



JOINT INTERAGENCY FIELD EXPERIMENTATION (JIFX)

NAVAL POSTGRADUATE SCHOOL

Prepared for: AAM IWG
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Naval Postgraduate School
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JIFX Bottom Line Up Front

- A **sponsored research** program begun in 2006
- An **experiment** in the methods to enable rapid technological development
- A year-round program anchored by **quarterly week-long** field events
- Provides technologists and researchers a low overhead turn-key solution for **safe, secure, legal, and collaborative** experimentation
- **A community** of Service, Joint, and Allied warfighter and government stakeholders in dialogue with Technology Developers from across commercial industry, the DoD, USG, and Academia
- **A bridge** informing stakeholders about state-of-the-art technology and technology developers about warfighter and government needs & requirements
- Allows stakeholders to engage with developers early in the development cycle in a **non-acquisition environment**

Mission and Purpose

- JIFX leads experimentation in alternative methods **to enable rapid technological development** by cultivating a **community of interest** and hosting broadly scoped **quarterly collaborative field events** which enable DoD, US government, and allied stakeholders to **identify, characterize, influence, and accelerate early-stage technology development and concepts of employment** that address national and collective security challenges.
- **Expand Services, Joint Force, and Allies knowledge with respect to warfighter gaps.**

Tenants



Austere By Design



Collaboration Is Expected



Bounded, Not Controlled



Develop Now!



