



JIFX
Joint Interagency Field Experimentation



NPS Joint Interagency Field Experimentation 21-4

Director's Update

JIFX Community,

I'm sending a well deserved "pat-on-the-back" for how much we accomplished together while overcoming the challenges posed by the physical environment, varied climates, and implementing pandemic mitigation protocols.

The JIFX team hosted 20 groups conducting 22 different experiments between NPS' two field laboratory sites located at [Camp Roberts, California](#), and the [Sea Air Land Military Research \(SLAMR\)](#) facility adjacent to the NPS campus in Monterey, California as well as one collaborative experiment conducted via a virtual bridge linking NPS and Plano, Texas. Our multi-institutional semi-structured learning environment model proved a powerful demonstration of the JIFX community's ability to optimize collaborative learning to facilitate the rapid development of capabilities.

We had 247 registered participants with 84 experimenters representing 19 businesses, one DoD research lab, and two academic institutions along with 40 DoD stakeholders from the Naval Special Warfare Command, Army Futures Command, Air Force Research Lab, TRANSCOM, STRATCOM, NORTHCOM, SOCOM, and SOUTHCOM who provided feedback and mentorship to experimenters. Fifty-one NPS students participated as technology evaluators or observers, representing three US military services and the Hellenic, Swedish, Brazilian, and Indonesian navies.

A comprehensive technical report with all the experiment results, the [JVAB Cyber Vulnerability Assessments](#), and the technology evaluations will be published in early October. U.S. government personnel will access the report through our CAC enabled website found here: [JIFX - Field Experimentation \(CAC\) - Naval Postgraduate School \(nps.edu\)](#)

Our next event, JIFX 22-1, is scheduled for November 1 - 5. There will be a dedicated 5G network available at the SLAMR site in November to support experimentation with 5G enabled or equipped technologies. The proposal portal is found at: [Experiment Proposal - Field Experimentation - Naval Postgraduate School \(nps.edu\)](#) We will accept experiment proposals for JIFX 22-1 until September 22. Please continue to nominate experimenters and technologies to participate in JIFX.

See you in November!

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Unmanned Aerial Systems

- A-03: Horizon, **Advanced Unmanned Aerospace**
- A-10: AARISS+ Automated Aerial Runway Intelligence and Safety Scan System with Vegetation Management, **Greensight**
- A-12: Multi-Ducted Angled Rotors (MDAR) SUAS, **Spydar Sensors, Inc**
- A-13: GreenSight/USDA Vineyard Monitoring Service, **GreenSight**
- A-14: Autonomous Exploration and Mapping in Complex Environments (Persistent Communications), **Exyn Technologies**
- A-15: GPS-Denied Autonomous Navigation & Mapping, **Exyn Technologies**

Unmanned Systems Design, Deployment, Operation, Networking and Control

- B-02: Network Extension and UxS Control Using Commercial Off The Shelf Hardware, **California State University Bakersfield**
- B-03: Ground Vehicle Autonomy, **DropDrone**
- B-04: Rapid Expeditionary Security Surveillance System (RES3) Sensor in a Box (SiaB), **Booz Allen Hamilton**

Countering Unmanned Systems

- C-01: "Sally" Radar, **Eikon Research, Inc.**

Cyber, Cyber Security, and Electronic Warfare

- E-01: IHM GPS Denied & Subterranean Navigation Trials, **Yotta Navigation**
- E-03: Privacy-Preserving Machine Learning, **Inpher, Inc.**

Intelligence, Surveillance, and Reconnaissance

- F-01: Smart Surveillance with Behavior Analysis At-the-Edge, **Gantz-Mountain Intelligence Automation Systems, Inc.**
- F-02: Beyond Line of Site Situational Awareness with Commercial Off-the-Shelf Hardware, **SF Wireless Emergency Mesh**

Situational Awareness

- G-01: Ex Scientia Maritime Situational Awareness Experiment, **Ex Scientia**
- G-03: Enabling real-time Artificial Intelligence and Machine Learning thru mobile connected High-Performance Compute at the Tactical Edge, **TMGcore LLC**
- G-04: Asset Tracking and Off Grid Communications, **3amInnovations**
- G-07: Conversational AI Technology for Rapid, Effective Decision Making, **Humaxa**
- G-09: Ground-based Accuracy - Post-processed, **Xona Space Systems**
- G-10: COPERS, **Air Force Research Lab**

[Experiment
Quad Charts](#)



Defense Support to Civil Authorities

- H-01: Applying Real-Time Operational Intelligence to DSCA, **Splunk & Orion Labs**

