



JIFX
Joint Interagency Field Experimentation



NPS Joint Interagency Field Experimentation 21-2 Update

Director's Note

With the 21-2 event JIFX continued to serve as an effective and efficient forum for the cross-pollination of emerging technology knowledge between NPS, DoN, DoD, USG, industry, and academic partners.

Through a series of informational presentations government representatives gave industry partners insight into opportunities to work with the DoD. OSD's Rapid Reaction Technology Office (RRTO) kicked off these information sessions, followed by the opportunity for participants to join the monthly meeting of the Secretary of the Navy's Consortium for Unmanned Systems Education and Research (CRUSER), an overview of the Thunderstorm Technology Demonstration venue (one of JIFX RRTO "stablemates"), and an introduction to NPS Wayne P. Hughes Jr. Naval Warfare Studies Institute (NWSI). We were especially enthusiastic to include presentations by the Navy's Small Business Programs Office and the Navy's SBIR/STTR Office.

The directors of the Navy's Unmanned Vehicles and Autonomous Systems (UVAS) working group conducted a government only session to present an overview of their efforts. The gentlemen were extremely enthusiastic about further enhancing connections between the Naval Research & Development Establishment (NR&DE) and NPS. The session was executed on the NPS TEAMS platform to ensure CUI materials exceeding the DOD CVR Teams security level could be presented.

The Tech Expo consisted of 42 firms presenting 47 emerging technologies. The presenters included companies with JIFX experience dating as far back as 2015. Highlights included Augmented Reality contact lenses under development for DARPA/AFWERX, the current status of Wave Relay mesh networking (another JIFX alum), a parallax free 360 degree throwable camera, and a scalable process for rapidly reforming carbon material into fuel. The Expo once more demonstrated the diversity and ingenuity of our fellow citizens. You can check out any of these technologies here nps.edu/web/fx/tech-expo.

Although limited in scope, this event also marked the return of live experimentation for the first time since the pandemic mandates went into effect. NPS students working from the NPS Field Laboratory at Camp Roberts, explored how infantry or artillery formations can obfuscate their Radio Frequency (RF) signature in the electromagnetic spectrum in order to confuse and challenge near peer competitor RF direction finding systems. Also in the field were faculty members conducting experiments focused on developing secondary autonomy systems to control Scan Eagle Aircraft.

The Multi-institutional All-Domain C2 experiment was a success with data input being achieved by University of Hawaii's Applied Research Laboratory (UARC), the MITRE Corporation (FFRDC) lab in Massachusetts, and NPS systems operating from the SLAMR Aquatic Environment #1. That data was simultaneously shared across AFRL's COPERS common operational picture system from air, sea, and sub-surface platforms. The experiment also proved our ability to connect the COPERS commercial quality, exportable C2 system to the Defense Research Enterprise Network (DREN) so that we can seamlessly share data across the NR&DE with the eventual goal to enable "whole of country" connectivity. You will learn more about all these activities in this update.

Finally, the JIFX team welcomes Michael Richardson, Colonel (USA-retired), to our team as the Deputy Director. Mike is coming up to speed incredibly fast and is looking forward to seeing you in the field with us in May.

Keep the press!



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Tech Expo Participants

Aurora Flight Sciences • Avalon Holographics • AVX Aircraft Company. • BotFactory, Inc. • Bounce Imaging • Caliola Engineering LLC • Circle Optics • CloudBees, Inc. • Crow Industries • DermaClip US, LLC • DropDrone • Elbit Systems Ltd. • FNA, Inc • Gates Defense Systems • General Atomics Aeronautical Systems Inc. • HCI Energy • Insight Up Solutions • Lumenier • Ocean Power Technologies • Orb Aerospace • Persistent Systems, LLC • Point Source Audio • Potter Technology • Promia Incorporated • Rapid Imaging Technologies LLC • Rhoman Aerospace • Roving Blue, Inc. • SeaSatellites • Sonardyne Inc. • Southwest Synergistic Solutions, LLC • Spectrabortics, LLC • Star Solutions • Strategic Mobility 21 Inc • Target Arm Inc. • Tectus Corporation • Telops USA • TETAC, Inc. • The Ulysses Group • TMGcore • Torrey Pines Logic, Inc. • Valkyrie Systems Aerospace Inc • Vidrov