Failure = Learning



Inclusive

FY24 Quarterly Events

JIFX 24-1, October 23-27, 2023

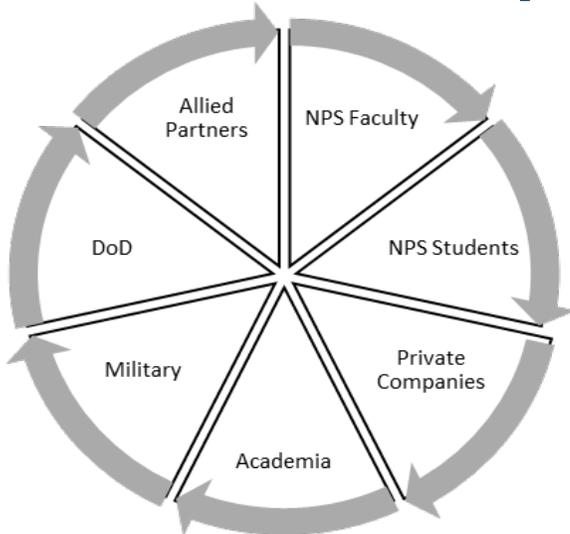
JIFX 24-2, February 5-9, 2024

JIFX 24-3, May 13-17, 2024

JIFX 24-4, August 5-9, 2024



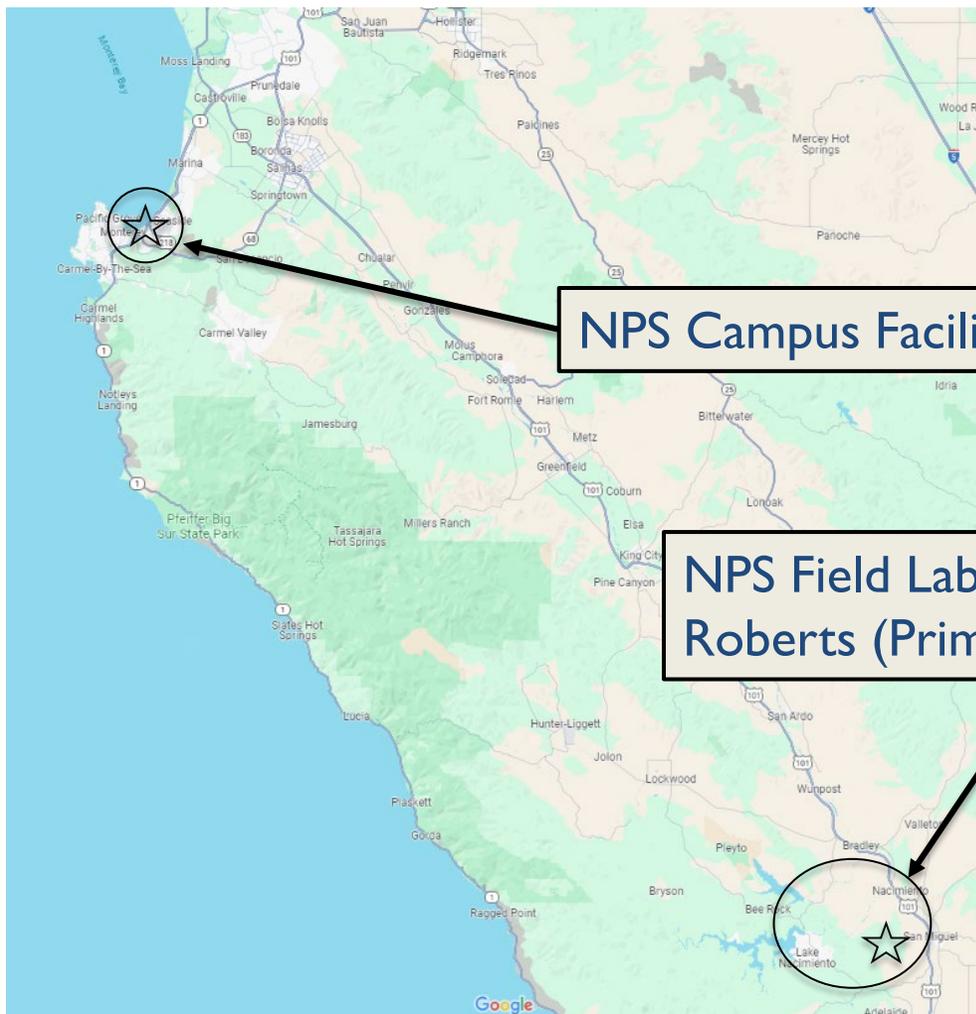
JIFX Community



Broad Areas of Interest

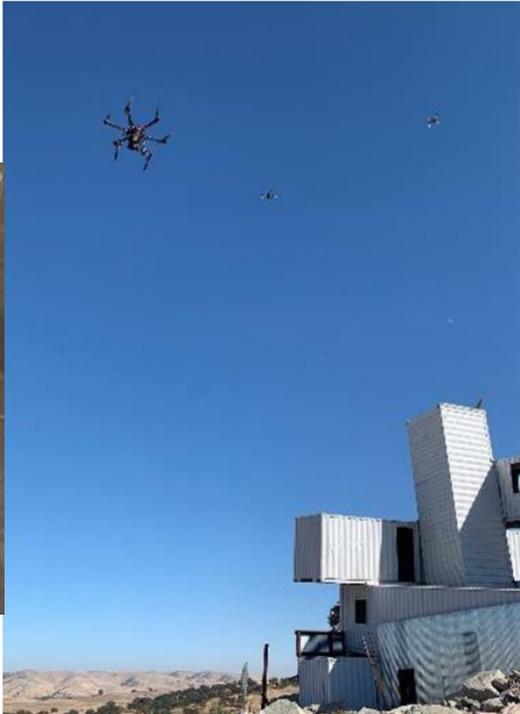
- Unmanned Aerial Systems
- UxS Design, Deployment, Ops, Networking & Control
- Countering Unmanned Systems
- Communication and Networking
- Cyber, Cyber Security, and Electronic Warfare
- Intelligence, Surveillance and Reconnaissance
- Situational Awareness
- Defense Support to Civil Authorities
- Health and Safety
- Expeditionary Operations
- Infrastructure and Power
- Mobility and Transportation
- Precision Strike, Non-Lethal Weapons, Info Ops

