United States Government Accountability Office

Report to the Ranking Member, Committee on Transportation and Infrastructure

October 2019

Unmanned Aircraft Systems

FAA's Compliance and Enforcement Approach for Drones Could Benefit from Improved Communication and Data

Highlights

Highlights of GAO-20-29, a report to the Ranking Member, Committee on Transportation and Infrastructure

Why GAO Did This Study

The use of small UAS—those weighing less than 55 pounds—continues to grow. As part of its safety mandate, FAA regulates and oversees UAS operations' compliance, which includes prohibiting small UAS operators from endangering the life or property of another, among other things. Recent airport closures attributed to UAS sightings highlight the unique challenges small UAS pose to aviation safety oversight.

GAO was asked to examine the integration of small UAS operations into FAA's safety oversight framework. This report examines: (1) how FAA's aviation safety inspectors conduct small UAS compliance and enforcement, and challenges they face in doing so, and (2) the extent to which FAA is planning for compliance and enforcement in an evolving UAS environment. GAO reviewed relevant statutes and regulations, FAA guidance and reports; and interviewed FAA officials including headquarters and aviation safety inspectors at 11 FAA district offices selected to obtain geographic distribution and other criteria. GAO also interviewed FAA law enforcement special agents and selected state or local law enforcement agencies in each district.

What GAO Recommends

GAO has three recommendations, including that FAA: (1) develop an approach to communicate to local law enforcement agencies expectations for their role in UAS investigations, and (2) identify and obtain data needed to evaluate FAA's small UAS compliance and enforcement activities, as the UAS environment evolves. FAA concurred with the recommendations.

View GAO-20-29. For more information, contact Heather Krause at (202) 512-2834 or Krauseh@gao.gov

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Unmanned Aircraft Systems

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What GAO Found

The Federal Aviation Administration (FAA) safety inspectors GAO met with said that law enforcement is an important source of information when they investigate potentially unsafe small unmanned aircraft systems' (UAS) operations. The inspectors also told GAO that they take actions to educate operators or enforce penalties, in line with FAA policies, but that they face several challenges, including obtaining key information for investigations. Inspectors explained that of the multiple sources that may provide information for UAS investigations, reports from state and local law enforcement generally provide the most useful and actionable information. However, most law enforcement stakeholders GAO met with (9 of 11) stated that officers may not know how to respond to UAS incidents or what information to share with FAA. While FAA has articulated the pivotal role local law enforcement can play, and has developed resources for these entities, FAA has not consistently communicated this information to its law enforcement partners. For example, while about half of the inspectors told us they regularly conduct outreach to law enforcement agencies, the remainder said their efforts have been limited. Without a clear approach to communicate to the tens of thousands of state and local law enforcement agencies across the country, FAA does not have reasonable assurance these agencies are armed with knowledge they need to help FAA identify and address unsafe UAS operations.

Examples of Locations and Sources for Information on Potentially Unsafe UAS Use

Source: GAO. | GAO-20-29

While FAA plans to continue its existing approach for small UAS safety oversight—focusing on operator education, targeted surveillance, and working with law enforcement—agency officials have not identified how they will use or improve existing data or considered whether additional data may be needed to assess their approach. FAA officials also said they will adjust their efforts moving forward based on semi-annual assessments of data. The agency, however, has not fully analyzed existing UAS safety data to identify trends in UAS incidents, and officials acknowledge these data have limitations (e.g., UAS data entries cannot be easily identified). In addition, FAA does not currently have plans to determine what existing or new data or information could help inform whether FAA's oversight efforts are working as intended. Taking steps to identify and obtain key data will enable FAA to assess its existing approach and determine what further activities, if any, it should undertake to ensure safety. These steps will be important as the number and type of UAS operations the agency is responsible for overseeing expands.

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Abbreviations

ARC	Aviation Rulemaking Committee
DOT	Department of Transportation
EIS	Enforcement Information System
FAA	Federal Aviation Administration
LEAP	Law Enforcement Assistance Program
PTRS	Program Tracking and Reporting Subsystem
ROC	Regional Operations Center
UAS	unmanned aircraft systems

Recommendations for Executive Action

We are making the following three recommendations to FAA:

- The Administrator of the FAA should identify UAS-specific education and training needs for inspectors, and develop appropriate training to address any needs identified. (Recommendation 1)
- The Administrator of the FAA should develop an approach to more effectively communicate key information to local law enforcement agencies regarding their expected role with regard to small UAS safety oversight. (Recommendation 2)
- The Administrator of the FAA should identify existing or new data and information needed to evaluate oversight activities and develop a mechanism for capturing these data as needed. (Recommendation 3)

Introduction

October 17, 2019

Dear Mr. Graves:

Small unmanned aircraft systems (UAS)—weighing less than 55 pounds and typically flown via remote control by a pilot located on the ground—are used for a variety of recreational and commercial purposes. Small UAS are relatively easy to purchase and operate, reasonably affordable, and often feature cameras for photography and videography. As small UAS have become more technologically advanced, businesses and others have expressed an interest in expanding small UAS operations for uses that are currently not routinely allowed by the Federal Aviation Administration (FAA), such as package delivery beyond an operator's visual line of sight and infrastructure inspection. FAA is responsible for maintaining the safety of the national airspace system, as well as the safe integration of UAS within that airspace. FAA estimates there were about 1.5 million small UAS in the United States in 2018, and the agency forecasts that there could be up to 3 million in the United States by 2023.

As small UAS—commonly referred to as drones—grow in popularity, there are also increasing concerns about safety risks, such as the potential for unintentional collisions between a small UAS and a manned aircraft, which could cause property damage, injury, or death. FAA prohibits the operator of any small UAS from endangering the life or property of another person, including by flying over people. In addition, recent airport closures and protracted flight delays attributed to UAS sightings in the United States and Europe have highlighted some of the unique challenges small UAS can pose to aviation safety oversight and their potential to disrupt the air transportation system.

