or on a hosted server in a data center, or cloud, and will process a live real-time streaming protocol (RTSP) from a camera sensor, generating a detection based on the analytic type. RAPTOR reduces the need for the end user to view multiple monitors and video streams manually. RAPTOR visualizes the data, and at the same time, makes all the data that is gathered by the analytics recordable, reportable, searchable, and alarmable. This technology could aid DoD/Partner logistics with airport/seaport control, in-transit visibility, forward operating base security and access control, etc. RAPTOR uses technology to help humans do what only humans can do…make *intelligent data-driven decisions*.

RAPTOR is a ready-to-go-to-market software and has been in development for over three years. Within the last year, RAPTOR software has undergone thousands of hours of rigorous testing with a wide variety of commercial off the shelf (COTS) sensors to give the customer options to ensure success with their surveillance system deployment. RAPTOR software can ingest compatible Application Programming Interfaces (APIs) making it capable to integrate with most programs in use. Our RAPTOR engineering team strives to meet customers' needs to ensure zero-trust cyber hardening from end-to-end.

RAPTOR has been tested at airfields, harbors and inlets, roadways, city centers, and large events just to name a few. Currently, local, state, and federal law enforcement agencies have deployed the RAPTOR software operationally, both in the US and OCONUS. The SCCI team is dedicated not only to technical support but has personnel to assist with deployment needs. SCCI is a small U.S. based company and has in-house developers which gives the customer rapid customizable solutions and integrations. SCCI will continue to be an agnostic software/hardware company striving to give the customers the most reliable, tested, end-to-end solutions in the industry.

SCCI is a premier designer, manufacturer, and supplier of covert and overt surveillance equipment and components. SCCI has been in the surveillance business for over 14 years and has grown to become an industry leader specifically meeting the requirements of federal, state, and local law enforcement organizations. SCCI designers and technicians, along with their elite fabrication partners and a complete graphic and print shop, can design and manufacture almost any covert concealment or overt surveillance system. SCCI has a full team to complete the technical drawings, with drafters and manufacturing partners with highly skilled metal manufacturing computer aided designers and a reviewing staff. Design, assembly, testing, component 3D printing, packing, and shipping takes place at their production facility in Palmer Lake, CO, located between two major metropolitan areas, Denver and Colorado Springs.

Sandoval Custom Creations, Inc, P.O. Box 155 Larkspur, CO 80118

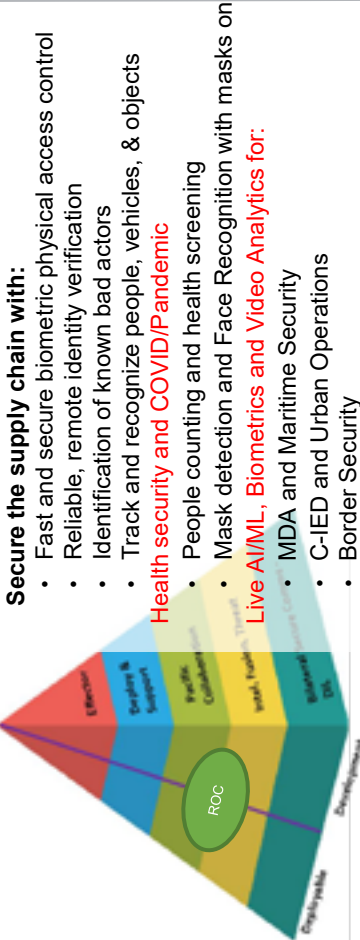# HMT with real-time security alerting and intelligence

Chris Centamore, **Rank One Computing Corporation**, Chris.Centamore@rankone.io

Technology Description / Product:

- ROC's AI/ML SDK provides biometric matching and object detection and recognition capability at the edge or on a server.
  - Lightweight for mobile applications
  - Fast and accurate
  - American Nascency – Developed, trained, and maintained in the US
- Live, HTML-based Person, Object, and OCR alerting application integrates with existing RTSP camera streams
  - Fused intelligence from multiple sensors
  - Low false alarm rate, high true positive rate (independently verified)
- Rapid data annotation and AI/ML algorithm training for continuous learning

Company Information:

Headquartered in Denver, CO, ROC products are deployed for operations:
- Handheld devices in theater supporting SOF
- Smart city video surveillance deployments
- National Media Exploitation Center (150 million faces)
- Annotation tools for IC/FBI multimedia exploitation unit
- FR for NYC HIDTA system, Michigan State Police (Face and Tattoo), LA county
- DEA tail-number recognition
- Fintech remote enrollment and identity verification

Rank One Computing (ROC) is the most trusted provider of Facial Recognition (FR) algorithms to the U.S. Military, Law Enforcement, and Commercial organizations.

Where does ROC fit? Contested logistics

Secure the supply chain with:
- Fast and secure biometric physical access control
- Reliable, remote identity verification
- Identification of known bad actors
- Track and recognize people, vehicles, & objects

Health security and COVID/Pandemic
- People counting and health screening
- Mask detection and Face Recognition with masks on

Live AI/ML, Biometrics and Video Analytics for:
- MDA and Maritime Security
- C-IED and Urban Operations
- Border Security

Rank One Computing's (ROC's) video analytics SDK and live video alerting platform, **ROC Watch,** reduces warfighter workloads by 'watching' multiple video streams and providing live alerting based on the detection and identification of persons or objects of interest. ROC provides one of the most accurate AI/ML-based **Face Recognition** technologies in the world and now makes it simple to add live alerts for Face Watchlists, **Objects, License Plate Recognition (LPR), and Optical Character Recognition (OCR).** Our easy to integrate SDK or simple to use ROC Watch web application integrates with existing video streams from ground or UAV-based sensors to instantly add intelligence. ROC's AI/ML algorithms are trained in the USA by American citizens to ensure that no poison AI models are injected by foreign actors. ROC can customize algorithms for specific applications, or you can use our existing video analytics algorithms to detect:

- Vehicles
  - Military vehicle
  - Car
  - Truck
  - Bus
  - Boat
  - Airplane
- Persons
- Weapons
- Text
  - Optical Character Recognition (OCR)
  - License Plate
  - Signs
  - Documents

ROC's AI/ML SDK was used by the Fintech market to enroll and verify 100M identities in 2021 and is used by special forces for the mobile capture of biometrics from subjects on the battlefield. ROC Watch is used for live video alerting by casinos, banks, and offices and is integrated with UAS video platforms from FLIR including the Black Hornet, the Pack Bot and the R70 quadcopter.

Our lightweight algorithm design permits hosting on edge devices but is scalable to support enterprise operations for large scale watchlists and datasets. ROC supports video databases with repositories as large as 500M videos as well as 1:1 identity verification functions. The ROC SDK can be implemented on android, OS, Windows, or Linux platforms, and ROC Watch is web-based to support deployment across a wide variety of devices and operating systems. ROC algorithms are threaded to support operation on CPU, GPU and NPU processors on servers or in the cloud.

ROC's identity verification capabilities support securing operations within a contested logistics environment.

ROC SDK and ROC Watch are ready to deploy today with existing video analytics and face recognition capabilities. ROC continues to develop additional algorithms and can customize machine learning models and business rules for specific applications. Innovations slated for the future include additional weapons detection capabilities, behavioral analytics, counter UAS, and lidar integration.
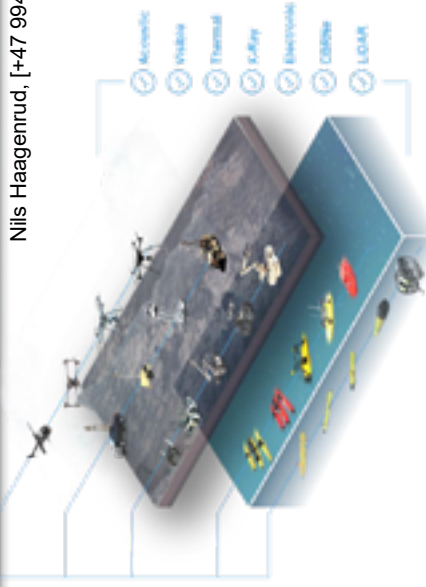
Rank One Computing is headquartered in Denver, Colorado and is dedicated to delivering advanced AI/ML capabilities with **American Nascency.**

Teledyne FLIR (ANY THREAT, ANYWHERE)

Nils Haagenrud, [+47 99421618], nils.Haagenrud@teledyneflir.com

Technology Description / Product:

Teledyne FLIR's family of systems will fit within all the objectives of POST FX 2022. Our company offers the world's most advanced unmanned air and ground systems portfolio and has delivered more than 11,000 unmanned systems to customers in over 55 countries.