Locations



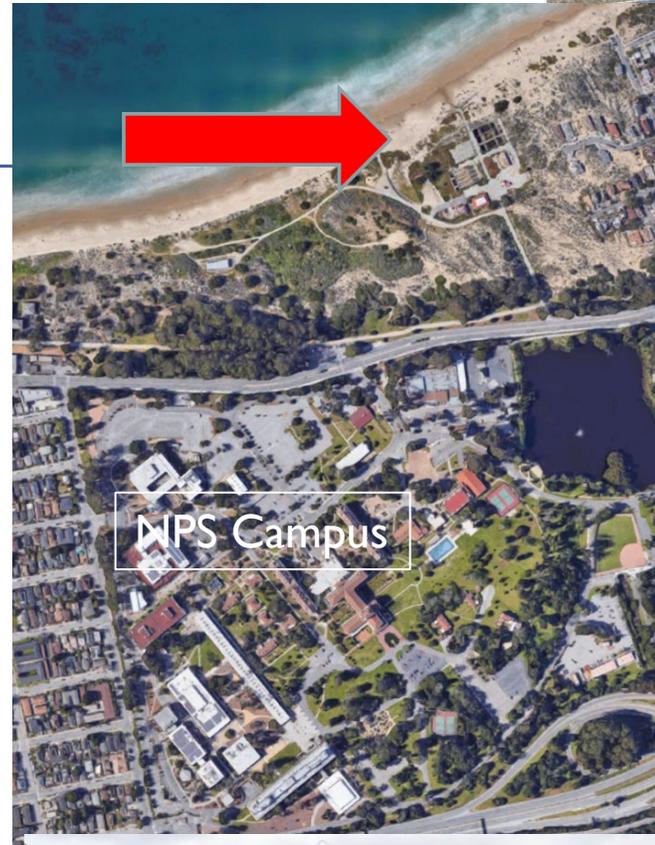
NPS Field Lab & Camp Roberts

- Controlled air & electromagnetic domains
 - Paved assault landing strip
 - Restricted Airspace to 15,000ft MSL
 - Varied Terrain
- Maneuver area – 30,000 acres
- Combined Arms Collective Training Facility (CACTF) for urban ops
- Live-fire training facilities available
- Networked “Technical Operations Center”



NPS Campus

- Network
 - CENETIX Laboratory
 - 5G, 4G, LTE infrastructure
 - Connectivity to field lab & other sites
- Ocean Front
 - Hardscape and dunes
- Aquatic Environment [Currently Offline]
 - Repurposed Water Treatment plant
 - 3x In-ground Tanks; 33'x111'x14' deep
 - Approximately 415,000 gallons per tank
- Future
 - Authorities to operate on and in bay
 - OPT buoy as sensor & network platform
 - Purposeful redevelopment of site



Accessible



JIFX Home Page - <https://www.nps.edu/web/fx/home>
 Vulcan - <https://vulcan-sof.com/login>



The JIFX team leads experimentation in alternative methods to enable rapid technological development by cultivating a community of interest and hosting broadly scoped quarterly collaborative field events which enable DoD, US government, and allied stakeholders to identify, influence, and accelerate early-stage technology development that address national and collective security challenges.

The JIFX program exists to provide an opportunity for NPS faculty, students, private companies, and academia to demonstrate and evaluate new technologies related to the Department of the Navy and the Department of Defense research in an operational field environment, and also to provide the operational community the opportunity to experiment with these technologies to better understand the capabilities that they may represent.

JIFX 24-2

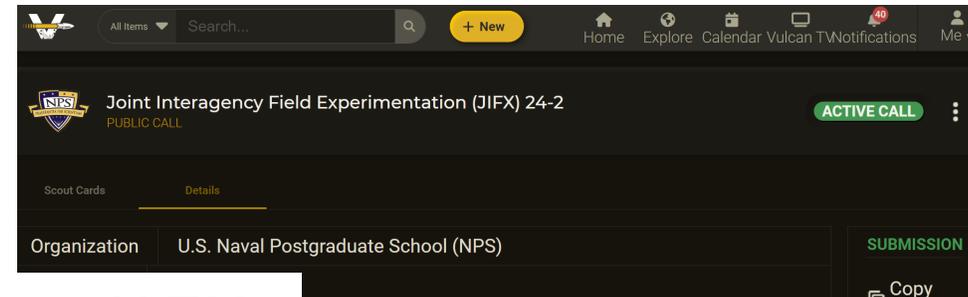
February 2024

Laboratory at Camp Roberts
 Multi-Domain UXS & Countermeasures

[Participant Registration](#)

Technology developers to interact with operational personnel to gain support or enhance USG/DoD capabilities. The environment is a partnership between government, academia, industry, and NGOs to test emerging and maturing technologies. These events enable the direct input of end users. Submissions that relate to any of the technologies listed below) will be considered for acceptance.