You asked us to examine issues related to FAA's integration of small UAS operations into its safety oversight framework. This report addresses: 1) how aviation safety inspectors conduct small UAS compliance and enforcement, 2) the challenges in carrying out small UAS compliance and enforcement and steps FAA is taking to mitigate them, and 3) the extent to which FAA is planning for compliance and enforcement activities in an evolving UAS environment.

To describe how aviation safety inspectors conduct small UAS compliance and enforcement, we reviewed relevant statutes and regulations; and FAA policies related to safety oversight, and

compliance and enforcement. Also, we reviewed FAA documentation related to small UAS investigations, including the memorandums outlining the role of FAA's Law Enforcement Assistance Program (LEAP) special agents and educational materials FAA developed for law enforcement agencies such as reference cards, guidance documents, and webinars. In addition, we reviewed relevant GAO and Department of Transportation (DOT) Inspector General reports addressing UAS oversight. To identify small UAS occurrences and completed small UAS compliance and enforcement actions, we analyzed FAA compliance and enforcement data from FAA's Program Tracking and Reporting Subsystem (PTRS) and Enforcement Information System (EIS) databases from October 2015—the year FAA's Compliance Program took effect—to October 2018.[1]

For data from PTRS, FAA officials told us they created a UAS-only dataset using keywords and filters for this 3-year period due to the data not being captured by aircraft type. We assessed the reliability of the data provided by FAA from both PTRS and EIS by reviewing them for anomalies, outliers, or missing information, among other things. Based on these steps, we determined them to be sufficiently reliable for the purposes of providing a high-level estimate of the number of occurrences and the compliance and enforcement actions FAA inspectors took nationwide during the relevant 3-year period as captured by FAA's search criteria. In addition, we interviewed FAA officials from headquarters offices involved in UAS safety oversight, including officials from the Office of Aviation Safety, Flight Standards Service, the UAS Integration Office, the Air Traffic Organization, and the Office of Security and Hazardous Materials Safety.

To obtain perspectives on the UAS compliance and enforcement process as well as to identify any challenges that may exist in carrying out compliance and enforcement activities, we interviewed a range of UAS and aviation stakeholders with responsibilities for or knowledge of small UAS compliance and enforcement. More specifically, to better understand how inspectors located in the field conduct small UAS investigations and the challenges inspectors may face, we selected a non-generalizable sample of 11 FAA Flight Standards district offices and conducted semi-structured interviews in each of these districts with FAA aviation safety inspectors and other staff such as aviation

[1]FAA Order 8900.1 Volume 7, Section 7-33 defines any small UAS event as an "occurrence" until sufficient information is gathered to determine whether the UAS was in violation of a regulation or involved in an accident.

safety technicians,[2] with FAA LEAP special agents whose coverage area includes the district office; and with one state or local law enforcement agency with jurisdiction near the district office. We selected the 11 district offices to include offices with the greatest number of completed compliance actions and offices with some of the fewest completed actions as documented in FAA's PTRS system from October 2015 through July 2018, as well as to ensure a range of urban and rural areas.[3] We also interviewed representatives from 12 organizations, including aviation and UAS industry associations. We selected these organizations based on our prior UAS work, interviews with FAA, and based on the selected organizations' knowledge of and involvement with safety oversight issues related to small UAS operating in the national airspace. The information and viewpoints we obtained from our interviews cannot be generalized to all aviation industry stakeholders, to FAA inspectors and special agents, or to state and local law enforcement agencies, but offer insight into understanding the issues examined in this report. In addition, we interviewed the FAA officials identified above to obtain information related to steps the agency is taking to mitigate any challenges district office inspectors and others face when conducting small UAS compliance and enforcement activities. Finally, we compared these steps to federal internal control standards related to demonstrating a commitment to develop staff with the knowledge to carry out their assigned duties and communicating necessary information externally.[4]

To examine the extent to which FAA is planning for small UAS compliance and enforcement activities in an evolving environment, we reviewed FAA's 2019 *Flight Standards UAS Oversight Plan (Oversight Plan),* as well as FAA reports and documents related to the integration of UAS into the national airspace system, documents such as the 2018 *UAS Integration Roadmap* and the fiscal year 2018 and 2019 *UAS Implementation Plans*. We also reviewed FAA's safety management

[2]We interviewed inspectors and other staff at the following FAA district offices: Allentown, Pennsylvania; Columbus, Ohio; Des Moines, Iowa; Fresno, California; Jackson, Mississippi; Nashville; Tennessee; North Texas, Texas; Richmond, Virginia; Seattle, Washington; South Florida, Florida; and, Spokane, Washington.

[3]At the time we developed our audit approach and selected district offices and other stakeholders for interviews, the most recent available data was through July 2018. We subsequently received updated data through October 2018, which as noted above, we used for purposes of analyzing the number of reported small UAS occurrences and compliance and enforcement actions.

[4]GAO, *Standards for Internal Control in the Federal Government*, GAO-14-704G (Washington, D.C.: September 2014).

system policy, which establishes basic management principles to guide the agency's safety management approach and safety oversight activities for all aircraft. Finally, we compared FAA's planned approach for future small UAS compliance and enforcement activities to federal internal control standards related to using quality information to achieve objectives and to FAA's safety management system approach, specifically its risk management principles related to accessing complete and meaningful data.

We conducted this performance audit from April 2018 to October 2019 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

FAA's Evolving Regulatory Framework for Small UAS

The FAA Modernization and Reform Act of 2012 directed FAA to develop a comprehensive plan to safely accelerate the integration of UAS into the national airspace.[5] In 2018, we found that in developing the small UAS regulatory framework—and similar to its regulatory approach in other areas, including manned aircraft—FAA has taken an incremental and risk-based approach to ensuring safety.[6] For example, in 2012, as directed by statute, FAA required that individuals have a traditional pilot certificate in order to operate a UAS in the national airspace and obtain prior approval for most small UAS operations.[7] In subsequent years, FAA implemented new rules, policies, and procedures that allowed for small UAS operations of increasing risk and complexity. For example, in June 2016, FAA issued the first regulations allowing routine small UAS operations largely for commercial purposes, commonly referred to as "Part 107."[8]

All small UAS operators are required to comply with certain basic FAA requirements, including safety-related operations. Generally, all small UAS operators have been required to register with FAA since 2015.[9] When registering, operators must indicate whether the UAS will be flown strictly for recreational use or for other than recreational

[5]FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 332,126 Stat. 11 (2012).