Our Products for Post FX:

- Black Hornet 3 PRS Smallest combat proven Nano UAV
- Black Hornet 3 VRS Vehicle Reconnaissance System (Base Protection)
- SkyRaider R80D MRR platform with unique capabilities ranging from designator, LiDAR to CBRN sensors
- Wingman VRS Prototype 3D Mock-Up of next generation VRS System
- PackBot UGV

Company Information:

Teledyne FLIR develops and manufactures solutions for enhanced imaging, advanced surveillance and security, and the accurate detection, identification, classification, and suppression of CBRNE threats for global military, law enforcement, public safety and other government entities.

POC's:
Nils Haagenrud, +47 99421618, Nils.Haagenrud@teledyneflir.com - Director US Programs
Chris Brown, +1 (781) 879-9209, Chris.Brown@teledyneflir.com – Sr. Product Manager

TELEDYNE

Where do we fit in?

Focus areas:

- Within the above pyramid, Teledyne FLIR is prepared to demonstrate a variety of both currently deployable and developmental unmanned systems and capabilities:

  - **Bilateral Secure Comms** – Teledyne FLIR's family of UxS are designed with a Modular Open System Architecture (MOSA)

  - **Intel, Fusion, Threat**

  - **Pacific Collaboration** – systems delivered to over 55 countries (17 within INDOPACOM)

  - **Deploy and Support** – the family of Teledyne FLIR UxS are designed with the expeditionary/deployed end users' requirements in mind

  - **Effector** – the multi-mission capabilities of our UxS allow it to be a force enabler for precision strike missions.

POST FX 2022 Report

Teledyne FLIR is a world leader in the design, manufacturing, and marketing of sensor and integrated systems that enhance perception and awareness to save lives and livelihoods. Our company provides innovative, tailor-made, modular approaches to hardening, fusion, integration, kitting, and production of intelligence, surveillance, and reconnaissance and force protection systems to the US and International Governments. Teledyne FLIR has delivered more than 25,000 unmanned systems to customers in over 55 countries. Supporting payloads include EO, LWIR, LiDAR, SIGINT, CBRN, and EOD disruptors. Teledyne FLIR offers technologies that support all layers of the POST FX 2022 pyramid. The picture below will give you a visual impression of all capabilities that can be delivered from Teledyne FLIR in the UxS segments, ranging from Small Group 1 UAS to larger UGVs.

1. Bilateral Secure Comms - Teledyne FLIR's family of UxS are designed with a Modular Open System Architecture (MOSA) that use the latest Government specified protocols and standards within each unmanned system domain (STANAG 4586, MAVLINK, RAS-G IOP, CoT, etc.), and provide interoperability with the Android Tactical Assault Kit (ATAK) out-of-the-box. Future development will utilize some of its most mature and fielded UxS as demonstrator platforms to showcase how a suite of tele-operated unmanned systems on disparate protocols can be unified under one data architecture to share mission relevant data and automate system control based on a series of user-defined, mission-specific tasks.

Additionally, one of the newest payloads developed for the R80D SkyRaider is the Tactical Radio Adapter Kit (TRAK), allowing the UAS to not only extend the range of the tactical mesh network, but easily distribute video and metadata to every user via encrypted, secure means.

2. Intel, Fusion, Threat - The R80D, Black Hornet PRS and VRS Wingman outfitted with an EO/IR sensor payload can be tasked with the rapid collection of multi-spectral imagery and using on edge artificial intelligence algorithms, identify and geotag Points of Interest. The R80D can simultaneously build a 3D point cloud using a LiDAR payload (RTL-450; developed by ARL and 4D Tech Solutions). Once captured as part of a sharable world data model, these points of interest, and associated threat level, can be distributed across the ATAK ecosystem in real-time for further disposition (such as prosecution by a UGV).

The VRS Wingman and R80D systems can also be deployed to provide ISR of an area or route and will perform missions with degraded or denied GPS. The VRS Wingman provides the ability for rapid reconnaissance in urban and sub-terranean environments.

3. Pacific Collaboration – With systems delivered to over 55 countries (17 within USINDOPACOM), Teledyne FLIR has a robust global user base and existing partnerships within the region. By designing our systems around government defined protocols and open architecture, our UxS are well-positioned to integrate into the existing capabilities of any partner nation within USINDOPACOM.

4. Deploy and Support – The family of Teledyne FLIR UxS are designed with the expeditionary/deployed end users' requirements in mind. The systems also provide a robust augmentation to forward operating base security capabilities. The EO/IR, SIGINT, and CBRN sensor capabilities allow security forces to identify and interrogate potential threats from several miles away, with minimal signature. The Wingman system is virtually undetectable at distances of over 100m due to its extremely low audible and visual signature.

5. Effector – The multi-mission capabilities of the R80D allow it to be a force enabler for precision strike missions. There are several unique R80D payloads which will support this mission set which can be further discussed. The VRS Wingman and R80D support Cursor on Target (CoT) messaging which allows for the distribution of information related to other units on the network (including artillery, mortars, CAS, etc.). Wingman enables high frequency low latency CoT updates to vehicle weapon systems for quick slew to target enabling engagement through walls, smoke, vegetation, etc.

All systems described and shown above meets TRL 9 requirements and are combat proven, in addition Teledyne FLIR is always developing new and future proof capabilities to meet the future threats in our environment. Please contact us for more information on our current products as well as future systems within the UxS portfolio.

POC's:
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POST FX 2022 Report

VTOL Resupply UAV for Contested Logistics

Colin McCavitt   Indigo Industries
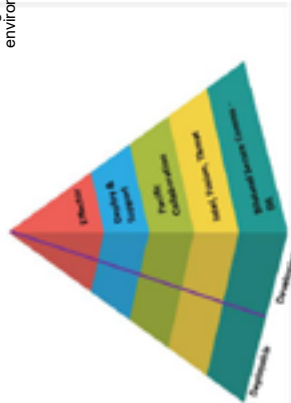
colin.mccavitt@indigo.industries

Technology Description / Product:

In partnership with OSD/R&E and USINDOPACOM, Indigo has produced two variants of a low-cost, runway-independent UAV that can autonomously transport lightweight payloads between installations (Ship -> FOB -> FOB -> Ship).:

Aircraft	Group 2	Group 3
Gross Take Off Weight	55 lb.	190 lb.
Useful Load	8.3 lb.	54 lb.
Wingspan	11.5 ft	18.9 ft
Range	200 nm	550 nm
Endurance	3.4 hr.	12.5 hr.

Company Information:

Indigo Industries provides rapid engineering of specialized technologies for the US Department of Defense and Intelligence Communities.

Indigo's headquarters is outside Indianapolis, Indiana with a prototype engineering office in Tempe, Arizona.

Where do we fit in?

- Indigo's VTOL UAV can facilitate operations in the following environments:
  - Contested logistics and operational energy
  - Health security and COVID/Pandemic
  - Maritime Domain Awareness (MDA) and Maritime Security
  - Illegal, unreported and unregulated fishing.
  - Humanitarian Assistance Disaster Relief (HADR)
  - Counter Improvised Explosive Devices (C-IED)
  - Border security
  - Devastating wildfires (Prevention and Low-cost Solutions)
  - Operations in the urban environment

Octavian is a runway independent hybrid-VTOL UAV specifically designed to perform logistical resupply operations in contested maritime environments.

The aircraft comes in two variants, a group 3 version with a 54lb useful payload capacity and a group 2 version with a 7lb pound useful payload. In its default configuration the Group 3 can fly a 20lb payload for 12.5 hours (750 NM) and the Group 2 can fly a 3lb payload for 3.5 hours (~200 NM).

Although Octavian's default payload is a netted cargo pallet, both versions are payload agnostic and can easily interface with a variety of payloads ranging from sensors (EO/IR, Hyperspectral) to small diameter munitions to wide area maritime surveillance radars.

Octavian has been tested with Silvus, Persistent Systems and conventional 900mhz radios and future upgrades will incorporate miniature SATCOM links.