- **Countermeasures:** Robust countermeasures to address security threats and vulnerabilities related to UXS including strategies and technologies aimed at protecting UXS from malicious activities, unauthorized access, and operational disruptions.
- **Autonomous Navigation:** Explore the challenges and breakthroughs in creating autonomous unmanned systems that can operate seamlessly across air, land, sea, and space domains.
- **Sensing Technologies:** Dive into the advanced sensor technologies that enable UXS to perceive their environment, make informed decisions, and adapt to changing conditions.
- **Communication Protocols:** Learn about secure and resilient communication protocols that facilitate real-time data exchange between UXS and their human operators.
- **Swarm Intelligence:** Investigate the potential of swarm robotics, where groups of UXS collaborate intelligently to achieve complex tasks with efficiency and redundancy.



JIFX Field Experimentation

Submit your JIFX Proposal here!

Upcoming Events

- JIFX 24-2:** 5–9 February 2024
 • Submission deadline: **10 November 2023**
- JIFX 24-3:** 13–17 May 2024
 • Submission deadline: **7 March 2024**
- JIFX 24-4:** 5–9 August 2024
 • Submission deadline: **6 June 2024**

For a preview of all the information needed to complete your JIFX Proposal, please see the [Proposal Preview page](#).

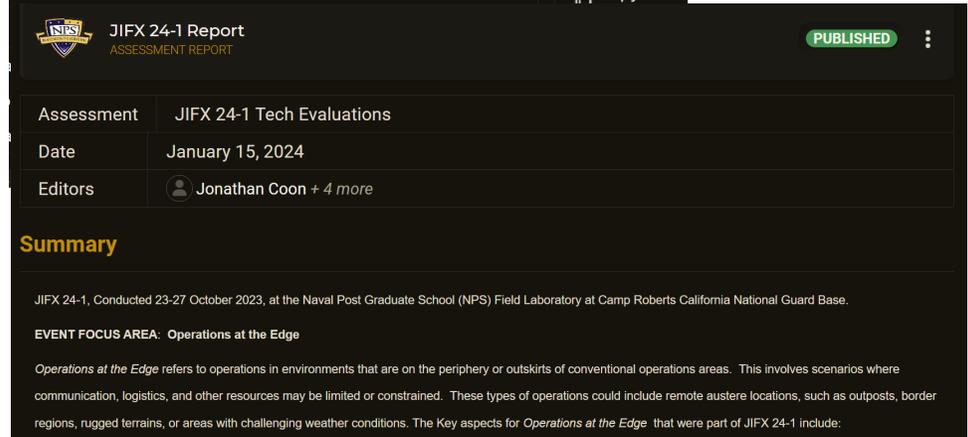
Applicants interested in attending a JIFX event to conduct an



Stay up to date on JIFX Updates

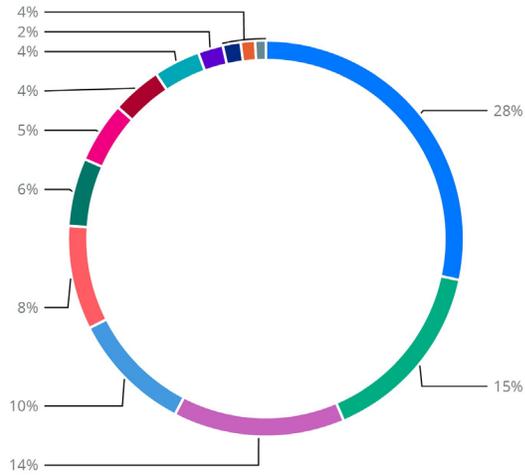
Sign up for the JIFX Community of Interest mailing list!