[6]GAO, *Small Unmanned Aircraft Systems: FAA Should Improve its Management of Safety Risks*, GAO-18-110 (Washington, D.C.: May 24, 2018).

[7]These requirements did not pertain to small UAS flown strictly for recreational use as a hobby and to those who follow the safety guidelines of a nationwide community-based organization, among other things. The 2012 Act prohibited the FAA from promulgating new rules regarding UAS flown for these purposes, meaning that FAA could prohibit them from endangering the national airspace but could not issue new regulations concerning their use.

[8]These regulations are codified at 14 C.F.R. §§ 107.1-107.205. UAS operating under "Part 107" include those for commercial use, as well as for recreational use that does not fit the parameters of strictly recreational operations or if a recreational user wishes to operate under Part 107.

[9]FAA first required that all operators register with FAA through a 2015 Interim Final Rule. In the 2017 case *Taylor v. Huerta*, the United States Court of Appeals for the District of Columbia Circuit held that FAA could not require recreational operators to register with the FAA. *Taylor v. Huerta,* 2017 WL 2859554 (D.C. Cir. 2016). Later that year, the National Defense Authorization Act of 2018 restored FAA's registration requirement for all small UAS, including UAS flown strictly for hobby purposes.

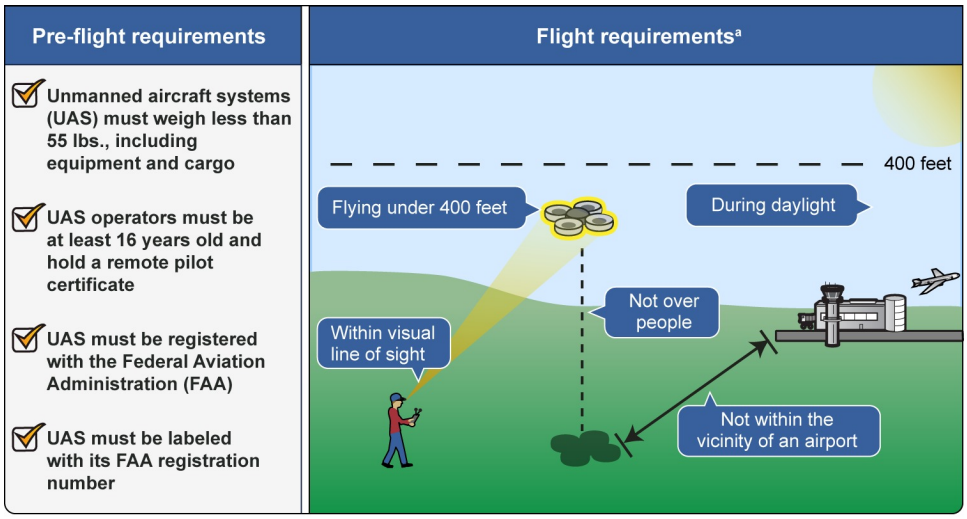
purposes (e.g., for commercial purposes).[10] Regardless, all operators are responsible for safely flying their small UAS.[11] UAS flown strictly for recreational purposes are generally allowed to fly—meaning without prior FAA approval—as long as they follow the safety guidelines of a nationwide, community-based organization, among other requirements. Those operating under Part 107 are allowed to routinely fly small UAS under certain conditions; in addition, they may also seek a waiver of certain FAA operational requirements from the agency on a case-by-case basis (see fig. 1). Unlike manned aircraft, FAA does not require UAS operators to obtain an airworthiness certification through the traditional aircraft certification process for their small UAS.[12] However, Part 107 operators are required to conduct a preflight inspection to ensure the airworthiness of their UAS.

[10]Operators who fly UAS strictly for recreational hobby purposes are only required to register once as an individual operator; they are not required to register any of their UAS. By contrast, operators who fly their UAS for all other purposes, including for commercial use, are required to register each of their UAS with the FAA.

[11]In addition, UAS operators are responsible for not flying in restricted or prohibited airspace. FAA has designated such airspace over certain areas or sites either temporarily (e.g., for a major sporting event) or permanently to protect national historic and other sites, such as critical infrastructure or military installations, from danger and security threats that could be caused by UAS.

[12]In broad terms, FAA's aircraft airworthiness certification requirements are that aircraft (a) conform to the FAA-approved design for the aircraft's type and (b) are in condition for safe flight. Aircraft certification involves FAA approval of the design, manufacturing, and operations of the aircraft.

Figure 1: Selected Pre-Flight and Flight Requirements for Small UAS Operating under Part 107 of FAA Regulations



Source: GAO. | GAO-20-29

[a]Small UAS operators can apply to FAA for approval to deviate from these requirements.

Recently, Congress and FAA have taken steps to further expand UAS operations as well as FAA's regulatory authority. In February 2019, for example, FAA published a notice of proposed rulemaking that would allow small UAS operators to routinely fly at night and over people in certain conditions without having to obtain a waiver.[13] In addition, FAA is currently taking steps to implement new statutory requirements for recreational users.[14]

[13]According to FAA, the agency plans to finalize its policy concerning remote identification of small UAS prior to finalizing the proposed changes in this rule that would permit operations of small UAS over people and operations at night.

[14]In October 2018, the FAA Reauthorization Act of 2018 addressed the exception for limited recreational operations of unmanned aircraft and created additional requirements, such as the requirement to operate below 400 feet. FAA Reauthorization Act of 2018, Pub. L. No. 115-254, § 44809, 132 Stat. 3300 (2018).

FAA Roles and Responsibilities

FAA's Office of Aviation Safety oversees the safety of the national airspace, and within this office, Flight Standards and the UAS Integration Office have primary responsibilities related to UAS safety and integration, including rule-making and enforcing safety regulations. Other FAA offices also have a role in UAS compliance and enforcement, including the Office of Security and Hazardous Materials Safety, the Air Traffic Organization, and the Office of Chief Counsel (see table 1).