Virtual Sessions

Rapid Reaction Technology Office (RRTO)

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Chief Operating Officer

NPS Naval Warfare Studies Institute (NWSI)

Colonel Randolph G. Pugh,
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Senior Marine Representative
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Department of the Navy Office of Small Business Programs (OSBP)

Ms. Arveice Washington
Deputy Director

Unmanned Vehicles and Autonomous Systems (UVAS) Working Group

Mr. Christopher Egan, SSTM
NUWC Division, Newport
Mr. Reid McAllister
NSWC Carderock Division

Rapid Reaction Technology Office: Thunderstorm Experimentation & Demonstration Venue

Mr. Thomas Goodall
Engineering Program Manager,
Penn. State University, ARL

Small Business Innovation Research (SBIR)

Small Business Technology Transfer (STTR)

Mr. Robert Smith
Director



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Scan Eagle Secondary Controller

A series of long duration flights evaluated Scan Eagle ISR capabilities to collect and transmit video and telemetry data. The first day's flight transmitted 7 GB of network traffic, including synchronized video and telemetry from the aircraft's sensors. That dataset will enable further research in visual navigation methods. The second day's flight successfully established internet connectivity between the platform's ground control station and the COPERS situational awareness system which enabled the system's participation in the multi-domain experiment. During that experiment the sensors collected an additional 6 GB of network data and successfully transmitted cursor-on-target (CoT) data through a commercial mesh network to COPERS making that data observable to experimenters distributed across the country. The team measured a data throughput of 5-9 Mbps across MANET into the Internet proving the technical feasibility of transmitting video as well as CoT to COPERS in future C2 experiments.



ScanEagle preparing for launch

Tactical RF Signature Manipulation



On Wednesday of JIFX, students in the NPS Department of Information Sciences attempted obfuscation in the electromagnetic spectrum to challenge direction finding systems. The approach used a top-of-the-line Rhode & Schwarz direction finding (DF) system against Persistent Systems Wave Relay radios, iCOM radios, and Instant Eye sUAS platforms. The unmanned platform enabled techniques and experiment parameters for evaluation at altitude - effectively enhancing power received at the sensor. Techniques used against the DF system proved to be effective beyond anticipated estimates. Follow-on experiments will be evaluated against the DF system at maximum theoretical estimates. Experiments were supported by multiple research agencies, most notably the NPS Research Department and the Joint Vulnerability Assessment Branch (JVAB).

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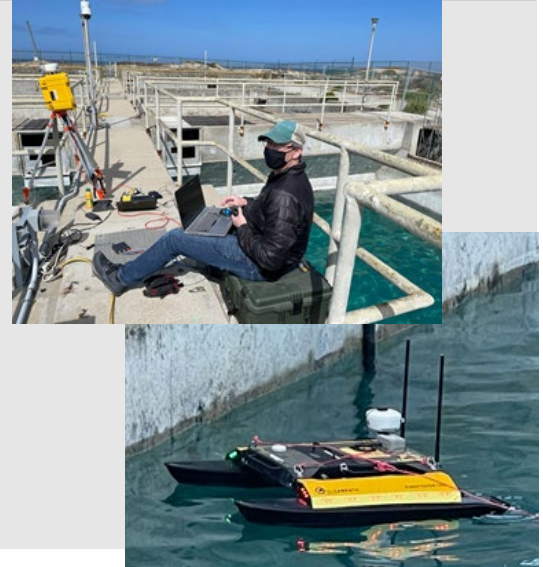
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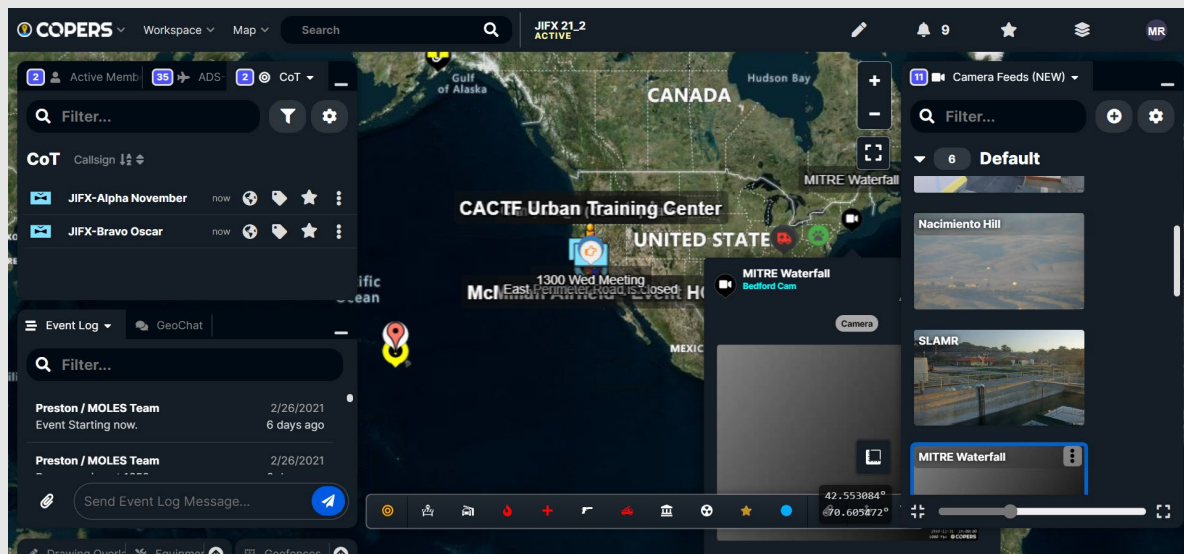
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Multi-Institutional All Domain Command Control for UxS