[Join the JIFX Community](#)



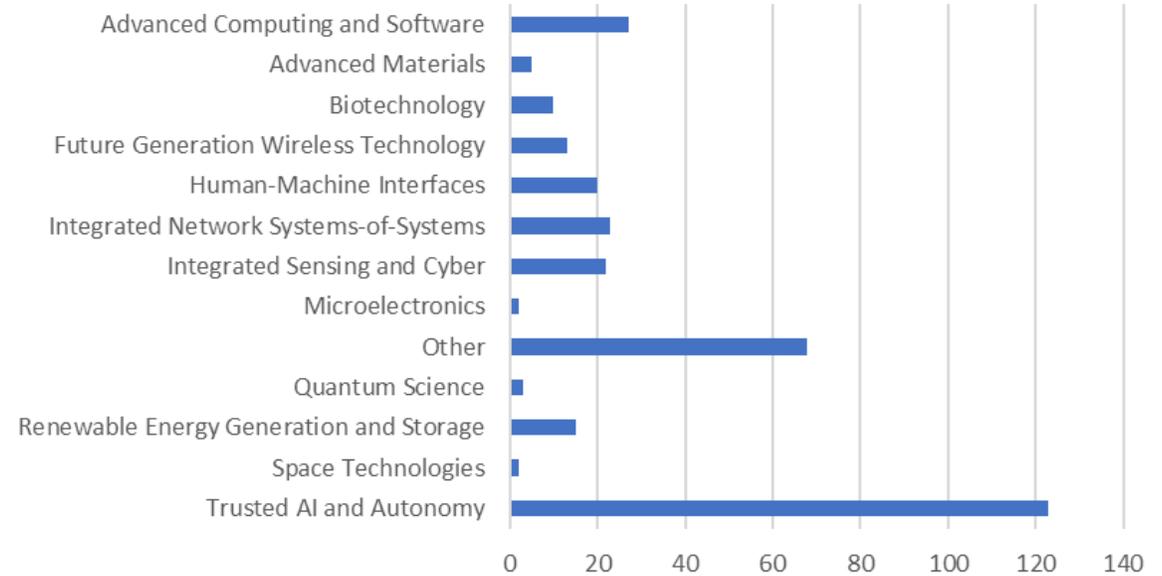
Active Pace 2020 – 2023

Experiments by RFI Areas of Interest



- Unmanned Aerial Systems
- Unmanned Systems (UxS) Design, Deployment, Operation, Networking and Control
- Situational Awareness
- Intelligence, Surveillance, and Reconnaissance (ISR)
- Communication and Networking
- Infrastructure and Power
- Cyber, Cyber Security, and Electronic Warfare
- Health and Safety
- Expeditionary Operations
- Countering Unmanned Systems
- Defense Support to Civil Authorities (DSCA)
- Mobility and Transportation
- Precision strike, Non-Lethal Weapons, Information Operations