- Octavian Group 2 and Group 3 would both need 30 days of aggressive flight testing to be considered operationally ready.
- Indigo can initially produce (Group 2 and Group 3):
  - Currently: Up to 15 units at a rate of 3 per month.
  - Two sets of elevated temperature tooling for pre-preg: Up to 50 units at 5 per month
  - Three sets of elevated temperature tooling for pre-preg: Up to 100 units at 7 per month
- Octavian is communications agnostic and can easily connect to a tactical network. The current comms radio is Silvus.
- Octavian can easily align with conventional EO/IR surveillance missions as well as perform innovative missions performing autonomous resupply operations.
- Octavian is integrated with commercially available parts facilitating sustainment and maintenance. The aircraft is operated by ArduPilot and Mission Planner, the two most proliferated open-source UAV software systems, making training and finding skilled operators much easier. Indigo initially trains people to fly Octavian with a SkyViper, a $100 COTS drone.
- Octavian's avionics are identical to the components used in its predecessor, the Cobalt UAV. Indigo's Cobalt passed a cyber inspection by the Joint Vulnerabilities Assessment Branch (JVAB) at Camp Roberts on November 15th, 2019.
- The next step for technological innovation is:
  - Introduction of new payloads (Hyperspectral, miniature SATCOM, airborne radars, SIGINT pods, direction finding systems (DF) and extended range fuel pods.
  - Extend automation by developing more containerized applications for the onboard MATADOR flight management system. Focus areas are:
    - Autonomous 3D routing
      - Collision Avoidance
        - Terrain (DTED, SRTM)
        - Aircraft (ADSB)
        - Obstacles (Computer Vision)
      - Weather Avoidance
      - Restricted Airspace / Kill Zones / Keypad
    - Autonomous Target Detection and Identification (Computer Vision + AI)
    - Over the Air (OTA) software updates

Indigo Industries / Defense & Intelligence Solutions, 3209 Smith Valley Rd., Greenwood, Indiana, 46142
www.indigo.industries

POST FX 2022 Report

Vanilla UAS: Low-Altitude, Long-Endurance Attritable UAS

Greg Pappianou, Platform Aerospace, 301.863.9253 x606, greg.pappianou@platformaero.com

Technology Readiness Level (TRL) 8 Group III ("tactical") UAS
World Record Endurance – 8-Days and 1 Hour Demonstrated to Date

5 day loiter
4 day loiter
3 day loiter

Where do we fit in?

Effector
Deploy & Support
Pacific Collaboration
Intel, Fusion, Threat
Bilateral Secure Comms-DIL
Deployable
Development

Technology Description / Product:

- Strategic endurance and payload in a low-cost Group III ("tactical") package – **up to 150 lbs of multi-INT sensors on open-architecture UAS with up to 10 days / 15,000 nm endurance**[1]

- Demonstrated over the horizon (OTH) capability, having deployed multiple SATCOM suites

- Large payload SWaP enables rapid integration of legacy UAS payloads without costly NRE to modify their form-factor; tactical altitudes (<15 kft) enables fielding of lower cost sensors

- Internal combustion diesel-cycle engine uses widely-available heavy fuels – not reliant on solar power and is immediately responsive to operator tasking / repositioning

- Low cost and extreme endurance means that **ISR budgets are spent "on target"**, not ground support and transit; operations can be based in lower cost, lower risk regions and still provide days of overhead coverage

Vanilla UAS is deemed exportable
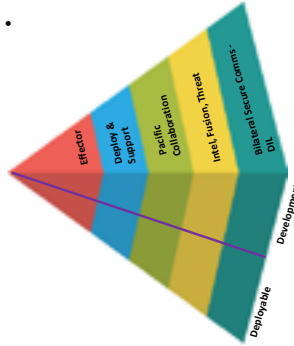
Focus areas:

- Vanilla enables any focus area in which persistent overhead ISR is required, especially in extreme distance scenarios, namely:

  - **Maritime Domain Awareness** – cross cueing between onboard hyperspectral / radar & EOIR camera, etc.

  - **HADR** – First-look post-event assessment without placing additional personnel at the site; comms link to disaster area

  - **Border & Natural Resources** – multi-day ISR & secure comms relay over borders and wild lands (e.g., fisheries, game reserves, wildfire sites)

Company Information:

- Platform Aerospace is a SDVOSB located near Naval Air Station Patuxent River with nearly 30 years of aerial ISR experience modifying special aircraft and developing novel technologies

Greg Pappianou, Chief Growth Officer

- 301.863.9253 x606 // greg.pappianou@platformaero.com

Justin Armer, Director of Vanilla Operations

- 928.713.6155 // justin.armer@platformaero.com

1 Vanilla UAS is engineered to trade between fuel and payload weight; endurance is dependent on payload configuration

Vanilla UAS: Multi-Day, Multi-Sensor Ultra-Endurance UAS

Greg Pappianou // greg.pappianou@platformaero.com // 301.863.9253 x606
Platform Aerospace | 43960 Airport View Dr. | Hollywood, MD 20636

Vanilla delivers long range/long dwell reconnaissance and ALE delivery capability through world-record endurance (193 hours (>8-days), over 19,000 km) and unmatched Group III C5ISR payload capacity (up to 150 lbs.) at a disruptive cost profile. Vanilla achieved TRL-8 maturity with sponsorship across the Department of Defense (DoD) and NASA, repeatedly demonstrating its open payload architecture through multi-day, multi-INT flights with increasingly complex sensor combinations at DoD exercises and independent test events. Vanilla UAS has demonstrated its capabilities in mission-relevant environments including high desert during summer months, over open-ocean via SATCOM, and beyond line-of-sight autonomous flight over the frozen arctic ice.

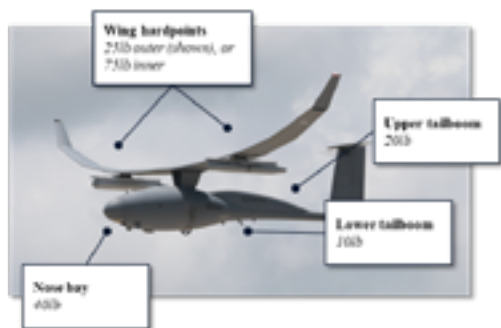*Illustrate time on station with EOIR, SATCOM, Mesh Radio Configuration*

(>8 days, >19,000 km un-refueled flight demonstrated with internal payloads)

Deployment Readiness

Vanilla UAS is in low-rate production at Platform Aerospace's vertically integrated engineering, manufacturing, integration, and operations facility in Maryland, USA. The system and team have obtained airspace clearances and demonstrated multi-sensor, multi-day operations at over a dozen CONUS and OCONUS locations.

Open Payload Architecture/Rapid Integration

Payload modularity is a governing concept of the Vanilla program and is complimented by Platform's expertise as a veteran aircraft systems integrator. Vanilla provides up to 150 lbs. of payload capacity across 5x mounts, and payloads are connected to the onboard IP network via a 10/100 ethernet connection enabling seamless integration and remote operation. Over 20 different payload systems have been integrated and flown on Vanilla, including multiple EO/IR cameras, RADAR suites, Mesh Radios, SATCOM suites, processors for edge processing, and hyperspectral imagers.

Disruptive Force Multiplier

Vanilla's disruptive potential is best realized when scaling operations – where the low cost and world-record endurance translate into multiple concurrent 24/7 flight operations with minimal increases in ground support logistics and site staffing. Additionally, all personnel and assets remain far removed from harm's way when leveraging the benefits of demonstrated unrefueled flight over 8 days (>19,000 km).

Vanilla Payload Capacity by Mount Location

Rebellion Defense - Iris Sensor Perception

Brian Gershkoff, Technical Architect, [813-300-4991] bgershkoff@rebelliondefense.com

Product Description: Iris – Sensor Perception

Iris has a Sensor Perception capability that delivers automatic target recognition (ATR) across synthetic aperture radar (SAR) in seconds.

