

STATEMENT OF EARL LAWRENCE, DIRECTOR OF THE FEDERAL AVIATION ADMINISTRATION'S UNMANNED AIRCRAFT SYSTEMS INTEGRATION OFFICE, BEFORE THE SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION, SUBCOMMITTEE ON AVIATION OPERATIONS, SAFETY AND SECURITY: KEEPING PACE WITH INNOVATION – UPDATE ON THE SAFE INTEGRATION OF UNMANNED AIRCRAFT SYSTEMS INTO THE AIRSPACE, MAY 8, 2018.

Chairman Blunt, Ranking Member Cantwell, Members of the Subcommittee:

I appreciate the opportunity to appear before you today to discuss the Federal Aviation Administration's (FAA) Unmanned Aircraft Systems (UAS) integration efforts. UAS—also referred to as drones—are at the forefront of aviation. They are being used today to inspect infrastructure, provide emergency response support, survey agriculture, and to go places that are otherwise dangerous for people or other vehicles. Entrepreneurs around the world are exploring innovative ways to use drones in their commercial activities. As of mid-April 2018, we have processed over 1 million UAS registrations, over 170,000 of which are for unmanned aircraft that can be flown commercially. The need for us to fully integrate this technology into the National Airspace System (NAS) continues to be a national priority.

The Department of Transportation and FAA's vision for integration goes beyond the accommodation practices in use today by most countries, which largely rely on operational segregation to maintain systemic safety. Our goal is ambitious. We intend to fully integrate UAS into the most complex airspace system in the world, enabling UAS to operate harmoniously with manned aircraft, occupying the same airspace and using many of the same standards and procedures. With the support of this Committee, and the continued engagement of our stakeholders, we have made significant progress toward realizing this vision.

One year ago, we appeared before this Committee to discuss the status of the safe integration of UAS into the NAS. Since then, we have worked tirelessly to maintain the United

States' position as the global leader in UAS integration. Today, I would like to share with you some of our accomplishments, our challenges, and our ongoing work toward our goal of fully integrating drones and their operators into the NAS.

Enabling Increased UAS Operations

The FAA is open for business. Using existing authorities, we are working with stakeholders to authorize increased UAS operations to the extent they can be accommodated safely. The small UAS rule, waivers and exemptions, and our traditional certification processes provide different pathways for UAS operators to access the NAS.

The small UAS rule, 14 CFR part 107, sets the global standard for small drone integration, enabling UAS operations with unmanned aircraft weighing less than 55 pounds. Today, drone operators are using part 107 to inspect oil and gas infrastructure, survey land and crops, support search and rescue, conduct disaster impact assessment, and capture photographs and videos for real estate and other commercial marketing purposes.

In keeping with our goal of a flexible regulatory framework to accommodate the rapid growth of UAS technology, some provisions of part 107 can be waived to allow expanded operations. Applicants must demonstrate that their proposed operation can be conducted safely outside the provisions of part 107. To assist applicants, we have published guidance on our website, including a step-by-step explanation of the waiver process.

We are also taking steps to further streamline the waiver and authorization process. Operators can now apply for waivers through the FAA DroneZone, our online portal for all UAS information and resources. To date, the FAA has issued almost 20,000 authorizations for operations in controlled airspace, and over 1,500 operational waivers, most of which enable night operations.

Consistent with our risk-based approach we are increasingly able to grant waivers for more complex operations, including for operations over people and beyond visual line-of-sight. Two of our original Pathfinder Program partners, BNSF Railway and PrecisionHawk, have been using these waivers to inspect infrastructure and conduct precision agricultural operations and crop monitoring, respectively. CNN, another Pathfinder partner, is using a waiver for operations over people to enhance its newsgathering and reporting. And X's Project Wing has used a waiver to test package delivery at an FAA-designated UAS test site in Blacksburg, Virginia. We encourage operators and innovators to bring us new ideas. If an operator provides the appropriate safety case to justify a more complex UAS operation, we will issue the waiver.

We are also working with stakeholders to enable additional UAS operations using more traditional certification pathways. Like manned aircraft, drones are increasingly being used to spray pesticides and fertilizers, and for other aerial applications needed for agriculture, horticulture, and forestry. Using our existing certification process under 14 CFR part 137 and our exemption authority, we have issued three agricultural aircraft operator certificates to UAS operators, with additional certifications in process. Other applicants are in the process of demonstrating compliance with applicable aircraft, operator, and airspace requirements for small cargo delivery beyond what is currently authorized under part 107. And we are working with several manufacturers to certify larger UAS. In November 2017, we published the first Federal Register notice seeking public comments on proposed design standards needed for an unmanned aircraft weighing 55 pounds or more—the FlightScan Corporation Camcopter S-100—to fly safely in the NAS.

Supporting Emergency Response

UAS were invaluable in supporting response and recovery efforts following the widespread devastation brought about by hurricanes in 2017. When winds and floodwaters destroyed homes, businesses, roadways, and industries, many agencies and companies sought FAA authorization to fly drones in the affected areas. We responded quickly, issuing a total of 355 emergency airspace authorizations, many within an hour or two of the request, to ensure that those drones could operate safely.

