



JIFX
Joint Interagency Field Experimentation



NPS Field Experimentation 18-4

Director's Note

JIFX 18-4 was held at the NPS Field Laboratory on McMillian Airfield, Camp Roberts, CA. Continuing our 15th year of field experimentation at NPS, this event, which focused on countering unmanned systems, hosted 12 total experiments with over 170 researchers and developers from over 40 unique organizations.

The event was conducted at the same time as a major National Guard (NG) training exercise, which had several implications throughout the week. First, in order to maintain our security policy of preventing incidental collection of sensitive information by civilian experimenters and COTS UxS, the event was significantly smaller than other recent events, with only 12 experiments invited to participate. Next until the NG Training exercise was complete, experimentation was restricted to the McMillan airfield and the small section of airspace above it. The NG Shadow unit was participating in the exercise and provided our experimenters with updated weather information and publicly releasable information about their system, while helping us make sure we were able to protect their sensitive information. As always support from Camp Roberts was superb, evening during this significantly busier time.

Students from three different programs at the Naval Postgraduate School attended the event to evaluate the Technology Readiness Levels of each experiment and provide assistance to the Joint Vulnerability Assessment Branch throughout the JIFX event. These students were from the Network Operations and Technology (NWOT), Cyber Systems and Operations (CSO), and Information Warfare Systems Engineering (ISWE) programs. We look forward to continuing the opportunity for NPS students to attend JIFX events in the near future.

We have begun working on updates to the JIFX Request for Information (RFI) for FY19 and look forward to releasing that soon. The JIFX stakeholders met last week to make initial comments and we will continue to refine that document over the next few weeks. In the near future, we will have a draft of that document released as well as an opportunity to apply for our next event, JIFX 19-1, scheduled to take place 29 October – 2 November 2018 at Camp Roberts. Visit www.nps.edu/fx to apply for that event.



<http://www.nps.edu/fx>



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Experiments at JIFX 18-4

Unmanned, Semi-Autonomous and Autonomous Systems Design, Deployment and Operation	VTOL Aerial ULS – Sub-Scale Aircraft , Elroy Air VTOL Aerial ULS – Autonomous Ground Navigation and Cargo Handling , Elroy Air UAS Learning Through Autonomous Curiosity , Carnegie Mellon University Wirelessly Powered UAS Communication Node , Empower Earth Inc. ScanEagle Autonomy Development , Naval Postgraduate School ARSENL , Naval Postgraduate School
Countering Unmanned Systems	Counter Small UAS System Architecture , Textron Systems
Air to Ground Communications	4th Generation LTE Long Range Communications , Space Naval Warfare (SPAWAR) Systems Center Pacific
Digital Analytics	Process FMV into 3D Maps for Analytics , Hivemapper
Intelligence, Surveillance, and Reconnaissance	Live 4K/Multispectral Imagery from sUAS Harsh Environment , Cytta Corp
Communication and Networking	CENETIX , Naval Postgraduate School
Expeditionary Operations, Infrastructure, Power, and Water	Airfield Damage Assessment Using Light Detecting and Ranging (LIDAR) , Naval Postgraduate School

Upcoming JIFX Events

JIFX 19-1	19 October – 2 November 2018
JIFX 19-2	4 – 8 February 2019
JIFX 19-3	29 April – 3 May 2019
JIFX 19-4	22 – 26 July 2019

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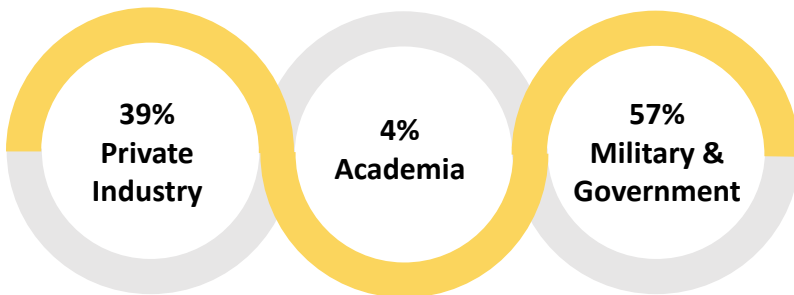
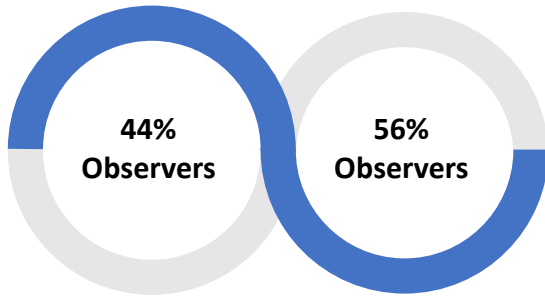
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Message from the Event Airboss