Experiments by OSD Critical Technology Area
2020–2023



2465

Participants

269

Experiments

58

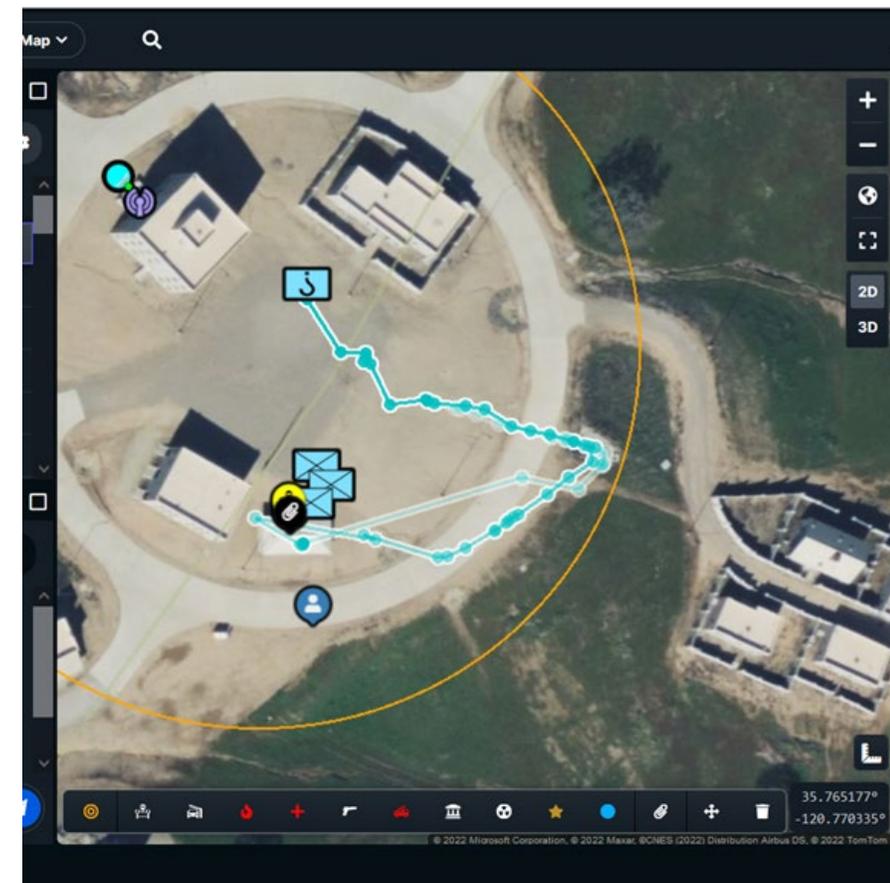
Cyber
Vulnerability
Assessments

591

Aerial
Sorties

What makes JIFX unique

- A recognized brand
- Connecting the NPS and the Navy to OSD, COCOMs and other stakeholders
- Efficient means for DoD to connect with early-stage & dual-use technologies from non-traditional sources
- Routine collaboration between private industry, DoD, and NPS faculty & students
- Facilitates rapid adaptation
- Dependable sustained cadence
- Leveraging the “learn now, build now” culture of a research institution



Two Decades Supporting Stakeholders

- **Wave Relay** - Persistent Systems
- **JUMP 20** – Arcturus (now AeroVironment)
- **Switch Blade** and **Puma** – AeroVironment
- **Instant Eye** – Instant Eye Robotics
- **Scan Eagle** – Insitu
- **FVR-90** - L3Harris
- **X2D** – Skydio
- **STRATUS** - White Fox Defense
- **NOVA 2** – Shield AI
- **VBAT** – Martin UAV [now Shield AI]
- **Chaparrel** - Elroy Air
- **Synthetic Aviation Fuel (SAF)** - Air Company
- **AARISS** and **WeatherHive** - Greensight, Inc



Enhancing & Sustaining: ScanEagle



2006: Flew first modified payload capable USN ScanEagle at JIFX event

2008: In conjunction with NSW, conducted first launch from Mark V Special Operations Craft

2009: ScanEagle flew from USS Brainbridge ISO operation to rescue crew of MV Maersk Alabama from Somali Pirates

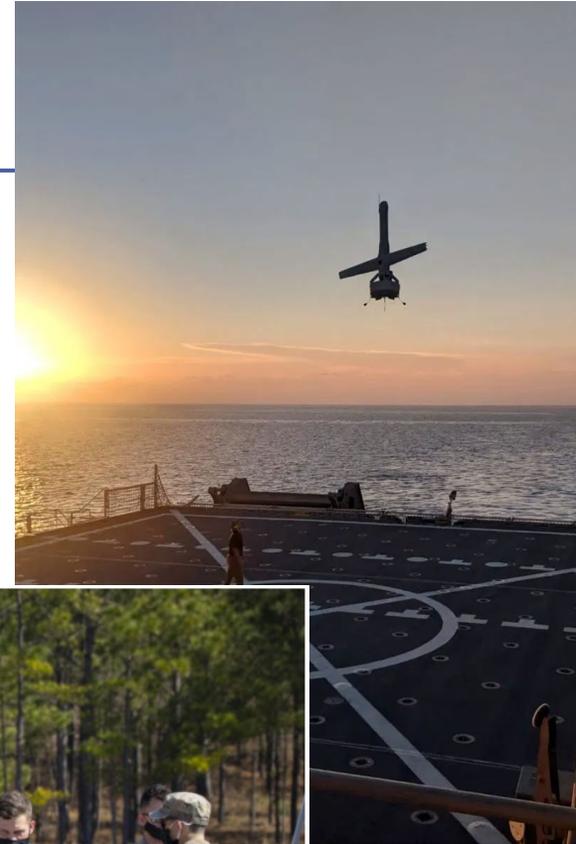
2010: Tested rapid-deployment SIGINT payload (SIGEAGLE) prior to deployment to USMC in Afghanistan