Table 1: Federal Aviation Administration (FAA) Offices' Roles and Responsibilities Related to Small Unmanned Aircraft Systems (UAS)

	FAA office oversight responsibilities	Role in UAS compliance and enforcement
Office of Aviation Safety	Oversees safety within the national airspace, advances operational safety, establishes safety rules and regulations, and certifies aviation competencies and the airworthiness of aircraft and equipment. **Office of Aviation Safety includes:** • Flight Standards • UAS Integration Office	• Flight Standards' aviation safety inspectors and technicians investigate potentially unsafe UAS use and may carry out compliance and enforcement actions. • UAS Integration Office seeks to integrate UAS operations into the national airspace while ensuring the safety of the public and integrity of the airspace by coordinating across various offices within the agency on UAS-related issues.
Office of Security and Hazardous Materials Safety	Ensures safety of the national airspace by overseeing the Law Enforcement Assistance Program, among other units.	• Law Enforcement Assistance Program special agents liaise with federal, state, and local law enforcement agencies to support UAS compliance and enforcement and coordinate criminal UAS investigations.
Air Traffic Organization	Oversees air traffic control facilities, among other units, and provides safe and efficient air navigation services in the national airspace.	• Air traffic controllers in air traffic control facilities report UAS sightings, sometimes relayed to them by manned aircraft operators, to Flight Standards district offices.
Office of Chief Counsel	Provides legal services to all FAA offices.	• If a UAS investigation requires legal enforcement, Office of Chief Counsel determines the appropriate action, such as a civil penalty or a suspension or revocation of the pilot or operator certificate.

Source: GAO analysis of FAA information. | GAO-20-29

Within the Office of Aviation Safety, approximately 4,200 aviation safety inspectors and technicians (inspectors) at 78 district offices nationwide are responsible for aviation safety oversight.[15] According to FAA guidance, inspectors are responsible for safety in air travel, including certifying aircraft and airmen, conducting oversight checks and surveillance of aviation operations, and investigating reported aviation incidents, and aviation safety technicians provide technical

[15]Although their roles differ, for the purposes of this report, we will refer to both aviation safety inspectors and technicians as "inspectors" because both positions may conduct work related to UAS compliance and enforcement, including as UAS focal points.

and administrative support to inspectors for these responsibilities. Since 2015, each FAA district office is to designate at least one inspector as a UAS focal point, to serve as a point of contact and subject matter expert on UAS issues.

Within the Office of Security and Hazardous Materials Safety, approximately 15 Law Enforcement Assistance Program (LEAP) agents are responsible for liaising with federal, state and local law enforcement agencies on a variety of public safety issues, including UAS.[16] For example, LEAP agents may gather evidence from law enforcement agencies to be documented in a memo and routed to a district office for inspectors to investigate. In addition, LEAP agents have access to the UAS registration database, which contains information about registered UAS operators' identities.

FAA's UAS Safety Oversight Approach

FAA uses its overarching, risk-based approach to safety oversight, referred to as the "safety management system," to help ensure that small UAS operators comply with relevant safety regulations.[17] As part of this, the agency assesses risk to safety for both manned and unmanned aircraft. According to FAA, the agency has identified a general risk for collision when UAS fly beyond visual line of sight of the pilot in command due in part to current technological limitations. However, according to FAA, small UAS generally present a comparatively lower risk than manned aircraft, as there have been no fatalities and very few injuries related to small UAS reported since Part 107 was published in 2016.

[16]The Office of Security and Hazardous Materials Safety also has a program in which approximately 75 hazardous materials aviation safety inspectors ensure compliance with and enforcement of regulations pertaining to the shipment of hazardous materials by air. As Part 107 prohibits the carriage of hazardous materials, this program supports the Office of Aviation Safety in the certification process for Part 135 operators. In April 2019, and for the first time, FAA certified a company as an air carrier for UAS package delivery under Part 135 of FAA regulations, which sets rules for for-hire aircraft operations. According to FAA, this certification was used because current UAS rules do not allow for UAS delivery beyond the UAS operator's line of sight, whereas there are no such rules under Part 135.

[17]FAA's safety management system, fully implemented in 2012, is the agency's formal, organization-wide approach to managing safety risk, and it includes policies, processes, and practices for the management of safety risk controls, such as oversight procedures.

In addition, the agency emphasizes the use of non-punitive actions whenever appropriate, focusing first on education—this agency-wide decision-making approach is referred to as the Compliance Program.[18] According to FAA, many UAS operators lack aviation experience and knowledge of UAS regulations. Accordingly, FAA's UAS safety oversight approach includes activities aimed at educating current and potential UAS operators on safe flying rules. For example, FAA has many initiatives underway including social media campaigns, mobile phone applications, partnerships with industry associations and manufacturers, outreach at industry events, a helpdesk, web portal, and online webinars. In addition to education, FAA has focused its other UAS safety efforts primarily on engaging and educating law enforcement and public safety agencies at all levels—federal, state, and local—and, to a lesser extent, conducting surveillance[19] to ensure compliance with UAS regulations.[20] If inspectors determine an operator is out of compliance, they then decide based on FAA guidance whether a compliance, administrative enforcement, or legal enforcement action would be most appropriate given the nature of the incident.[21]

FAA's Program Tracking and Reporting Subsystem (PTRS) is the database where inspectors are to record UAS incidents, complaints, and related information—documented as occurrences—as well as

[18]In 2015, FAA shifted the agency's compliance focus from legal enforcement to education and introduced an approach referred to as the Compliance Philosophy. Rather than taking legal enforcement action as an automatic first step to address noncompliance, FAA now educates offenders and allows them to take steps to redress a noncompliance finding in certain situations. As of October 2018, FAA began using the term "Compliance Program" to describe this approach.

[19]According to FAA guidance, surveillance involves conducting a site visit to a UAS operation to determine whether an operator is in compliance with established procedures and regulations, such as having a remote pilot certificate when operating under Part 107 regulations.