- Full exploitation of SAR data at machine-speed
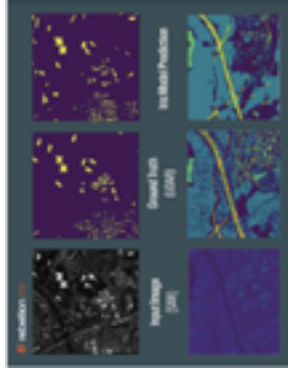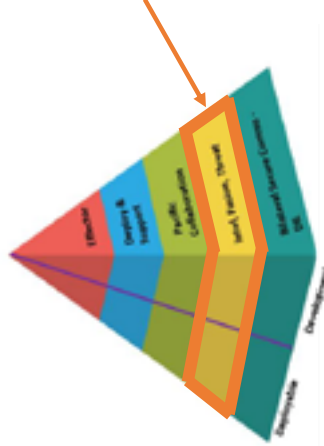 - Corroborated SAR, LiDAR, EO, RF data types

60% model accuracy in 45 minutes for new targets, with <100 tiles from ICEYE spotlight imagery

12 hours to develop new AI models for the detection of new objects

Company Information: Rebellion Defense

Rebellion builds and deploys cutting-edge technology in this software-centric national security era in which software speed, reliability, and agility will be critical to protecting the United States, the United Kingdom, and allied nations.

- We build AI products for national defense
- You maintain ownership of your data; we make sense of it
- We secure data from the operational edge to HQ
- Our software easily integrates with existing hardware & SW

Where do we fit in?

Intel, Fusion, Threat
- Contested logistics and operational energy
- Maritime Domain Awareness (MDA) and Maritime Security
- Operations in urban environments

Iris's Sensor Perception capability combines and analyzes military and commercially available Synthetic Aperture Radar (SAR) sensor data to rapidly detect and classify targets of interest around the globe. Leveraging advanced Computer Vision (CV) and Artificial Intelligence/Machine Learning (AI/ML) models, Iris automates the labor-intensive target recognition analysis at machine-speed, driving down time and driving up confidence in decision-making. Iris delivers trust in what users view across a geographic location by corroborating insights with additional sensor types, including electro-optical (EO) and radio frequency (RF). Iris software leverages industry best practices, strict identity and access management (IAM) protocols and zero trust architecture to deliver a cyber hardened solution. Our software is currently under contract with the US government and continues to develop object of interest detection and classification capabilities to automate pattern-of-life insights.

Iris Sensor Perception features include:

SAR Automated Target Recognition (ATR): Iris automatically detects objects of interest, including specific classes of aircraft, ground vehicles, and surface vessels using both airborne platform and commercial or national satellite collection data. Models can be trained in under 12 hours to adapt to new scenarios and deployed against archives of imagery or processed in near real time on platform. In conjunction with the US government SAR ATR contract, our algorithms are being vetted by a third party to validate integrity, competency, robustness, and resiliency across multiple vendors' data and various classes of objects.

Trusted corroboration and anomaly detection: Iris's Sensor Perception illuminates changes in pattern of life through coherent change detection (CCD) in phase and/or amplitude (red fled / blue new), as well as automatically counting objects of interest and notifying the user when a particular predefined threshold has been crossed. Through root normalization and abstraction of various modalities of data at irregular collection intervals, Iris illuminates patterns unnoticed by humans to aid in predicting what may happen going forward.

Persistent visibility: Leveraging commercial satellite SAR provides more persistent visibility into denied access regions and lowers the barrier to disseminate insights to analysts. Iris is optimized to analyze both data from satellites and low graze angle collects from airborne platforms. Using this data, Iris is able to successfully execute SAR ATR in near real time on objects of interest, day or night, rain or shine.

Platform independence: Iris can be deployed to edge nodes for inference and integrated into tactical networks to support both mission planning and execution environments. Using existing OSINT and mission data, Iris Sensor Perception can be used to evaluate post mission performance and/or plan mission activities of manned or unmanned platforms.

Rebellion Defense was founded in 2019 to build and deploy cutting-edge technology in this software-centric national security era in which software speed, reliability, and agility will be critical to protecting the United States, the United Kingdom, and allied nations. We've brought together technologists who have built software products that transformed our way of life in the commercial sector with defense experts who deeply understand the mission and the stakes to build technology for defense and national security.
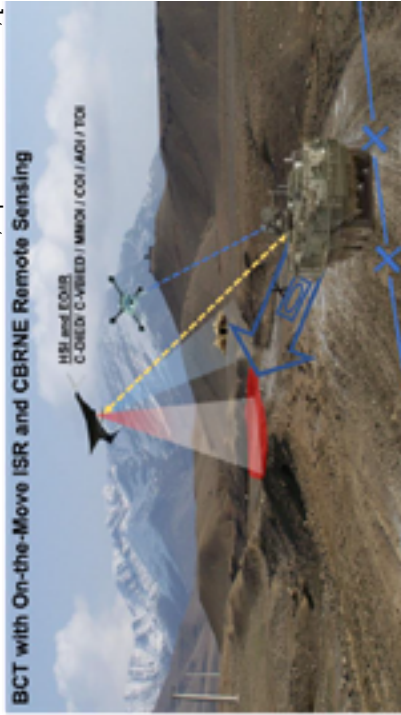
It's time for a
REBELLION.

POC: Brian Gershkoff, Technical Architect, [813-300-4991] bgershkoff@rebelliondefense.com

Spectrum Photonics // Hyperspectral Chemical Aerial Reconnaissance System (HyCARS)

Ed Knobbe, Spectrum Photonics, [808-748-1709], ed.knobbe@spectrum-photonics.com

Technology Description / Product:

Description: Ultra-compact, solid-state hyperspectral payload
- SWaP: 30"x10"x12" , <45 lb, <200W
- Longwave Infrared sensor payload w/ roll correction
- AI-enabled on-board target assessment
- Standardized interface and Comms architecture

Requirement: 2018 USARPAC CEMA/CWMD UON

Scope:
- 24-month effort: FY20/Q3 to FY22/Q3
- Tech and Op Demos
- Collaborate w/USARPAC Raven-X Project
- Deliver operational prototype to USARPAC

Optical core with roll corrector; no support electronics

Point of Contact Information:

Tech Manager: CCDC CBC, Dr. Alan Samuels; alan.c.samuels.civ@mail.mil
- Lead Performer: Spectrum Photonics; Dr. Ed Knobbe; ed.knobbe@spectrum-photonics.com
- Payload Integration: U. of Hawaii ARL; Ted Ralston; ralston2@arl.hawaii.edu

Transition Coordinator: JPEO CBRN Defense; Mr. Jon Bartel, IEW Lead; jonathan.d.bartel.civ@mail.mil

Operational Manager: USINDOPACOM J85; Dr. Mike von Fahnestock; frank.vonfahnestock.ctr@pacom.mil

Operational User: USARPAC G-8, Mr. Anthony Lambert; Raven-X Project Manager anthony.j.lambert1.civ@mail.mil

Funding Sponsor: OSD Rapid Innovation Fund Office

Expected Operational Value:

AI/ML-enabled, ultra-compact hyperspectral imager (HSI) integrated onto a Group 3 UAV provides operational value:
- Delivers capability for the on-the-move Integrated Early Warning (IEW) CONOP
  - Wide area Chem & Explosive Surveillance
  - Cues CBRNE Recon Group 1 UAVs
- Delivers high-fidelity, dynamic and cost-effective ISR to operational maneuver units
- Delivers standardized interface and comms architecture for integration into IEW CONOPS

Other focus areas: Humanitarian Assistance Disaster Relief (HADR) and Counter Improvised Explosive Devices (C-IED)

BCT with On-the-Move ISR and CBRNE Remote Sensing

SPECTRUM PHOTONICS' HYPERSPECTRAL CHEMICAL AIRBORNE RECONNAISSANCE SYSTEM (HYCARS)

