Uncrewed Aircraft Systems Training Exercises for Disaster Response

FEMA / JIFX / NASA / USGS White Paper

June 10, 2021

Challenge & Opportunity

Disasters are occurring with increasing frequency and severity. They are threatening our citizens and the natural assets that our country relies upon for ecosystem services and economic viability. Recent decades have seen a steady rise in the costs from natural events, which destroy housing and infrastructure and disrupt trade and regional economies. Hurricanes strike our Gulf Coast and Caribbean territories; the West nervously awaits the next catastrophic earthquake or wildfire; tsunami and floods increasingly impact our Northeast. All of these natural hazards challenge our first line of defense, the emergency response community. During major emergencies, this community links federal, state, and local responders together to help save lives and protect homes, lands, and infrastructure. Time is money in disaster response, making it imperative that first responders have the best available information to make actionable decisions. Uncrewed Aircraft Systems (UAS) are an innovative technology that provides organic, cost-effective, and readily deployable remote sensing capabilities to emergency response teams. As with any new technology, UAS are inherently disruptive to an organization. The challenges with incorporating UAS into disaster response are heightened due to the risk of operating in crowded and complex airspace. Testing, evaluating, and integrating UAS in an exercise environment is vital if we are to confidently deploy this technology during a disaster.

Emerging technologies such as UAS can be integrated into all phases of the Incident Command System, providing several emergency and security services:

- Reconnaissance and Situational Awareness
- Emergency Payloads
- Communications
- Search and Rescue
- Damage, Structural and Risk Assessment
- Accident / Criminal Investigation
- Logistics Support
- FEMA / Insurance Documentation
- Disaster Mapping
- Disaster Recovery

These and many other capabilities offer the opportunity to investigate new ways of responding to natural disasters. The challenge is to identify barriers to implementation and build a collective and coordinated effort to overcome them.

Need

UAS are evolving rapidly. To ensure that the emergency response community has access to the best available technology there is a pressing need for an exercise and evaluation event. This event would bring together members from the government emergency response with private sector entities in an annual exercise to marry private sector innovation with disaster response needs. Specifically, this event would do the following:

- Accelerate new businesses
- Create a community of trusted partners that know how to work together in disasters
- Create new partnerships between federal agencies and industry
- Demonstrate and onboard new technology
- Leverage a whole of government response

JIFX Model

Many different models might achieve these goals. Monterey Post-Graduate Naval School's Joint Interagency Field Experimentation (JIFX) is one successful example of a field technology demonstration event. Twice a year, JIFX issues a call for proposals to demonstrate technology that will help the Department of Defense (DOD) on specific issues, like field application of artificial intelligence (AI) from drones. JIFX uses the California National Guard's Camp Roberts to provide a large outdoor range where technology demonstrations can occur with reduced overhead. Applicants including federal, state, local and international emergency management, disaster response, humanitarian assistance organizations, universities, and industry bring new technology to demonstrate. Successful demonstrations could lead to funding opportunities.

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FEMA Model

FEMA Region 4 has been holding exercises specifically focused on integrating UAS into disaster response. The Region 4 approach begins with regularly scheduled blue sky coordination meetings and field exercises. The primary focus has been on UAS activities with state, local, tribal, and territorial (SLTT) partners with the knowledge that all disasters are local. Recent multi-state disasters have highlighted the need for additional resources and capabilities to augment our typical options. We have begun to include federal partners in both our regional and state coordination meetings and exercises. The immediate benefits realized include the introduction of additional federal partner capabilities in support of SLTT governments and the familiarization for federal partners with the Incident Command System Air Operations and Remote Sensing processes including the mission assignment protocols. We intend to expand the amount of federal partner participation and incorporate those additional UAS capabilities into our overall response and recovery strategies for disaster operations.

We could apply these models to solve the challenges of implementing new technology for disaster response. An entity with a statutory role, like the Federal Emergency Management Agency (FEMA) or the U.S. Northern Command (NORTHCOMM), could issue a call for new technologies to respond to a flood. Using a place like Camp Roberts, we could simulate flood extent, timing and damage. Winning proposals would receive help setting up their particular scenario, and a chance to demonstrate how their technology works. A panel of responders with experience, like past incident commanders, could develop scenarios, and serve as technology evaluators. Successful demonstrations could be eligible for further funding through Small Business Innovation Research / Small Business Technology Transfer (SBIR/STTR) or other federal opportunities.

A biennial or annual opportunity like this would not only keep responders up to date with demonstrated new technology, it would create a community of practitioners that would know each other and could pull in all of the federal family assets during the next disaster. Writing Interagency Agreements (IAAs) to use assets and other pre-scripting could lead us towards where we all want to go: the ability to flow the Nation's best new technology into disaster areas to save lives, quantify damage and accelerate recovery.

What next?

Join us at the fall 2021 Fifth Federal UAS Workshop to learn more about this endeavor. There will be a plenary talk on this topic followed by a breakout working group that will chart the future course for this initiative.

We would like your thoughts and input on the following topics:

- How could this initiative be funded?
- How do we best engage the UAS industry?
- What federal agency should take the lead?
- What SLTT partners should be invited?
- What do you see as the key outcomes from such an exercise?

FEMA ⊱ JIFX ⊱ NASA ⊱ USGS

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