[20]While FAA is solely responsible for enforcing safety regulations, current agency guidance notes that some state and local governments are enacting their own laws specific to the safe operation of UAS. The guidance also explains that some states and localities can apply their general "police power" laws to UAS operations (e.g., assault, criminal trespass, injury to persons or property). This means UAS operations might violate federal as well as state and local laws. FAA officials told us DOT is currently reviewing the department's position regarding which types of state and local laws relating to UAS it believes may be federally preempted. The officials said they expect this review to be completed by the end of 2019, with results to be publicly announced as revised agency guidance or in some other form.

[21]Compliance actions refer to non-enforcement methods for correcting unintentional deviations or noncompliance. Enforcement actions—administrative and legal—refer to actions taken when a finding of violation occurs.

actions taken. For example, inspectors are instructed to document any subsequent information gathered during their investigations, as well as any findings of noncompliance and compliance actions taken. According to FAA, the database is designed to enable inspectors to plan work, record specific job-activities performed, capture information collected during an investigation or other work activity, and analyze trends affecting aviation safety. Administrative and legal enforcement actions and any associated civil penalties are documented separately in FAA's Enforcement Information System (EIS) database.

Major Findings

Selected FAA Inspectors Identified Law Enforcement as a Key Information Source when Conducting UAS Investigations

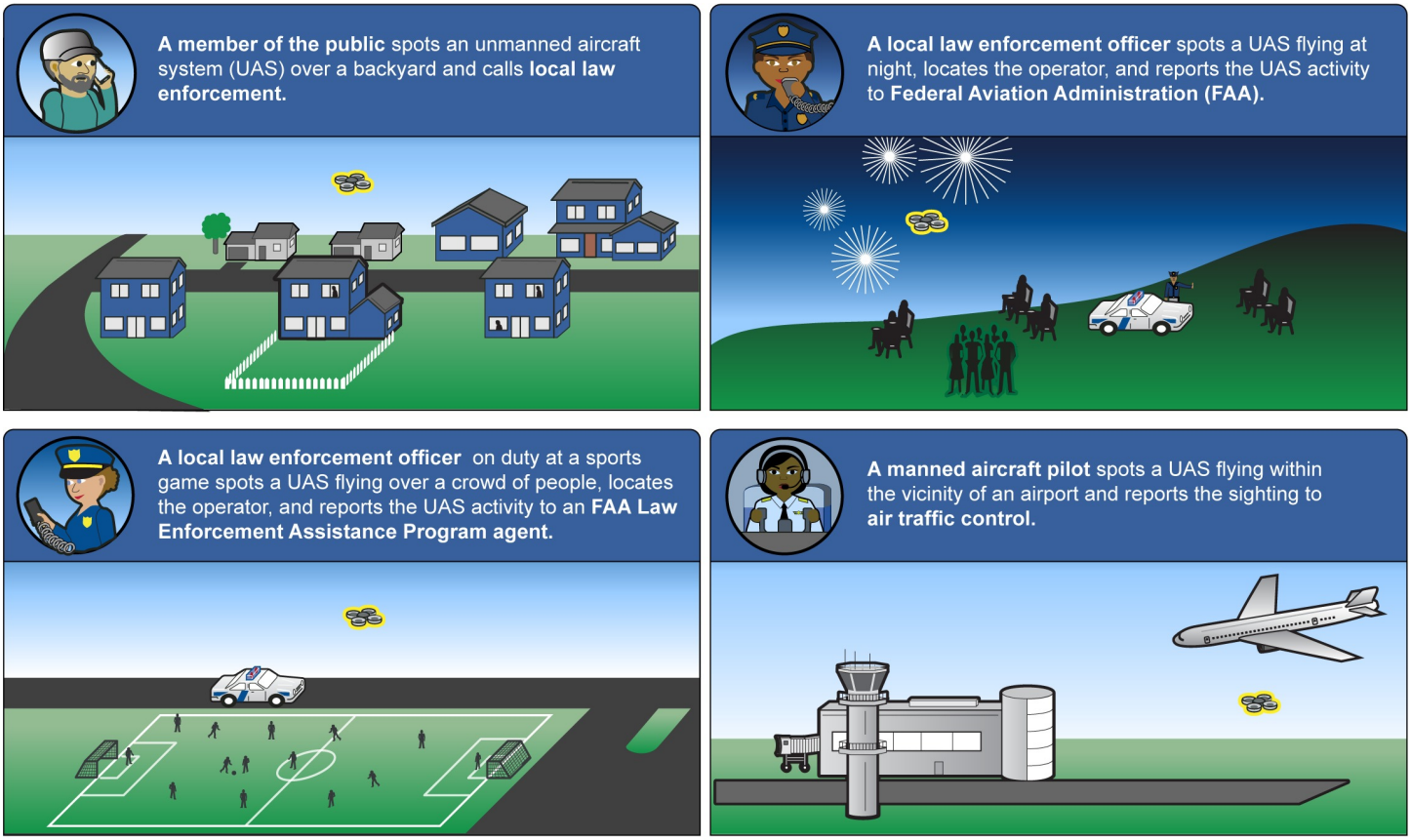
Selected FAA Inspectors Identified Gathering Evidence and Law Enforcement Information as Most Important for UAS Investigations

FAA policies outline a process for inspectors to follow when evaluating reports of noncompliance for both manned and unmanned aircraft.[22] This process begins when an FAA inspector at a district office becomes aware of a potential regulatory violation. Inspectors are then required to gather evidence to identify the operator of the UAS, notify the operator of an investigation, investigate and analyze the incident, and determine whether a regulatory violation occurred.[23] According to FAA guidance, inspectors may be made aware of potentially unsafe small UAS use and obtain information to investigate and conduct compliance investigations from multiple sources (see fig. 2).

[22]FAA orders such as 8900.1 Volume 14 provide direction and guidance to FAA inspectors to carry out compliance and enforcement investigations, and order 8900.1 Volume 16 provides additional direction and guidance specific to UAS.

[23]According to FAA guidance, inspectors document all potentially noncompliant operations as an "occurrence" until the inspector can gather sufficient information to determine whether an operation was in violation of a regulation or was involved in an accident.