2013: Experimentation with autonomous copilot software

2017-Present: Ongoing experimentation with enhanced payloads and at sea launch & recovery

Establishing Connections: V-BAT

- 2016-2018, Martin UAV refined system & built relations with stakeholders at JIFX
- Evaluated by services
 - 2016 Trident Spectre; SOUTHCOM UNITAS
 - 2017 USMC Ship to Shore Experiment
 - 2018 USAF Phase II SIBR Award
 - 2021 Army's Future Tactical UAS Demo and Expeditionary Warfare Experiment.
- 2020, Deployed in support of 31st MEU utilizing TTPs developed at Marine Corps Warfighting Laboratory
- 2024 under procurement by SOCOM for NSW



Informing Requirements: Chapparral

- Start-up began attending JIFX in 2018
- Autonomous Cargo UAS, 150+lbs payload, 300-mile delivery range
- CRADA/Partnerships with:
 - NPS
 - USAF Agility Prime
 - AYR Logistics global HA/DR
- JAN 2024 inaugural flight of production model in commercial airspace
- USMC student thesis conclusions informing logistics concepts for EABO and Stand-in-Forces



Early Engagement: Edgebox

- At 21-2, TMG Core introduced 2-phase liquid cooled high-performance computing platform delivering capabilities of large-scale data center or data center PODs.
- 21-3 demonstrated mobile form factor of system proving potential applications for national strategic resiliency.
- 22-1 Distributed experiment from Thunderstorm Contested Logistics Tech Demo.
- 22-2 Reconfigured for maritime and aviation platforms.
- Under evaluation by IQT.
- CRADA with NPS.