Spectrum Photonics' Hyperspectral Chemical Airborne Reconnaissance System (HyCARS) is a long-wave infrared (LWIR) sensor designed for applications where a premium is placed on minimization of system size, weight and power (SWaP). HyCARS gives the US new advantages in Integrated Early Warning and other actionable Measurement and Signature Intelligence (MASINT) by bringing wide area chemical and exploitable LWIR signatures awareness to the Tactical Intelligence picture. Implementation of advanced onboard processing enables HyCARS to deliver near real-time situational awareness to the distributed information network, thereby significantly enhancing decision support, combat effectiveness, and safety. Spectrum Photonics' first HyCARS prototype has been developed for Group 3 UAS-borne deployment and is ready to begin transition to operational users; smaller HyCARS system designs suited to deployment from Group 2 UAS and/or adapted to ground-based platforms are presently in progress.
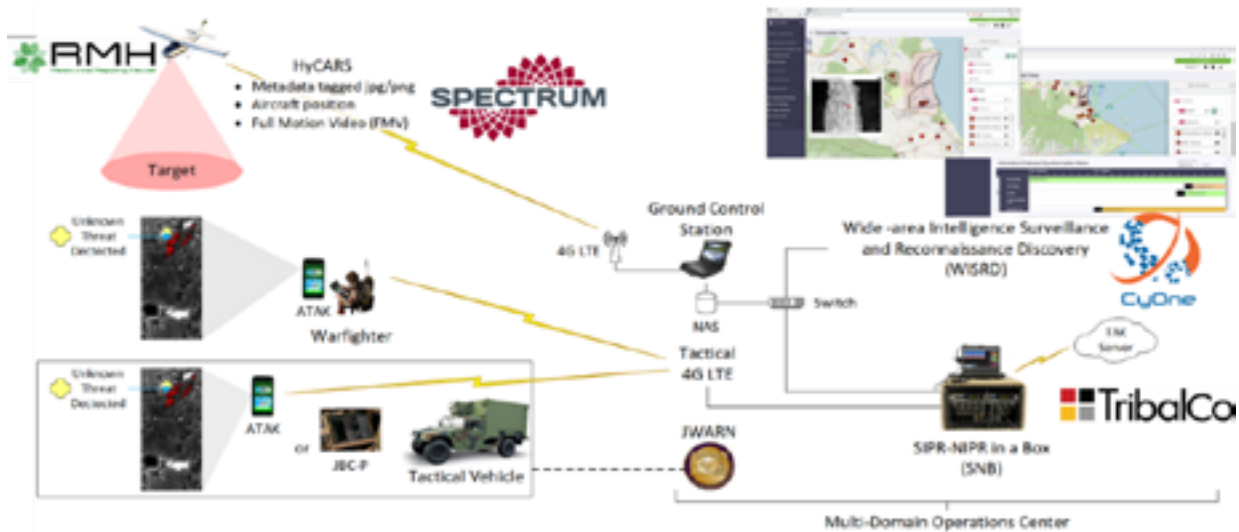
On 11 March 2022, HyCARS successfully completed a live operational demonstration before a group of US Government observers during exercises conducted at Marine Corps Training Area, Bellows (Oahu, HI) in conjunction with the Pacific Operational Science and Technology Field Exercise (POST FX). Working as part of an integrated team, Spectrum Photonics along with the University of Hawaii Applied Research Laboratory (ARL at UH), Tribalco, CyOne and Resource Mapping Hawaii successfully demonstrated 1) down-linked aircraft metadata and hyperspectral collection data products, using on-board processing for near real-time detection of chemical plumes and other targets of interest; 2) metadata tagged images, full motion video (FMV), aircraft telemetry ingested into Tribalco's SIPR-NIPR-in-a-Box (SNB); 3) SNB sharing HyCARS detection images, E/O FMV feed from the aircraft, and aircraft telemetry to CyOne's Wide area Intelligence Surveillance Reconnaissance Discovery (WISRD) mission planning application; and 4) SNB dissemination of images, full motion video and aircraft telemetry to multiple Android Tactical Assault Kit (ATAK) smartphones.

ABOVE: The team's integrated operational view for HyCARS live demonstration. LEFT: (Left side, upper display) HyCARS ground station operator view, showing near real-time chemical plume detection. (Right side – lower display) data assimilation by Tribalco's SNB, with distribution to ATAK networked devices. (Right side – upper display) live-feed distribution to ISR common operating picture via Cyone's WISRD mission planning application.

Prototype HyCARS sensor development has been conducted under the Small Business Innovative Research (SBIR) program, with funding provided by the Office of the Secretary of Defense through the Rapid Innovation Fund (RIF) Program. Technical oversight is provided by US Army Development Command and US Indo-Pacific Command. Spectrum Photonics is a small business located in Honolulu, HI. For more information, please contact Dr. Edward Knobbe: ed.knobbe@spectrum-photonics.com.

RMH – Aerial Support and Testing of Sensor Platforms in Complex Environments

Stephen Ambagis, Resource Mapping Hawaii, [808.756.5265], stephen@remaphawaii.com
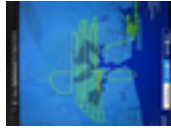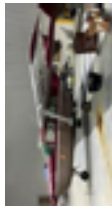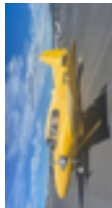
Technology Description / Product:

RMH has been an aerial solutions and mapping provider in the Pacific for over 13 years and focuses on remote sensing product development.

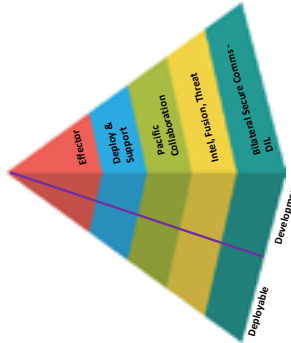We provide technical knowledge of sensor requirements for both in air and use case scenarios. RMH has 3 aerial mapping aircraft engineered to support installation of most sensor types and configurations. We fly in all weather conditions, complex terrain, and airspace supplying the most critical and wide-ranging testing conditions possible for sensor development prior to deployment on drone platforms.

Point of Contact Information:

CEO / technical lead- Stephen Ambagis (stephen@remaphawaii.com)
Flight operations manager- Miguel Castrence (Miguel@remaphawaii.com)
Sensor Development - Dana Slaymaker (Dana@remaphawaii.com)

Website:
www.Remaphawaii.com

Phase III

Phase II

Phase I

Where do we fit in?

- RMH's primarily role is to support **development** of sensor and UAV platforms using manned aircraft operations.
  - Test UAV payloads in manned aircraft prior to integration
  - SAFE, LOW COST, FLEXIBLE
  - Testing and evaluation of UAV avionics
  - Over water, complex air space, complex terrain
  - Operations in both the Pacific and Desert Southwest
  - Variable aircraft options for sensor needs (single engine, multi-engine, inline twin)

Effector
Deploy & Support
Pacific Collaboration
Intel, Fusion, Threat
Bilateral Secure Comms- DIL

Deployable
Development

Introduction

Resource Mapping Hawaii (RMH) has two well-tested and deployable services/products for DoD use.

RMH has developed an approach and the necessary equipment to act as a surrogate testing platform for all forms of sensor packages destined for either drones or manned aircraft. By using our general aviation manned aircraft specifically designed for sensor testing, RMH is making the path to validation and deployment a reality. This approach is specifically geared to both greatly reduce the cost of development but also speed up and make safer the process of getting these products tested for accuracy, applicability, and reliability. By using this approach, we are able to test sensors over complex airspace, terrain, inclement weather, populations, or anywhere manned aircraft can fly. This is a gross improvement over where most drones can operate currently, thus greatly improving the testing process. Once completely vetted these sensors can be loaded onto the flight platform of choice for final assessment and approval.

We are also an aerial mapping service provider with a special custom capacity that allows us to take portable mapping systems to far flung parts of the globe and produce both high resolution ortho mapping as well as fully constructed "digital twin" 3D models of environments. Our proprietary system can be mounted on any Cessna 172, 182, or 206, the most ubiquitous aircraft in the world, and collect up to 2cm GSD imagery. This allows us to mobilize to remote places without having to bring large expensive aircraft and sensors and still produce the highest-grade products. RMH has been providing this service in the Pacific for the past 14 years and has a proven track record on DoD and non-DoD large scale projects.

RMH is a small business under 10 employees but is included on 2 separate USACE IDIQ teams and has performed as a prime contractor on DoD contracts. Our business has two locations, one on the island of Oahu in Hawaii one in Tucson, Arizona. We have specialized aircraft assets in both locations and our portable systems are deployable globally.