Figure 2: Examples of Sources of Information for FAA Investigations into Potentially Unsafe Use of UAS



Source: GAO. | GAO-20-29

However, inspectors at the 11 district offices we met with identified some sources—particularly information from state and local law enforcement—as more useful sources for conducting compliance investigations than others.

- **Law enforcement.** FAA guidance states that law enforcement agencies are often well-positioned to deter, detect, immediately investigate, and take appropriate action to stop unauthorized or unsafe UAS operations because these agencies are on the ground in communities across the country and able to make first contact with UAS operators if there is an incident. According to a few inspectors we spoke to, they are less likely to happen upon unsafe UAS operations than local law enforcement as they do not regularly patrol communities, and there are far fewer inspectors compared to law enforcement officers. Inspectors at 7 of 11 district offices we met with agreed that law enforcement officers generally provide the most relevant and actionable information

to conduct a UAS investigation. For example, inspectors at one district office we met with said reports from law enforcement provide the most helpful information to conduct an investigation because they typically contain the information identifying the UAS operator. Almost all of the law enforcement agencies we spoke with (10 of 11) had received and responded to calls and complaints about UAS flying in a potentially unsafe manner in their communities. Law enforcement may provide information to FAA inspectors directly by phone or email. In addition, law enforcement officers may file a report to their region's designated LEAP agent, who serves as a liaison between the local law enforcement community and FAA district offices.[24] Inspectors at most district offices we met with (7 of 11) said they coordinate with their LEAP agents routinely for law enforcement-related information.

- **Reports from the public.** Members of the public who see small UAS operating in an unsafe manner can email FAA, contact their local FAA district office directly, or call FAA's safety hotline to report a suspicious incident. In addition, the public may call state or local law enforcement about a small UAS incident, and in turn the law enforcement agency may share this information with FAA. According to inspectors at one district office we met with, calls from the public do not necessarily assist with compliance and enforcement efforts, as FAA is extremely limited in its ability to act with the immediacy that would be required for complaints such as individuals reporting they saw a UAS flying "suspiciously" near someone's home.[25] Inspectors at another district office said they have also received complaints from registered UAS operators reporting operators not registered under Part 107 who are using their device as part of a commercial business—such as for real estate photography—and those inspectors are able to initiate investigations based on these reports.

- **Air traffic sightings reports.** FAA's Air Traffic Organization collects reports from pilots of manned aircraft, air traffic controllers, and others of sightings of UAS operating in a

[24]FAA guidance also encourages law enforcement to call one of FAA's Regional Operations Centers (ROCs) to report a UAS accident or incident. ROCs have trained personnel working 24 hours a day to respond to reports. The ROCs are part of FAA's Office of Finance and Management.

[25]Because many small UAS are battery operated, flights are generally limited to approximately 20-30 minutes in duration. However, many factors including aircraft model and weather conditions may affect a flight's length.

potentially unsafe manner around manned aircraft and airports. The Air Traffic Organization forwards these reports to the relevant district office. In contrast to information provided by law enforcement, inspectors at one district office said that while they receive UAS sightings reports on a daily basis from air traffic controllers, they do not attempt to initiate investigations based on those reported sightings because they generally lack actionable information. That is, the reports often do not contain information that can help identify the operator, which is a crucial piece of information needed to move forward in an investigation. Further, we have previously reported that it is difficult to verify that these sightings involve non-compliant UAS operations.[26]

- **Surveillance.** Inspectors may also become aware of a UAS in violation of regulations through surveillance. In 2016, FAA issued guidance to inspectors outlining key procedures to follow for UAS surveillance. Inspectors at 6 of the 11 district offices we met with told us they have conducted limited or unplanned surveillance activities, such as visiting a local outdoor event where UAS may be flown, such as at a hot air balloon festival. However, inspectors at the remaining 5 district offices we spoke to said they had not conducted any small UAS surveillance activities. Inspectors at one district office explained it was difficult to conduct surveillance because they do not generally have advance notice of when or where a UAS will be flying.

The inspectors we met with emphasized that collecting evidence to identify the operator is essential to being able to move forward with a UAS investigation. For example, if the UAS operator cannot be identified, the inspector is not able to continue the investigation any further or notify the operator about potential noncompliance. Inspectors also told us there are different ways they obtain this evidence. An operator may have been identified by local law enforcement—which generally has a significant presence in the public and throughout local communities—and inspectors may coordinate with law enforcement to receive this information. Inspectors may also collect evidence to identify an operator. For example, if inspectors have access to the UAS, they can attempt to identify registration information located on the device. However, inspectors do not have access to the small UAS registration database that contains operators' contact information. Thus for these types of incidents,

[26]GAO-18-110.

inspectors must coordinate with their designated LEAP agent to check the database if they want to obtain information identifying the operator. For example, inspectors at one district office told us that direct access to registration information would be beneficial for their UAS investigations, compared to waiting for a LEAP agent to check the database and share relevant information. According to FAA officials, because the agency decided to limit access to as few people as possible, the small UAS registration database can only be accessed by LEAP agents. According to FAA officials, as of July 2019, the agency was planning to provide FAA inspectors access to UAS registration information, but officials were not certain when inspectors would be granted access.

Once the operator has been identified and notified, the next step in FAA's process is investigating and analyzing an incident, identifying who did what, where, when, and why. Determining why the event happened and identifying the underlying root cause(s) is the purpose of the investigation. According to inspectors at two district offices we met with, social media videos (e.g., YouTube and Facebook) can also be a source of evidence for the investigation after they have been alerted of a potential violation. For example, some videos may contain the operator's contact information as well as details about where and when the non-compliant operation occurred, or capture an operation potentially out of compliance with FAA regulations—e.g., a UAS being flown over a crowd of people.

According to inspectors we met with, if they are able to obtain sufficient evidence through the investigation process, FAA guidance lays out how to determine whether a violation of FAA's regulations occurred and what action to take. According to FAA policy, once inspectors determine whether a violation occurred, they can close an investigation without action if no violation was found or there was insufficient evidence to determine non-compliance. If an inspector determines that an operator was out of compliance, then the inspector is to use FAA's Compliance Action Decision Process to decide which of the following types of actions would be most appropriate to bring an individual or entity to full compliance:[27]

- **Compliance actions.** Actions focused on education, such as counseling, on-the-spot corrections, additional training, or other cooperative means for correcting unintentional deviations or

[27]8900.1 Volume 14, Chpt. 1, Sec.2.

noncompliance that arise from factors such as simple mistakes or lack of understanding.