Health and Safety

- I-02: Surface & Air Germ Elimination (S.A.G.E.), **Violet Defense, LLC**

Expeditionary Operations

- J-02: Craitor Portable, Ruggedized, Intelligent 3D Printer, **Craitor, Inc.**

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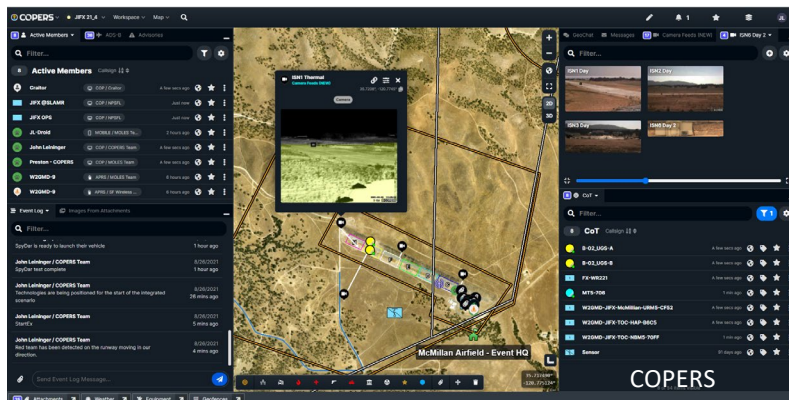
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Integrated Experiment

Because stand alone technologies are rarely useful to the military, each JIFX week culminates in a curated integrated experiment led by the JIFX team. Integrated experiments help experimenters and stakeholders see how well the various capabilities can work together to facilitate military or emergency style operations. For JIFX 21-4, the participating experimenters were divided into two teams – Red and Blue. The Blue team was responsible for protecting the McMillan Airfield at Camp Roberts while the Red team attempted to enter and occupy the airfield.

To begin the scenario, Red launched an unmanned surface vehicle at the SLAMR site that deployed an array of networked Persistent Objective Detect Sensornet (PODS) buoys transmitting threat detection data enabled by Booz Allen Hamilton’s Sensor in a Box (Siab). This mobile temporary network allowed Red to control and monitor their other unmanned systems. Red moved to covertly emplace ground-based sensors and Unmanned Ground Vehicles (UGV) outside the Blue team's perimeter. Using SpyDar’s VTOL unmanned air vehicle with Multi-Ducted Angled Fans, the Red team placed a mesh-connected UGV-mounted ISR system from CSU Bakersfield, SF Wireless Emergency Mesh, and Splunk. With communications spotty out on the operational edge, the Red commander ordered one of 3am Innovation's mesh network nodes to be lifted to 400 feet on a GreenSight One Way Lifter UAS. The aerial node enabled communications from controllers beyond line of site to the UGV assets. With communications established the UGVs maneuvered into the McMillan perimeter to observe Blue forces and collect data transmissions from the Blue team wireless network.

The Blue team used Gantz Mountain’s Smart Surveillance with Behavior Analysis at the Edge systems to detect Red's UGVs which triggered an alert via the Air Force Research Lab’s [COPERS situational awareness toolset](#). The Blue team commander responded by launching a Greensight Dreamer AI analytics capable UAS, to collect high resolution overhead imagery of the threat. The presence of Red team UGV’s was confirmed, and imagery was transmitted to the Technical Operations Center to support the Blue team commander's decision cycle.



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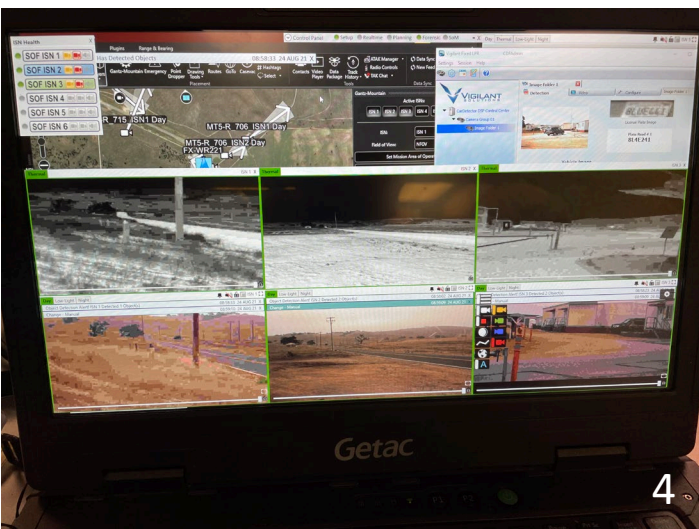
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NPS Joint Interagency Field Experimentation 21-4 Update

Clockwise From Top Left:

- 1. CSU Bakersfield** tested the ability of UxS systems constructed with commercial off-the-shelf components and open-source technologies to expand the coverage of existing adhoc networks.
- 2. Exyn Technologies** used ExynAI to generate this image of the CACTF Rubble Pile.
- 3. Xona** is building a constellation of Low Earth Orbit (LEO) satellites for navigational services. The beacons, as shown in the photo, were set-up around Camp Roberts to transmit navigational signals.
- 4. Gantz Mountain** experimented with their expeditionary multi-mission smart tactical surveillance systems featuring AI-enabled advanced behavior analysis and threat determination at the tactical edge.



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Clockwise From Top:

- 1. Greensight's** Automated Aerial Runway Intelligence and Safety Scan (AARISS) system detected a small wrench placed on the McMillan Airfield runway.
- 2. Spydar's** Multi-Ducted Angled Rotors (M-DAR) SUAS made its inaugural flight in a field environment.
- 3. 3amInnovations** tracked assets and set-up an off-grid communication network.



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