Stephen Ambagis
CEO

National Disaster Preparedness Training Center, Energetic Materials Research and Testing Center

Picture of Technology

Rapid Integrated Damage Assessment (RIDA)

HADR:
InvestDM
Chatty Beetle
PDC DisasterAware

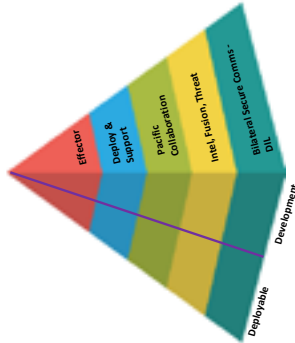**Drone Assessment and Response Tactics (DART)**

Technology Description / Product:

Rapid Integrated Damage Assessment (RIDA) is a methodology to perform rapid damage assessments integrating remote sensing technologies, e.g., satellite, plane, drone, ground-based imagery and machine learning convolutional neural networks (CNN) algorithms to automate and classify damage levels.

HADR Communications with Chatty Beetle is a portable Iridium satellite terminal that permits text-based alerts and messaging in remote locations, where communication is limited.

Drone Assessment and Response Tactics (DART) applies analog and electronic UAS detection techniques, and threat response tactics. Training includes field demonstrations and exercises on UAS types, their capabilities, and simulated UAS threats involving Improvised Explosive Devices (IEDs).

Company Information: National Disaster Preparedness Training Center – Energetic Materials Research and Training

Karl Kim, Ph.D.
National Disaster Preparedness
Training Center (NDPTC)
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Where do we fit in?

■ **Focus Areas:**

• Rapid Disaster Damage Assessment
• Humanitarian Assistance and Disaster Relief
• Counter Drone activity and drone improvised explosive device delivery

Effector
Deploy & Support
Pacific Collaboration
Intel, Fusion, threat
Bilateral Secure Comms - DIL
Deployable
Development

NDPTC's technology-based training focuses on the application of **Rapid Integrated Damage Assessment (RIDA)**, which applies commercially off-the-shelf 360 panoramic imaging cameras, unmanned aerial vehicles, and other sensors to capture imagery that will be integrated with machine learning algorithms (convolutional neural network) to auto-detect damage and debris after a disaster. Other technologies integrated with training, include the application of equipment for interoperable communications before, during, and after a disaster. One of these technologies is the **Chatty Beetle**. The **Chatty Beetle** is a portable Iridium satellite terminal that permits text-based alerts and messaging in remote locations, where communication options are limited.

• The **Chatty Beetle** technology has been deployed to remote islands where communication is limited; it also has been deployed to the Nation of Tonga, after the 2022 eruption and tsunami. It has been in use since 2003 in various remote locations to support communications during disasters. We are currently in search of an organization that can assist in the production process.

• The **RIDA** technology, mostly is composed of commercially off the shelf technology, but the analysis and modeling process is ongoing to improve the algorithms to conduct damage assessments. The **Chatty Beetle** is a standalone 2-way text messaging system. It can be integrated as a backup to support primary ITNs.

• The **Chatty Beetle** can be integrated as a backup communications unit. It is user friendly and easy to maintain. The user commands were also designed to be easy to recognize and remember.

• The **Rapid Integrated Damage Assessment (RIDA)** has been deployed and tested after natural disasters such as Hurricane Ida in Louisiana, but continuously being improved to be integrated into operational disaster damage assessment missions.

• The **Chatty Beetle** operates using the Iridium network of satellites. It also uses SSL/TLS.

• We are exploring options of the **Chatty Beetle** for production and the development of a desktop version. We continue to look for lower cost and smaller camera and sensors that can be integrated in the **RIDA** in order to make it more feasible for rapid response activities. As well as a way to integrate the damage assessment with the sensor for real time damage assessment, rather than post processing.

The National Disaster Preparedness Training Center (NDPTC) was established as a member of the National Domestic Preparedness Consortium (NDPC) in 2009. The NDPC has been authorized by the U.S. Congress and is sponsored through the Department of Homeland Security/Federal Emergency Management Agency's National Preparedness Directorate. Since its establishment in 1998, the NDPC's impact on national preparedness has been substantial. The NDPC has conducted training in all 50 states and each U.S. territory. This training has benefited more than 1,900,000 people since 1998. The consortium applies its expertise in academics, curriculum development, and instructional techniques to produce training programs that address the most urgent needs of the emergency response community.

The National Disaster Preparedness Training Center (NDPTC) specifically focuses on natural hazards, coastal communities, and the special needs and opportunities of islands and territories. The NDPTC actively engages internally with FEMA and the University of Hawai`i, as well as with external partners across the region to integrate the delivery of its trainings, products, and services. NDPTC is the premier and trusted provider of risk-based natural hazards training focused on underserved, vulnerable populations living in hazardous, coastal, and island communities. NDPTC has 20 full time staff, and is based out of the University of Hawaii, but has over 75 instructors nationwide to assist in our training deliveries across the nation.

The NDPTC works collaboratively to develop and deliver training and education on disaster preparedness, response, and recovery to governmental, tribal, territorial, non-profit and private partners integrating land use, infrastructure, urban planning, environmental management, and emerging technologies to build and sustain resilient communities. NDPTC also has worked with USAID and international partners in the IndoPacific region to develop training and education programs for natural disaster risk reduction, and humanitarian and disaster relief (HADR) activities. The NDPTC has been working with the Indonesian Disaster Management Education and Training Center (PUSDIKLAT) and Badan Nasional Penanggulangan Bencana (BNPB) since 2014 to design and develop a training, education, and workforce development program on disaster risk reduction and emergency management.

Eric Yamashita

Associate Director for Training Technology and Innovation
National Disaster Preparedness Training Center

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Orb Aerospace – HADR/Contested Logistics

Brian Davis, Orb Aerospace, [810 814-2186], brian@orb.aero

Orb NOMAD – Advanced Air Mobility Asset:

The Orb NOMAD Advanced Air Mobility Platform has 30% less drag with a proprietary airframe and engine configuration, 8x energy density for propulsion, modular wings, universal pilotage, flexible payload configurations, and a minimal logistic footprint for maintenance and sustainment.

Size: 1300 lbs fully loaded, 20' W x 27' L x 7'H, (Shipping Configuration: 8' wide)

Capabilities of the Technology:

Universal pilotage: manned/autonomous/remote,

Modular wings: maximum range/maximum endurance,

Expeditionary payload options: passengers/cargo/sensor

Superior performance capabilities: 1070nm/500lb payload/180kts cruise

Safety: Triple Redundancy, Emergency = Land like an airplane

Application to International Partner Needs:

Humanitarian Missions & Disaster Relief

Joint International Exercises – Orb NOMAD Prototype Integration

Joint Training & Promotion – Orb NOMAD VR Simulator

Node Based Aerial Logistics

Application to COCOM Operational Needs:

Aerial Logistics, Agile Combat Employment, Sensor Platforms, Manned/Unmanned Teaming, Overwatch, Casualty Evacuation, Ship to Shore, Ship to Ship, Island to Island, Operations in a Contested Environment, Forward Line of Troops Resupply

Accessible Aviation for All Mankind
- Cost Effective Purchase and Sustainment
- Dual Use – Civilian – HADR / Military – Contested Aerial Logistics
- ORB NOMAD VR Simulator – Licenses Available for Training & Promotion

Orb Nomad – US INDOPACOM Hawaii POST Focus Areas:
- Contested logistics and operational energy
- Maritime Domain Awareness (MDA) and Maritime Security
- Humanitarian Assistance Disaster Relief (HADR)
- Counter Improvised Explosive Devices (C-IED)
- Operations in the urban environment

POST FX 2022 Report

Performance: 1000NM, 500LB Payload, 180KTS

Orb Aerospace's hybrid eVTOL performance is expected to surpass the USAF current agility prime AOI requirements with a 1000nm range at 180kts with a payload of 500lbs.

Orb's significant performance advantage can be attributed to proprietary airframe design and engine configuration, reducing drag in horizontal flight by 30% along with hybrid electric power generation using a turbo alternator and JP-8 fuel. The mission impact of this project on the Air Force and the Department of Defense will be significantly improving the efficiency of existing aerial logistics and filling mission-critical gaps by providing new survivable and sustainable transportation solutions at the unit level during combat, training, and disaster relief operations. Orb NOMAD can be piloted, autonomous, or flown remotely; offers flexible payload configurations for passengers, cargo, and/or sensors; uses modular wings for maximum endurance or range; and is designed to fit into an 8' shipping container or USAF cargo aircraft for ease of global deployment. Once in theater, Orb NOMAD will have an incredibly low maintenance and sustainment footprint, using JP-8 fuel and existing infrastructure, with all parts being field replaceable with 1-2 personnel.