Human-Machine teams located at the Sea Land Air Military Research (SLAMR) Initiative’s Aquatic Environment #1, the Naval Postgraduate School’s Field Laboratory on Camp Roberts, and Scott Air Force Base connected with teams in Massachusetts (MITRE) and Hawaii (UH-Applied Research Laboratory) to demonstrate telemetry data and imagery sharing capabilities. Each experimenter shared their data in real time via the Air Force Research Labs COPERS situational awareness system. JIFX participants were able to access and operate the COPERS tool suite while simultaneously observing a guided tour of the experiment hosted by the JIFX Director and leaders of the COPERS R&D team. The experiment proved the ability for COPERS to connect commercial quality, exportable C2 system data to the Defense Research Enterprise Network (DREN) for seamless integration across the NR&DE. A future experiment will explore how to enable “whole of country” connectivity with the same C2 tool suite.



Air Force Research Lab COPERS Display



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Social Media During the Event

Naval Postgraduate School @NPS_Monterey · 3h

From the field at #JIFX - A team of @USMC Info Warfare students is using airspace at the NPS Field Lab to support research in mitigating detection of #tactical #communications signals.

Stay tuned for our full report from JIFX or check out NPS.edu/fx for more info.



1 retweet 2 likes

Naval Postgraduate School Retweeted

DON OSBP @DON_OSBP · 4h

Thank you @NPS_Monterey for inviting @DON_OSBP & @donsbir to participate in @jifx 21-2. It was truly an honor and we look to partnering with you again soon.

#Navy #JIFX

Naval Postgraduate School @NPS_Monterey · Mar 3

1/2 - Experimentation, discussion underway at the NPS Field Lab, and across #DOD virtually, during @JIFX 21-2.

Participants heard directly from @dodsbir lead Mr. Robert Smith and @DON_OSBP Deputy Director Avreice Washington on how to do business with the DON.

[Show this thread](#)

2 retweets 5 likes

Naval Postgraduate School Retweeted

Sea Land Air Military Research Initiative - SLAMR @TheSLA... · 4h

Scan Eagle #UAS launches as part of the Multi-Institutional All Domain Command and Control #experiment during @JIFX 21-2. @NPS_Monterey @DoDCTO



2 retweets 3 likes

Naval Postgraduate School @NPS_Monterey · Mar 3

2/2 - In the field, researchers performed Secondary Controller experimentation on NPS' ScanEagle for possible rapid transition to the fleet/force, and a team of students explored Tactical RF Signature Manipulation for their research theses.

More info: NPS.edu/fx



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