- **Administrative enforcement actions.** A type of enforcement action, administration enforcement actions can include warning notices or letters of correction. According to FAA policy, administrative actions are appropriate when the agency determines that a compliance action would be ineffective, but a legal enforcement action is not required or warranted.
- **Legal enforcement actions.** Among others, legal enforcement actions constitute civil penalties or suspensions or revocation of pilots' or operators' certificates. An inspector may refer a case to FAA attorneys for legal enforcement actions or civil penalties up to $20,000 per violation for operators knowingly interfering with wildfire suppression, law enforcement, and emergency response efforts.[28] In addition, an operator's pilot certificate may be suspended or revoked in cases of intentional or reckless deviations from FAA's regulations and also in some cases of repeated noncompliance or when operators demonstrate an unwillingness or inability to correct noncompliance following an FAA compliance or administrative action.[29] Also, according to FAA guidance, an individual who fails to register a small UAS could face a criminal penalty of up to $250,000[30] and up to 3 years in prison.[31]

[28]49 U.S.C. § 46320.

[29]Under the Compliance Program, FAA allows individuals and entities to take steps to address a noncompliance finding and demonstrate compliance before initiating a legal enforcement action.

[30]18 U.S.C. § 3571.

[31]49 U.S.C. § 46306.

FAA Data Show That District Offices Completed Approximately 570 UAS Compliance and Enforcement Actions from 2015 to 2018

Data from FAA's PTRS and EIS databases, which track inspector activities, show that district offices have taken few compliance and enforcement actions for UAS activity relative to the number of recorded UAS occurrences.[32] Specifically, inspectors at FAA's district offices entered approximately 5,500 UAS occurrences—which include reports of potentially unsafe incidents, investigations, and general inquiries related to UAS—in the PTRS database from October 2015 to October 2018. During the same time period, inspectors completed approximately 570 compliance and enforcement actions,[33] which, as discussed above, can result in actions ranging from on-the-spot corrections to civil penalties.[34]

Of the approximately 570 actions completed by inspectors from October 2015 to October 2018, about 470 were compliance actions, according to PTRS data. Based on FAA's data, over half of all district offices (47 of 78) took five or fewer compliance actions during this 3-year period. The district office with the most compliance actions had completed 59—more than double the number completed by the district office with the second-most compliance actions. Officials at the district that had taken the most compliance actions said their management had prioritized UAS issues several years ago, including building relationships with local law enforcement agencies and others in the community in order to proactively address UAS noncompliance and help respond to UAS incidents.

In addition, the data show that district offices completed substantially fewer UAS enforcement actions than compliance actions, which is in line with FAA's Compliance Program's emphasis on educational actions whenever appropriate. As noted above, FAA's guidance states that administrative enforcement and legal enforcement actions may

[32]Officials told us that this count of occurrences includes reports of potentially non-compliant UAS operations where FAA did not have sufficient evidence to determine whether the activity was truly out of compliance, as well as general informational calls from the public about UAS regulations. In other words, not all of the occurrences represent non-compliant activity.

[33]FAA identified these closed UAS compliance and enforcement actions from October 1, 2015, to October 1, 2018, based on a search query using multiple criteria. Any compliance and enforcement actions initiated in this timeframe that are still under investigation were not included in the data provided by FAA.

[34]According to updated data provided by FAA, from October 1, 2018, through July 31, 2019, inspectors at FAA's district offices entered approximately 1,360 UAS occurrences. During the same time period, inspectors completed approximately 164 compliance actions and 17 administrative and legal enforcement actions, according to FAA data.

be used when an operator is unwilling or unable to comply with regulations or can be based on the severity of the violation. Of the 158 enforcement investigations opened from October 2015 to October 2018, 98 resulted in administrative action or legal enforcement action, such as a warning notice or a civil penalty. Of the 98 completed actions, 51 involved the assessment of civil penalties, 44 resulted in administrative actions, and 3 resulted in the suspension or revocation of UAS remote pilots' certificates, according to the data FAA provided. During this time frame, FAA levied civil penalties ranging from $250 to $55,000.

Three Key Challenges Can Impede Small UAS Compliance and Enforcement

The Nature of UAS Pose Challenges to UAS Investigations

Those we interviewed generally agreed that the nature of UAS operations presents a key challenge to obtaining sufficient evidence to investigate potentially non-compliant UAS operations. Interviewees who shared this view included inspectors at all 11 selected district offices, all LEAP agents we met with, and 7 of 11 law enforcement officials. Small UAS are not easily identified or tracked in the national airspace, and can take off or land from almost any location. Moreover, FAA officials also told us that most of the UAS sightings reports they receive cannot be verified because small UAS typically are not detected by radar and often the operator cannot be identified or the device or other physical evidence cannot be recovered. Consequently, FAA officials told us that identifying and gathering evidence about potentially noncompliant small UAS activity can be difficult. By contrast, manned aircraft are readily identifiable, as they generally require a runway and fly according to a pre-approved route with a known operator—a certified pilot.