21-2



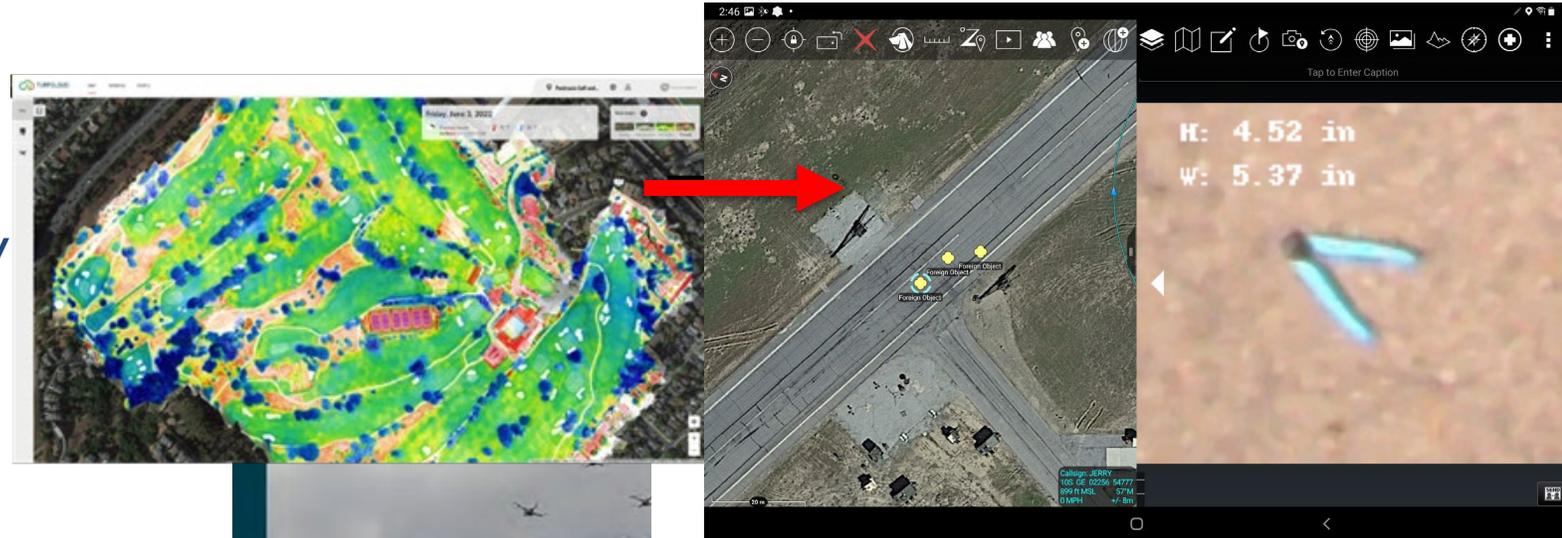
21-3



22-1

Accelerating Development: Greensight

- “Eye in the sky” for golf courses
<https://www.greensightag.com/golf>
 now developing ISRT tools for DoD
- JIFX 19-3: Aerial Automated Runway Inspection Safety Scan (AARISS)
 Automated Change Detection and Classification
- 21-3: AARISS & One Way Lifter (OWL)
- JIFX 23-2, 23-3, 24-1: Weather Hive
 tactical weather measurement system enabling hyper precise forecasting in tactical scenarios utilizing swarms of Nano-UAVs.
- 24-2: Weather Hive; Mustang; CASSEE



Supporting NPS Mission

- The Naval Postgraduate School provides defense-focused graduate education, including classified studies and interdisciplinary research, to advance the operational effectiveness, technological leadership and warfighting advantage of the Naval service.
- JIFX supports the NPS mission by providing:
 - controlled sites to conduct interdisciplinary graduate education and research for students
 - applied research opportunities to evaluate the latest technologies and remain on the cutting edge of their disciplines
 - a platform for DoN, sister services, and DoD agencies to field test prototype platforms, payloads, and concepts of operations



Doubling Return on Investment



USN Students at JIFX 24-1 (23-27 OCT 2023)

- **Experiment:** Leveraging space communication architecture for maritime autonomous surface vessel (ASV) experimentation
- **Highlight:** NPS student team tested space-based comms to enable over-the-horizon C2 of an ASV conducting ISRT.
- **Interim Conclusion:** Hypothesis validated that low earth orbit communications satellites viable to provide real time C2 of an uncrewed surface vessel located over a thousand miles away.
- **Pioneering distributed C4I for Tactical forces:** research includes acquisition and adoption; topic establishes consequential line of Intelligent Autonomous Systems (IAS) research for future cohorts.
- **Returning More Capable Leaders to the Force:** Technologically literate thought leaders and subject matter experts who are competent and confident moving from theory to application

Value Proposition for Sponsors

- Safe, secure, legal, & collaborative venue for non-traditional technology innovators to meet and work with you
- Responsive to stakeholders: 45-90 days from nomination to field observation
- Fertile ground for harvesting technology and concept of employment directly to force
- Cost effective relative to other venues
- Quarterly Events
 - Surrogate experimentation series
 - Sponsor operational challenges
- Off-cycle experimentation
 - Coordination and support by FX Team
 - NPS Field Lab utilization and support



Summary

JIFX capabilities represent a low cost, low barrier to entry venue for identification, characterization, assessment, and the rapid iterative development of technologies in support of near-term capability development and technology adoption by US government agencies.

- A platform for collaboration between industry, civilian academia, DoD, and USG research and development enterprise before fiscal commitment
- A venue for early-stage technology validation
- A turn-key solution for safe, secure, legal, and collaborative experimentation by a wide variety of researchers
- Additional access point to NPS research programming



Contact Information

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www.nps.edu/fx

