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JIFX 18-2 Quicklook Report

Monterey, California: Naval Postgraduate School

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JIFX

Joint Interagency Field Experimentation

From The Director

Commencing the 15th year of NPS Field Experimentation, JIFX 18-2 hosted 18 experiments from 26 February to 2 March, at Camp Roberts, the California National Guard's premier Maneuver Training Center. The NPS field experimentation program conducts quarterly collaborative experimentation to help the Department of Defense, other government agencies, andstate and local governments incorporate emerging technology into their operations. Over 180 researchers and developers from 77 government, private, and academic organizations participated in this cycle, which was focused on the impact of unmanned and autonomous systems on wildfire fighting operations and support. Experiments ranged from information security in diverse and ad hoc networks, to three-dimensional visualizations of operating areas, and to the use of unmanned ground and air vehicles for precisely locating hazardous material. Planning has already begun for the next experimentation cycle. JIFX 18-3 will be held 4-8 June and will focus on the use of larger (group 2 & 3) unmanned air systems to provide persistent multi-purpose support to military, disaster response, and humanitarian operations.

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18 Experiments **183** Experimenters **77** Unique Organizations

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Experiments at 18-2

Unmanned, Semi-Autonomous and Autonomous Systems Design, Deployment and Operation	**A-01: Swarm Multi-Rotor Drones**, Naval Postgraduate School **A-05: VTOL Air Cargo Logistics System - Sub-Scale System Bring-Up**, Elroy Air **A-06: One World Terrain**, University of Southern California's Institute for Creative Technologies **A-07: VTOL Air Cargo Logistics System - Robotic Cargo System**, Elroy Air
Countering Unmanned Systems	**B-01: MEMS Acoustic Directional Finder Capable of Detecting a Low Slow Flyer with a High Level of Directional Accuracy**, Naval Postgraduate School **B-02: RF Unmanned/Autonomous Systems (UAS) detection**, Spectranetix **B-03: DroneFox**, WhiteFox Defense Technologies
Communication and Networking	**J-01: Leveraging Commercial-Off-The-Shelf Technologies to Create Wireless Sensor Networks to Augment Airbase Ground Defense**, Naval Postgraduate School **J-02: Project Kymeta**, Kymeta Government Solutions **J-03: CENETIX**, Naval Postgraduate School **J-04: Limit Data Travel Distance**, HOPZERO **J-05: Wireless Networked Communications for Persistent Sensing**, US Army Research Laboratory
Decision Support, Situational Awareness, and Visualization	**K-01: Simtable Visualization**, Simtable **K-03: Data Transmission Limits to Support Information Exchange between Disparate Organizations**, HOPZERO
Humanitarian Assistance, Disaster Response, Defense Support to Civil Authority	**L-01: Sparrowhawk Paramotor Unmanned Air-Vehicle Humanitarian Assistance and Disaster Response Operations Support Capability**, Trident world Systems, Inc. **L-02: Mounted, Semi-Permanent, Off-Grid Solar Charging Kit**, Canopy Rising, Ltd. **L-03: Fulcrum Community for Mobile Data Collection during Disaster Response**, Spatial Networks, Inc.
Cyber, Cyber Security and Electronic Warfare	**N-01: Range and effects test against known emitters of interest using the Fly Away Broadcast System- Marine Corps Variant (FABS-MCV) Heavy (H)**, Marine Corps Information Operations Center