NOMAD is still in development. Once NOMAD has completed successful flight testing with our first full-scale prototype, it is our intention to offer the current hybrid electric JP-8 powered generator version for maximum performance and an additional fully electric version, powered by a proprietary fuel cell that will be fueled with agricultural by-products that can be found in every part of the world. This fuel cell version would eliminate a logistic trail that can be tracked by near-pear adversaries and will be locally sustainable with regional micro-manufacturing hubs. Orbs will be most effectively deployed in manned and unmanned teaming squadrons of 24 Orb's with a mixture of passenger, cargo, and sensor configurations. Squadrons of 24 Orbs are expected to provide continuous, pax, cargo, and sensor operations for a fraction of the purchase/ sustainment cost or manpower requirement of one advanced helicopter.

Orb Aerospace is currently on contract with USAF AFWERX for a Phase 2 STTR – Min Viable Scale Orb NOMAD prototype and with the National Guard to establish our proprietary Orb NOMAD Virtual Reality Simulator on MOTAR for operational and maintenance training. Orb is now interested in partnering with DoD and government agencies for OTA, OTP, follow-on Phase II, and phase III SBIR contracts for full scale development, field exercises, and tailored mission and regional logistic and JADC2 network integration.

Orb Aerospace: A group of the uniquely intelligent people. Dedicated to pushing the limits of aviation and the technology around it. Not for the richest among us, but for the benefit of every man.

CAGE: 8GRL1

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Advanced Additive Manufacturing for Accelerated UAS Development & Fielding
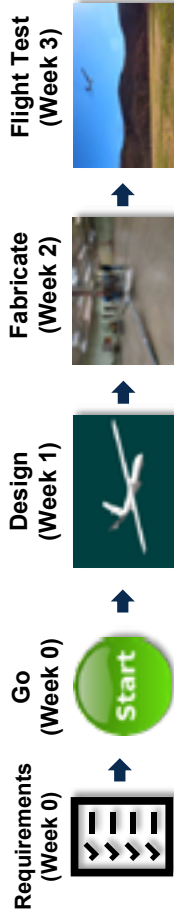
RapidFlight

Ryan Cross – VP, Advanced Development   ryan.cross@rapidflight.aero

Technology Description / Product:

Advanced Additive Manufacturing (AAM) employs proprietary processes, procedures, and techniques to generate clean-sheet aircraft with unprecedented development velocities. These design and manufacturing methodologies reduce the need for high-cost tooling, high artisanal manufacturing touch time, and support and sustainment bottlenecks.

Requirements (Week 0) → Go (Week 0) Start → Design (Week 1) → Fabricate (Week 2) → Flight Test (Week 3)

Where do we fit in?

RapidFlight's AAM development and manufacturing approach directly supports the following focus areas:

- Contested logistics and operational synergy
- Maritime Domain Awareness (MDA) and Maritime Security
- Illegal, unreported and unregulated fishing
- Border security

Company Information:

Founded by Jay Gundlach Ph.D., RapidFlight redefines the UAS industry and strengthens our national security by providing high-performance Unmanned Aircraft Systems that utilize Additive Manufacturing (AAM) to capture:

- Aggressive Mission Responsiveness
- Dramatic Cost Savings
- Accelerated Time to Market
- Un-constrained Logistics
- Nimble System Adaptability

Located in Manassas, VA, our team specializes in clean-sheet aircraft design, fabrication, test, production, and fielding of advanced UAS mission solutions.

RapidFlight Introduction

Advanced Additive Manufacturing (AAM) employs proprietary processes, procedures, and techniques to generate clean sheet aircraft with unprecedented development velocities. These design and manufacturing methodologies reduce the need for high-cost tooling, high artisanal manufacturing touch time, and support and sustainment bottlenecks. AAM was developed by RapidFlight and is the core of how our team captures:

- Aggressive Mission Responsiveness
- Dramatic Cost Savings
- Accelerated Time to Market
- Un-constrained Logistics
- Nimble System Adaptability

Our Technologies

Advanced Additive Manufacturing was pioneered by the RapidFlight team as a method to advance digital engineering concepts into reality with our vision for digital manufacturing. In practice, AAM has been flight-validated for a DOD customer offering an unprecedented three-week requirement-to-first flight development cycle for a Group 2 UAS. The speed with which the aircraft was designed, fabricated, and advanced to flight allowed for significant validated flight test data to roll into subsequent design cycles, significantly increasing speed of validated learnings and sharply reducing fabrication and non-recuring engineering expenses.

RapidFlight is continuing to strengthen and proliferate AAM across a myriad of customer solutions. We are equipped to transition customer requirements to flight at a pace that preserved operational utility and aggressive short-cycle system adaptability to meet dynamic mission environments.
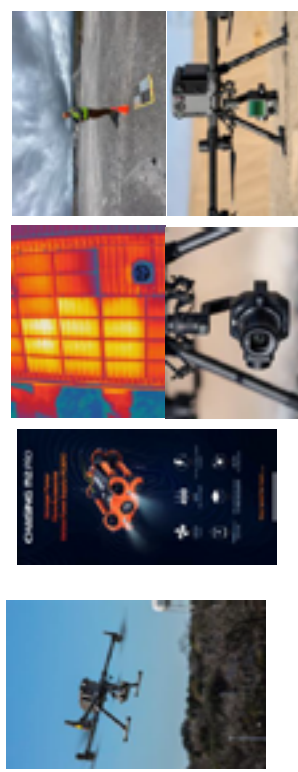
Company Description

RapidFlight is headquartered in Manassas, VA, in a 25,000SF development facility and our team specializes in clean sheet aircraft design, fabrication, test, production, and fielding of advanced UAS mission solutions. Founded by Jay Gundlach Ph.D., RapidFlight redefines the UAS industry and strengthens our national security by providing high-performance Unmanned Aircraft Systems that utilize Additive Manufacturing (AAM).

703-828-4102 • INFO@RAPIDFLIGHT.AERO • RAPIDFLIGHT.AERO • MANASSAS, VA

Drone Services Hawaii newest DJI and CHASING tech for SAR and HADR

Michael Elliott Mike.elliott@droneserviceshawaii.com 808-888-0806

Technology Description / Product:

Static display of DJI M300 RTK, DRTK-2 GNSS Base Station, XT2 FLIR Camera, H20T FLIR, P1 45 MP mapping camera, L1 LIDAR camera.

Discussion of the above systems, their ease of use and capabilities.

Brochures for various Enterprise systems we offer through a partnership with Rocky Mountain Unmanned Systems.

Discuss HOVERMAP LIDAR system and it's use in SAR and HADR

Brochures and discussion on the CHASING M2 Pro UUV and it's sidescan sonar systems, claw attachments.

Discuss PROPELLER AERO AEROPOINTS 2.0 GCP system
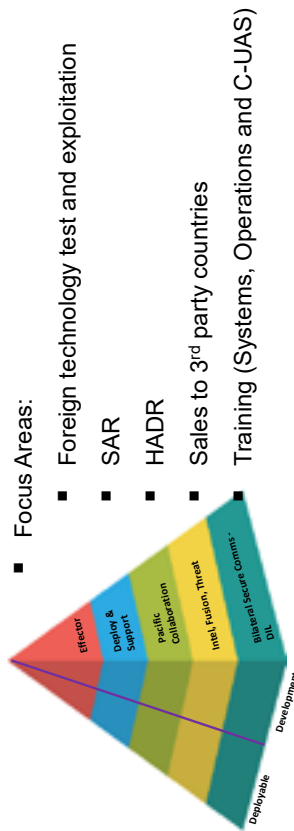
Company Information:

Drone Services Hawaii is a local small business founded in 2014 to provide sales of equipment, commercial services and training to the local community.

Our founders are military veterans, native Hawaiian and female Asian Pacific Islanders. Our extensive experience working with the various communities in Hawaii has worked to grow a greater acceptance and understanding of the powerful capabilities that drones offer.

We are the state's leader in mapping, LIDAR, solar inspection and building inspections using a variety of the latest technology.

We were also a key member of the development team for the C-UAS course just approved by FEMA.