Drones played a critical role in performing search and rescue missions, assessing damage to roads, bridges, and other critical infrastructure, and helping insurance companies act more quickly on claims from homeowners. In Puerto Rico, the FAA approved the first UAS operation of its kind to provide essential communication services. We granted AT&T approval to operate a 60-pound tethered drone to provide temporary voice, data, and internet service while construction crews rebuilt a tower to restore permanent service on the island. Today, drones are playing an important role in restoring power to many parts of the island where the terrain makes it difficult and dangerous for workers to make repairs. Drones are being used to find broken utility poles and downed power lines, and to lift new transmission lines into place, making it easier and safer for workers to do their jobs.

The FAA's ability to quickly authorize UAS operations after these storms was especially critical because most local airports were either closed or dedicated to emergency relief flights, and the fuel supply was low. As former Administrator Michael Huerta said: "Essentially, every drone that flew meant that a traditional aircraft was not putting an additional strain on an already fragile system. I don't think it's an exaggeration to say that the hurricane response will be looked back upon as a landmark in the evolution of drone usage in this country."

UAS Airspace Authorizations and Traffic Management

Under part 107, drone operators must secure approval from the agency to operate in any airspace where air traffic control is providing separation services. To facilitate those approvals, we deployed the prototype Low Altitude Authorization and Notification Capability (LAANC) at several air traffic facilities last November to evaluate the feasibility of a fully automated solution enabled by public/private data sharing. Based on the prototype's success, we began the first phase of a nationwide beta test of LAANC on April 30, 2018, enabling LAANC services at about 80 airports in the South Central United States. This rollout will continue incrementally to nearly 300 air traffic facilities covering approximately 500 airports. We expect to complete nationwide deployment in September 2018.

LAANC uses airspace data based on the FAA's UAS facility maps, which show the maximum altitudes in one square mile areas around airports where UAS may operate safely under part 107. LAANC gives drone operators the ability to request and receive real-time authorization from the FAA, which allows operators to quickly plan and execute their flights. Air traffic controllers are also made aware of the locations where planned drone operations will take place.

LAANC is an important step toward implementing UAS Traffic Management (UTM). NASA's UTM research efforts are exploring concepts of operation, data exchange requirements, and a supporting framework to enable multiple beyond visual line-of-sight UAS operations at low altitudes in airspace where FAA air traffic services are not provided. NASA is coordinating with the FAA's seven UAS test sites around the country, as well as a variety of industry partners, to perform phased testing. Phase one testing was completed in 2016, and phase two testing concluded in June 2017. While we're supporting NASA in completing the final stages of their

testing this spring, the FAA is already implementing foundational UTM capabilities like LAANC, and also beginning work to establish remote identification requirements. The UAS Identification and Tracking Aviation Rulemaking Committee (ARC) delivered their recommendations last October, and we have initiated a rulemaking process as directed by Section 2202 of the FAA 2016 Reauthorization (FAA Extension, Safety, and Security Act).

UAS Integration Pilot Program

On October 25, 2017, President Trump directed the Secretary of Transportation to launch an initiative to safely test and validate advanced operations of drones in partnership with state, tribal, and local governments in select jurisdictions—the UAS Integration Pilot Program. The pilot program is a crucial step in accelerating the Department of Transportation’s and FAA’s UAS integration efforts. The goals of the program are to identify ways to balance local and national interests, improve communications with local, state, and tribal jurisdictions, address security and privacy risks, accelerate the approval of operations that currently require special authorizations, and collect data to support the regulatory development steps needed to allow more complex, routine low-altitude operations. The results of this program will be used to help ensure the United States remains the global leader in UAS integration and fully realizes the economic and societal benefits of this technology.

As stated in the Federal Register notice announcing the pilot program, the deadline for Lead Applicants—state, local, or tribal governments—to submit their completed proposals was January 4, 2018. The response to the program has been enthusiastic—149 lead applicants submitted proposals for consideration. After evaluating the applications, the Secretary of Transportation will invite a minimum of 10 government/private sector partnerships to participate

in the pilot program. We are in the final stages of the selection process and anticipate an announcement soon.

Additionally, in the course of reviewing the applications for the UAS Integration Pilot Program, we realized some good news: a large number of the projects and activities proposed by applicants could go forward under the FAA's existing rules, including with waivers where appropriate. Accordingly, once the ten selections for the Pilot Program are announced, the FAA will be reaching out to other applicants, as well as interested state and local authorities, to provide additional information on how to operationalize their proposed projects.

Challenges Ahead

The FAA's commitment to the safe, secure, and efficient integration of UAS and the expansion of routine UAS operations requires resolving several key challenges to enable this emerging technology to achieve its full potential. Congress recognized a number of these challenges in the FAA Extension, Safety, and Security Act of 2016. Technical issues to ensure that a drone maintains a safe distance from other aircraft and that the pilot retains control of the drone must be addressed before UAS operations beyond visual line-of-sight can become routine. And there are additional policy questions raised by UAS use, including security, privacy, and enforcement.