A big thanks to all of the participants at JIFX 18-4 for their commitment to safety. We flew 30 aircraft for 138 sorties over 5 days from McMillan Airfield and the CACTF (Combined Arms Collective Training Facility). Flights ranged from Group 3 UAS at 12,000' MSL to Group 1 'copters at 10' AGL. Everyone worked together to share the airspace, accomplish experimental objectives, and achieve zero mishaps or incidents. We would also like to thank the Oregon Army National Guard Shadow operators, Navy Special Warfare Scan Eagle operators, and the Roberts Radio air control team for their flexibility and collaborative attitude. Putting a high volume of experimental unmanned aircraft in a small airspace is a risky endeavor. The experimenters adherence to the Air Control Plan (ACP) and their engagement with the Airboss team allowed us to mitigate those risks to an acceptable level, while still allowing you to push your technologies to (or past) their current limitations.

JIFX 18-4 Attendance



Experiment A-03: Elroy Air VTOL Aerial ULS:
Sub-Scale Aircraft

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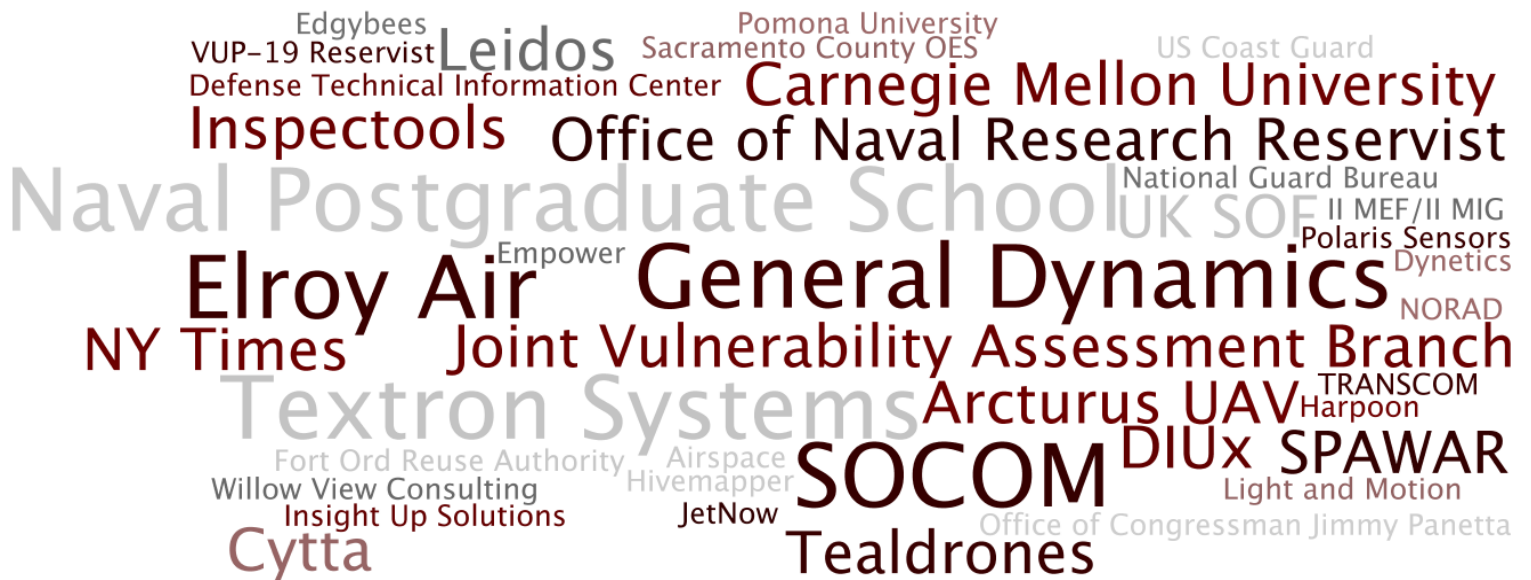
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Experiment Highlights

- **CYTTA**, experimented with high-definition video compression, and integrated with our continuing experimentation using ad-hoc mesh networking were able to provide 4K video to the technical operations center over relatively low-bandwidth mesh. This indicates that in the very near future, U.S. forces should be able to significantly improve situational awareness and detailed analytical capabilities at the tactical edge, an on-going challenge for our warriors.
- The CYTTA video, along with video and images collected from multiple platforms was integrated into geo-referenced 3-D models by **Hivemapper**, further increasing situational awareness while minimizing the demands placed on directed collection platforms.
- **Carnegie Mellon University**, a regular participant at JIFX, continued their iterative development of on-platform computer vision and machine learning, creating nested machine learning algorithms able to autonomously teach a “naïve” algorithm how to learn from its sensors.
- **Elroy Air**, another frequent participant, experimented with updated full-scale automated ground navigation and cargo loading, in parallel with flying a sub-scale prototype capability of beyond line-of-sight operations. Their long-term development plan may provide us with the capability for autonomous resupply and evacuation operations.

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