Unmanned Aerial Systems and Disaster Response:
A State-by-State Assessment

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While the technology behind unmanned aerial systems presents considerable potential to expand emergency response capabilities at the local, state, and federal levels during disasters, this emerging technology currently lacks appropriate policies and regulations for safe, cost-effective, and legally sound use. In particular, the absence of collaboration between federal, state, local, and non-governmental agencies limits the safety, cost-savings, and other benefits that states can reap from unmanned aerial systems in the context of disaster response and management.

In an effort to better understand the dynamics limiting collaboration across governmental and non-governmental agencies, a team of researchers associated with the Autonomous Systems Policy Institute (ASPI) at Syracuse University surveyed state-level emergency-response divisions across the United States, asking a series of questions:

- How did divisions implement unmanned aerial systems (UAS) as part of their disaster-response operational plans?
- How did they develop policies to govern UAS use in the context of disaster response?
- How did divisions coordinate UAS command and control between state, local, and federal agencies?
- How did they account for federal laws and regulations restricting UAS use?
- How did divisions manage the legal, jurisdictional, ethical, and public perceptions of UAS?
- How did they train personnel to comply with Federal Aviation Administration (FAA) requirements?

The research team made positive contact with 48 states and received survey responses from 27 state personnel.

Review of survey responses revealed a number of trends. Most substantively, our analysis documented significant diversity in how the federal government, on one hand, and state governments, on the other, have developed and implemented policies and laws related to UAS. The federal government fails to clearly identify a primary authority in relation to UAS use in disaster settings. Although the Federal Emergency Management Agency (FEMA) maintains control over disaster situations, often times, other entities own and control UAS assets (i.e., military versus FAA responsibilities). Many state governments, by contrast, place responsibility for UAS assets within their departments of transportation, while others rely on their governments' authorities to use National Guard UAS assets with permission from the Secretary of Defense. As these brief examples show, conflicting approaches to UAS from one government level to another and from state to state create a complicated regulatory landscape that becomes a barrier to the fast responses needed in disaster situations.

More broadly, our research yielded four main findings. First, it showed that federal policies overseeing UAS in disaster response do not clearly establish or fully identify:

- **Command and control** (i.e., who oversees decisions concerning how personnel, property, and equipment are utilized and who manages data resources to synchronize mission accomplishment)
- **Technology and capability standards** (i.e., established minimum production and performance specifications)
- **Criteria for leveraging UAS technology to further its use in disaster settings**
- **Procedures governing data collection and use**

As a result, each state we surveyed had varying policies and procedures overseeing the use of UAS in disaster-response settings. In best-case scenarios, state agencies identified a need for UAS technology and had begun to develop plans for how to effectively leverage these systems. In worst-case scenarios, states had not identified or designated a single or specific responsible agency to oversee UAS use in emergency settings, leaving the decision about whether and how to use this technology in the hands of leaders from the first responding agencies, rather than in a well-established and thought-out plan.

Second, our research showed that many states that had developed plans and programs overseeing UAS use in disaster settings had done so without coordinating with other federal or state agencies. States' failure to work collaboratively with other federal and/or state agencies can lead to missed opportunities to:

- Identify various uses for UAS technology *before* a disaster happens.
- Leverage and learn from best practices and policies enacted in other states.
- Define and mitigate against public and private moral, social, and ethical concerns surrounding the use of UAS technology.

Third, this study revealed that federal, state, and local policy overseeing UAS use in emergencies does not ensure its effective application during disaster response. Each state, for example, had varying policies and procedures overseeing UAS use in these settings, with no standardized approach or policies from state to state. At one end of the spectrum, some state agencies had identified a need for technology and initiated planning processes to leverage UAS. At the other end of the spectrum, no single state agency was responsible for exercising authority over UAS use in emergency settings. For states that had implemented plans, policies, and procedures overseeing UAS use in disaster settings, coordination with other federal or state agencies did not exist.

Fourth, our analysis identified disparities between policy creation and policy understanding, which furthered the divide between capabilities and effectiveness. Many states, for example, lack a formal policy governing UAS use because federal standards vary from federal agency to federal agency. FEMA has certain authorities, DoD requires a lengthy bureaucratic process to employ assets, and FAA policies concerning airspace, required training, and authorities to fly drones muddy the water even further. These technological and policy weaknesses impact the effectiveness of UAS responses in a disaster setting, even as public law continues to evolve with emerging UAS technology. For example, Section 336 Public Law 112-95, dated February 14, 2012, commonly referred to as the FAA Modernization and Reform Act of 2012, contains only six pages of law that applies directly to UAS use and mentions "Unmanned Aircraft Systems" only 30 times. However, Public Law 115-254, referred to as the FAA Reauthorization Act of 2018, dated January 3, 2018, expands legal responsibilities, authorities, rules, and restrictions regarding UAVs to 56 pages, with more than 140 references to unmanned aircraft. States and legislators see the importance of putting thought into regulating UAS use, but there is little collaboration between states and the federal government, partly because the FAA has yet to develop and disperse clear policies and procedures to various state agencies on UAS use in disaster settings.

In response to these findings, we recommend the following collaborative projects to further ASPI's policy analysis and to create a more responsive policy framework for UAS use:

Recommendation 1: Industry leaders should partner with leading academic institutions studying the design, regulation, and uses of UAS to further research and align developing UAS policies with the latest capabilities and applications of the technology. Collaborating with established academic institutions surrounding UAS technologies complements industry and government efforts to align policy recommendations and novel research in the field.

Recommendation 2: Public administration and policy departments should leverage undergraduate and graduate student projects to further research efforts identified in this report. A quick look at federal stakeholders provides insight into the collaborative nature of emergency management. However, wading deep into the bureaucratic trenches of federal and state cooperation entails greater refinement. Exploring federal, state, and local government policies related to UAS use in disaster response can reveal the different approaches to maintaining lines of communication, creating response plans, and establishing chains of command necessary to launch UAS in emergencies. By reviewing past disaster scenarios to determine the interplay of these various factors, students can identify lessons learned and apply them to future research on UAS.

Recommendation 3: The Department of Homeland Security, via FEMA, in conjunction with the Department of Transportation, via the FAA, should develop a UAS grant program to advance and promulgate federal guidance, to improve oversight, command, and control of disaster-response oriented UAS programs, and to structure collaborative frameworks between states and higher-level agencies. Leveraging grant programs would allow input from states while standardizing methodologies across the United States. Grant funding also forces compliance without dictating federal oversight. States need standardization to know when to call on federal and other state partners and agencies.

For more information on the Autonomous Systems Policy Institute, visit *https://www.maxwell.syr.edu/autonomous-policy/*.

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