The 2016 FAA Extension clearly articulates Congress's concerns that the security challenges presented by the malicious or errant use of UAS technology require a layered and integrated government response. We are using our existing authority to address concerns about unauthorized drone operations over certain sensitive federal facilities. To date, we have restricted drone flights over military facilities, sensitive energy facilities, and iconic landmarks like the Statue of Liberty, Hoover Dam, and Mount Rushmore in the interest of national security.

Using this authority, we are considering additional federal agency requests for restrictions as they are received. To ensure the public is aware of these restricted locations, we created an interactive map available on the FAA website, and we updated our B4UFLY mobile app to include a warning to users in close proximity of these sites. This work is also helping us determine the most efficient and effective way to implement section 2209 of the 2016 FAA Extension, which will offer non-federal critical infrastructure owners to petition the FAA for flight restrictions over their facilities.

We also continue to work with our interagency federal partners to develop policies and procedures that will support protection of critical facilities and assets from UAS-based threats, while preserving airspace access and the safety and efficiency of operations in the NAS. Congress has provided the Department of Defense and the Department of Energy authorities to respond to UAS that pose a threat to designated facilities and assets. We also support the Administration's proposal to enable the Departments of Justice (DOJ) and Homeland Security (DHS) to protect certain facilities, assets, and operations critical to national security against threats from UAS. Under this proposal, DOJ and DHS will work closely with FAA to ensure that detection and mitigation technologies are developed, tested, and deployed in a manner that minimizes adverse impacts on airspace access, as well as air navigation services, avionics, and other systems that ensure safe and efficient operations in the NAS. By enabling Federal security and law enforcement agencies to detect and mitigate UAS threats and risks posed by errant or malicious UAS operations, the United States will continue to lead the way in UAS innovation and offer the safest and most efficient aviation system in the world.

Another ongoing challenge to UAS integration is the potential for conflict between manned and unmanned aircraft. Last year, we saw a significant increase in the number of

reported drone-sightings from pilots of manned aircraft. Although we cannot verify these reports, as the federal agency responsible for the safety of the flying community, we are greatly concerned with the increasing number of these reports, along with events in New York, South Carolina, and Las Vegas.

Our Unmanned Aircraft Safety Team (UAST) made recommendations to further reduce the likelihood of serious incidents and provide more accurate information about UAS sightings. First, public education and outreach are key to reducing these incidents. Efforts such as the “Know Before You Fly” information campaign and the small UAS registration process serve as opportunities to ensure UAS operators understand the rules and responsibilities for flying an aircraft in the NAS. The UAST also recommended continued work on remote identification of UAS to provide more accurate and critical data that will allow us to contact a UAS operator, educate the operator, or, when necessary, take enforcement action to address a violation of federal regulations. We, along with our security and law enforcement partners, need to be able to quickly identify unmanned aircraft and their operators in order to discern between the clueless, the careless, and the criminal—including serious threats to national security—and to ensure that all operators conduct compliant operations or face the consequences of introducing a safety or security risk into the NAS.

Remote Identification

As Congress has recognized, remote identification of UAS is a critical step on the path to full integration of UAS technology. In order to ensure that our airspace remains the safest in the world, and to enable our law enforcement and national security partners to identify and respond to security risks, we need to know who is operating in the airspace. Effective integration and threat discrimination will continue to be a challenge until all aircraft in the NAS—manned and

unmanned—are able to be identified. Anonymous operations are inconsistent with safe and secure integration.

We recently published the report and recommendations prepared by the summer 2017 UAS Identification and Tracking ARC. The ARC's 74 members represented a diverse array of stakeholders that included the aviation community and industry member organizations, law enforcement agencies and public safety organizations, manufacturers, researchers, and standards entities involved with UAS. The ARC's recommendations cover issues related to existing and emerging technologies, law enforcement and national security, and how to implement remote identification and tracking. Although some recommendations were not unanimous, the group reached general agreement on most issues. The FAA is reviewing the technical data and recommendations in the ARC report to support the development of the FAA's remote ID requirements, which we are committed to implementing as quickly as possible.

We are also making headway with an ARC to address UAS in controlled airspace, which will provide recommendations on UAS integration in, and transit to, high altitude airspace. It will develop scenarios that will encompass the most desired operations, identify gaps in research and development needed to successfully integrate larger UAS into controlled airspace, and recommend up to five prioritized changes to policies and procedures that will spur integration and economic growth. The ARC held its fourth meeting at the end of March 2018 and plans to have its fifth meeting at the end of this month, where the ARC will draft and prioritize a working list of recommendations. The ARC will continue to meet through the expiration of the ARC's charter in June 2019.

Conclusion

Throughout our history, the FAA has adapted to changes in technology and has successfully integrated new operators and equipment into the NAS. Our progress in accommodating new technologies and operations demonstrates that the agency is well positioned to maintain its status as the global leader in UAS integration. We are committed to working with Congress and all of our stakeholders to find solutions to our common challenges. Working together, we are confident we can balance safety and security with innovation. With the support of this Committee and the robust engagement of our stakeholders, we will continue to safely, securely, and efficiently integrate UAS into the NAS and solidify America's role as the global leader in aviation.

This concludes my statement. I will be happy to answer your questions at this time.