Latest systems from DJI for commercial and industrial use. Latest FLIR with H20T and XT2, newest mapping camera with the DJI P1 and DJI low-cost LIDAR with the L1. Chasing M2 PRO, Aeropoints for GCP

Where do we fit in?

- Focus Areas:
  - Foreign technology test and exploitation
  - SAR
  - HADR
  - Sales to 3rd party countries
  - Training (Systems, Operations and C-UAS)

Silvus Technologies

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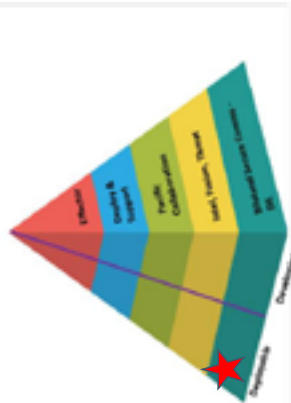
Silvus Technologies is committed to providing the most technically advanced, easy to use Mobile Ad Hoc Network solutions on the market.

Leveraging its roots in cutting-edge DARPA-funded research, Silvus Technologies developed StreamCaster, the world's first family of Multiple Input Multiple Output (MIMO) enabled Mobile Ad Hoc Networking (MANET) radios.

Unlike legacy MANET systems which are based on the 802.11 (WiFi) waveform, StreamCaster radios utilize Silvus' proprietary Mobile Networked MIMO (MN-MIMO) waveform which was developed specifically to deliver unprecedented range, throughput, and robustness in harsh tactical conditions characterized by long range, unpredictable terrain, high mobility, and electromagnetic interference.

Company Information:

- Founded in 2004 by UCLA Professor Babak Daneshrad
- 18 years of experience performing more than 3 dozen government R&D contracts with over $75M in R&D contracts
- Proprietary waveform not based on Wi-Fi protocols
- Secure solution including AES 256 / FIPS 140-2, Level 2
- Los Angeles HQ and production, San Diego RF design lab
- Rapidly becoming the mesh radio of choice for a wide range of organizations across the globe

Where do we fit in?

Today, StreamCaster radios are enabling a multitude of use cases across military, law enforcement, unmanned systems, airborne ISR, maritime, broadcasting, firefighting, commercial services and more.

Precision VTUAS Recovery (PVUR) and UAS Wireless Recharging

James Latson, NIWC Indo-Pacific, james.l.Latson.civ@us.navy.mil

Current VTOL UAS recovery requires Warfighter exposure, piloting skills

Landing target

UAS

Moving truck

Proposed autonomous VTOL UAS recovery device can recover and recharge UAS in day/night on moving platform without any Warfighter presence

Current Technology
- Vertical Take-Off and Landing UAS (VTUAS) are typically recovered by trained UAS pilots exposed to enemy targeting

Impact of New Technology
- Autonomous landing pad uses ultrasound positioning to recover VTUAS with cm accuracy on a moving platform in day/night conditions without pilot presence or operating skills. When coupled with solar-powered drone charging pad, perpetual self-charging drones can be enabled.
- UAS wireless recharging capability ensures longer operation times

Where do we fit in?
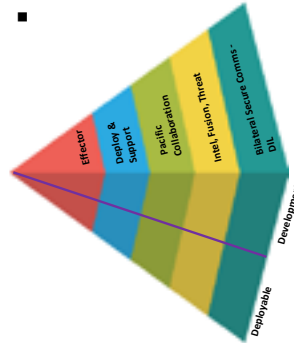
- Focus Areas:
  - Maritime Domain Awareness (MDA) and Maritime Security
  - Counter Improvised Explosive Devices (C-IED)
  - Operations in the urban environment

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Naval Information Warfare Center
PACIFIC

NDIA

FLIR SkyRanger
Rapid Airfield Damage Assessment Systems

Tech. Sergeant Dylan Pera, United States Air Force, [808-449-0011], dylan.pera@us.af.mil
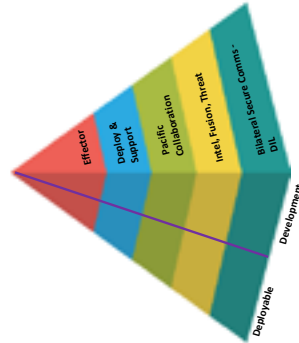
Technology Description / Product:

- Day & night operations
  - Electro-Optical (EO) 30x zoom and Long Wavelength Infrared (LWIR) sensors
- Video and still picture capability
- Interfaces between sUAS station & Geospatial Expeditionary Planning Tool
- All weather
  - IP-53 rated lightweight frame (5.3 lbs)
  - Operating temperatures: -22°F to 122°F
  - Operable in sustained 40 mph winds/55 mph gusts
- Transferable data via SD card/raw video transfer
  - AES 256 Encrypted Local Network

Company Information:

Air Force Installation and Mission Support Center

- Master Sergeant Matt Kmiec – Expeditionary Engineering Modernization Superintendent
- Lance S. Filler - Airfield Damage Repair Team Lead
- Craig Hutchinson – Small Unmanned Aircraft System Instructor
- Josh McClelland - Small Unmanned Aircraft System Instructor
- Marc Neubert - Small Unmanned Aircraft System Instructor
- Dylan Pera - Small Unmanned Aircraft System Operator (Joint Base Pearl Harbor-Hickam, HI)

Where do we fit in?

- An emergent capability in the Air Force Civil Engineering Center's Rapid Airfield Damage Recovery Mission:
  - Post-attack airfield recovery operations
  - Locate, classify, and measure debris, damage and UXOs
  - Primarily used contingency environments
  - Rapid determination of Minimum Airfield Operating Strip
  - Rapid Explosive Hazard Mitigation (REHM)
  - Mitigates the explosive risks for recovery personnel

Effector
Deploy & Support
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Intel, Fusion, Threat
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Development
Deployable

CONCLUSION

The concept of field experimentation held concurrently with the annual POST conference has been substantiated to increase the utility and value of the conference to USINDOPACOM, its allies and partners, supporting industry and academia. The organizers of POST FX 2022 hope that, in publishing this report, positive interaction will continue forward, building collaborative connections and experimentation, including higher-level security solutions. Based on experience with POST FX 2022, re-establishing the organizing committee in the late summer/early fall to consider how to accomplish POST FX in the spring is recommended.

The organizers wish to pass a most sincere "Mahalo" to all the sponsors, supporters, participants, and attendees of POST FX 2022.

Image credit:Josh Levy

Table of Acronyms

AAA	Airspace Access Authorization
AAR	After Action Report
AOR	Area Of Responsibility
ARL at UH	Applied Research Lab at the University of Hawai'i
ATAK	Android Tactical Awareness Kit
ATC	Air Traffic Control
A2/AD	Anti-Access and Aerial Denial
BAFS	Bellows Air Force Station
BDA	Battle Damage Assessment
CENTCOM	Central Command
COIN	Counterinsurgency
DoD	Department of Defense
EABO	Expeditionary Advances Base Operations
EPC	Entry Point Control
FAA	Federal Aviation Administration
FAR	Federal Acquisition Regulation
FX	Field Experimentation
GTRI	Georgia Tech Research Institute
HADR	Humanitarian Assistance and Disaster Relief
IED	Improvised Explosive Devices
ISR	Intelligence, Surveillance, Reconnaissance
IUU	Illegal, Unreported, and Unregulated
JFMCC	Joint Forces Maritime Component Commander
J81	Joint Innovation & Experimentation Division

LTE	Long-Term Evolution
MDA	Maritime Domain Awareness
MCTAB	Marine Corps Training Area Bellows
NDS	National Defense Strategy
OPFAC	Operational Facility
POST	Pacific Operational Science & Technology Conference
POST FX	POST Field Experimentation
R&E	Research and Engineering
SNB	SIPR/NIPR in a BOX
STUN	Secure Transmission on Unclean Networks
S&T	Science and Technology
TAOC	Tactical Air Operations Center
TIDES	Technology Incubation, Demonstration and Experimentation Support
T&E	Test and Evaluation
UAS	Uncrewed Aircraft System
UAV	Uncrewed Aerial Vehicle
UGV	Uncrewed Ground Vehicle
UH	University of Hawai'i
US	United States
USD(R&E)	Under Secretary of Defense for Research and Engineering
USINDOPACOM	United States Indo-Pacific Command
USV	Uncrewed Surface Vehicle
VTOL	Vertical Take-Off and Landing