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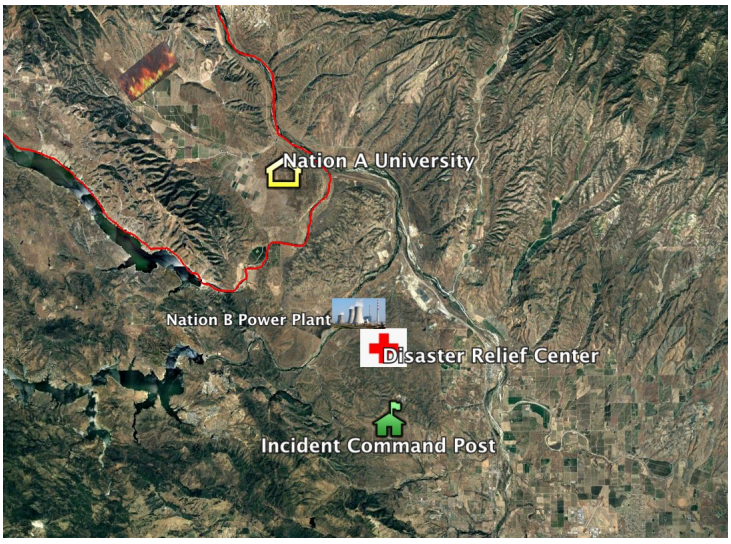
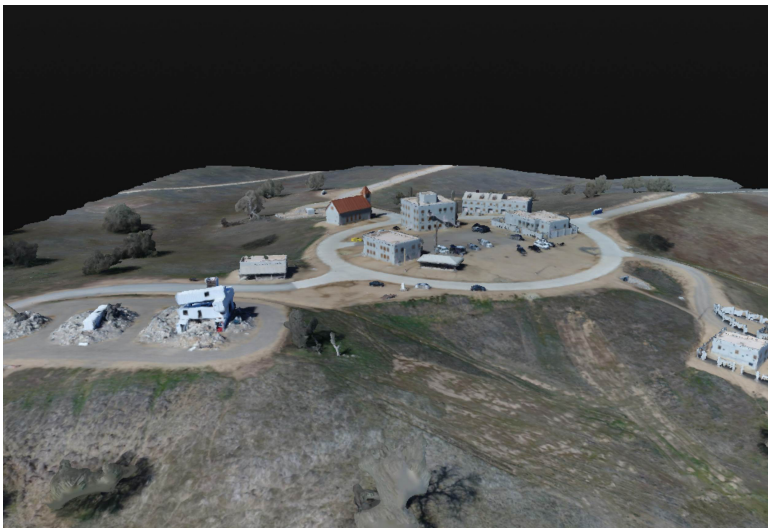
Integrated Scenario Recap

The week culminated with an integrated scenario exercise in which 183 participants played a role in tackling the challenges associated with a simulated cross national border humanitarian assistance and disaster response operation after a wildfire. The scenario utilized the standard incident command system methodology and included a number of objectives designed to test the capabilities of the experiments while determining their ability to work in conjunction with one another. Once the simulated fire began across the border, unmanned aerial systems (UAS) were tasked with mapping the terrain, tracking the fire, and providing escape routes for the population while coordinating with other UAS and identifying those considered to be 'rogue.' As the fire progressed across the border, new challenges included tracking radioactive material removed from a university and addressing problems associated with a mass refugee migration. An airfield for C-17s was established through UAS support and the perimeter guarded by the same. Critical infrastructure including a power generation facility were mapped and monitored and with communications being interrupted, participants were tasked with providing an alternate means of sharing data. As the emphasis shifted to fighting the fire, UAS and associated technologies provided plume modeling, tracking the fire line and first responders, and providing critical equipment via airlift. Worldwide data flow was monitored in all stages of the exercise while controlling access was demonstrated. Finally, the exercise concluded with a damage assessment phase designed to identify hot spots as well as the root cause of the fire. While the actual weather at the exercise site hampered some of the joint activity, the demonstration of integration was nevertheless a success as UAS provided data back to mapping and tracking systems which in turn provided data for offsite analysis.



Phase 1 Integrated Scenario Map



3D Imagery of the Combined Arms Collective Training Facility (CACTF) taken by the University of Southern California Institute for Creative Technologies

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Experiment Highlight:
Naval Postgraduate School Center for Networking Innovation and Experimentation

The objective was to Facilitate C-WMD situational awareness (SA) across the operational spectrum by exploring ways to optimize operational and technological aspects of C-WMD Wide Area Search (WAS) operations for nuclear materials of concern. This was Defense Threat Reduction Agency (DTRA) funded research, conducted in the context of an unclassified intelligence scenario approved by DTRA. In conjunction with the DTRA funded work was thesis work by four NPS master's students who are working on SOCOM-related supervision of and reachback to experts during C-WMD operations.

We conducted more than 2 of 3 intended phases of experimentation in which we evaluated the functionality, operability, and transmission of acquisition data of selected radiological sensors in configurations aboard small UAVs, UGVs and hand-held operations against strong radiological sources. These trials were successfully accomplished on Tuesday, 27 February. On Day 2, we then measured the quality of the data feeds from each source into 3 different software platforms, including a chat function, a network management function, and a radiological search management function. We were able to evaluate the ability to transmit sensor data by various methods to our software tools under a constrained communications environment. Due to weather, we were unable to conduct our 3rd phase of experimentation completely. However, we consolidated some Day 3 trials into Wednesday, and accomplished several tasks wherein a SOF representative would orchestrate radiological search by multiple operators using multiple sensors on various platforms and adjudicate those acquisitions of greatest concern.

NPS CENETIX Research Team

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DTRA Radiological research office
RADMet Company
Terratracker Company

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