FAA officials said that they expect "remote identification"—a technology that would allow a person on the ground to gather information from a UAS flying in the airspace above—to ultimately mitigate some challenges posed by the nature of UAS. According to FAA, remote identification is designed to enable the agency to identify UAS and operators in near real-time. Also, according to FAA, remote identification may help address the agency's ability to determine the extent to which unsafe UAS operations exist in the national airspace,

a challenge we previously reported on.[35] While technologies that allow remote identification and tracking of UAS exist currently, there are different methods for how this technology can be implemented, and no consensus exists on the preferred standard. In September 2017, the UAS Identification and Tracking Aviation Rulemaking Committee issued a final report with recommendations for FAA to consider, including the technical requirements, intended benefits, and implementation strategies for remote identification.[36] FAA is in the process of developing a proposed rule for remote identification, so the full requirements have yet to be defined, and the extent to which any future requirements will directly assist small UAS compliance and enforcement has yet to be determined.[37]

FAA has also taken steps to address challenges associated with the nature of small UAS activity by changing requirements for UAS surveillance; this change involves conducting site visits to UAS operations. Inspectors we met with told us that UAS surveillance activities were limited or nonexistent at their district offices to date. However, FAA has recently sought to identify fruitful opportunities for surveillance. For example, in February 2019, the agency issued a notice setting out two new surveillance requirements to help identify non-compliant UAS activity, requiring certain district offices to conduct specific surveillance activities. According to FAA officials, these new requirements were formulated based on the recent accumulation of sufficient data from PTRS and UAS sightings reports.[38] Specifically,

[35]We previously found that FAA lacks reliable information about unsafe UAS operations in the national airspace that may enable officials to conduct compliance investigations. For example, while FAA inspectors review reports of accidents and incidents submitted to the agency, we reported that FAA officials said it would be impossible to know whether operators have reported all of their accidents and incidents, which is required for operators flying under certain regulations, like Part 107. We reported FAA was taking some steps to better understand the extent of unsafe use of small UAS, such as planning to develop a web-based system for the public to report sightings of UAS. See GAO-18-110.

[36]UAS Identification and Tracking (UAS ID) Aviation Rulemaking Committee (ARC), *ARC Recommendations Final Report* (Sept. 30, 2017).

[37]FAA plans to publish a notice of proposed rulemaking on remote identification of UAS in December 2019. FAA officials have identified remote identification and tracking of UAS as a way to further address oversight, security, and law enforcement concerns regarding the further integration of UAS into the national airspace.

[38]FAA's February 2019 implementation notice outlines these requirements and provides additional direction to district offices. For example, the requirements to conduct specific surveillance apply only to those district offices above a certain threshold of UAS activity, according to data captured in PTRS and from sightings reports. See *FAA Implementation Notice 8900.504 – Expanded Unmanned Aircraft Systems Oversight* (Feb. 28, 2019).

if the data reveal 10 or more UAS sightings near an airport, FAA headquarters requires the district office to conduct surveillance site visits, and FAA guidance suggests that these visits be done in the surrounding area near the identified airport.

Selected Inspectors and LEAP Agents Identified Limited UAS Training as a Challenge

Inspectors at almost all of the 11 district offices we met with identified limited UAS-specific knowledge as a challenge related to UAS compliance and enforcement. FAA requires all inspectors to take a one-time online course on regulations that govern small UAS operations under Part 107.[39] Inspectors also receive training on FAA's safety compliance and enforcement process, but the material is not specific to UAS. In 2014, FAA headquarters officials also began holding weekly teleconferences intended for inspectors serving as UAS focal points—and open to all inspectors—to discuss a range of UAS topics. All of the inspectors we spoke to had participated in these teleconferences, to varying degrees.

However, inspectors at nearly all of the district offices we interviewed (10 of 11) reported that FAA training related to small UAS was insufficient. For example, some inspectors we met with (5 of 11) said it would be helpful to have investigation training tailored specifically to UAS. This practice is not uncommon in FAA. According to agency officials, the agency provides training specific to conducting incident investigations for aircraft such as rotorcraft (e.g., helicopters). In addition, two inspectors also told us that while some of the strongest evidence for UAS investigations comes from social media videos, FAA has not provided clear direction on how to obtain this evidence or the extent to which it can be used to support a compliance or enforcement action. Inspectors at one district office also said that UAS training for inspectors could help them determine the priority for UAS investigations among their competing workload demands.

In addition to inspectors, most LEAP agents we met with (7 of 8) also said that they had received limited UAS-specific training, but FAA has recently added UAS training requirements for LEAP agents. While LEAP agents are required to interface with law enforcement regarding UAS as a liaison, FAA does not currently have any required formal UAS training courses for them. Rather, one agent told us that

[39]As of July 2019, FAA officials said they were in the final review stages of developing an updated online Public Aircraft Operations training that includes UAS operations and will be mandatory for all FAA inspectors.

agents are only provided informal training or materials on UAS to pass along to law enforcement, an outcome that makes it difficult to provide local law enforcement agencies with the most relevant information. Another LEAP agent said that training is needed to clarify small UAS requirements and to provide tips on explaining those requirements to law enforcement officers. According to officials in FAA's Office of Security and Hazardous Materials Safety, who oversee the LEAP program, LEAP agents have a long history of experience assisting law enforcement on drug interdiction efforts. But most LEAP agents had little-to-no exposure to UAS prior to January 2015 when they were tasked with working with law enforcement officials and helping educate them on how to handle suspected unauthorized UAS operations. In response to these needs, FAA's Office of Security and Hazardous Materials Safety updated the fiscal year 2020 LEAP training curriculum to include three UAS trainings, including two FAA online courses and one Federal Bureau of Investigation course, which LEAP agents will be required to take in fiscal year 2020.

While FAA Flight Standards officials said the agency's general approach is to continually assess and identify emerging training needs, they did not identify any actions taken to formally assess whether inspectors' current UAS training is sufficient. They also said that they believe their existing UAS training for inspectors, including the weekly UAS teleconferences and available online UAS courses, is sufficient. FAA officials also said that they are incorporating UAS content into revisions of two agricultural operations courses and that there are optional trainings and materials available to all FAA employees. While the officials added that the agency will continue to seek opportunities to increase inspectors' knowledge through existing training, particularly through their weekly teleconferences, FAA does not currently have plans to make changes to FAA's existing small UAS training for inspectors.

According to federal internal control standards, management should demonstrate a commitment to develop competent individuals.[40] Such a commitment includes ensuring staff are qualified to carry out assigned responsibilities. Developing a competency in an area requires relevant knowledge, skills, and abilities, which are gained largely from professional experience, training, and certifications. Without assessing whether current training for inspectors is sufficient—by identifying what UAS-specific education and training needs exist for FAA inspectors, and addressing those needs—FAA

[40]GAO-14-704G.

does not have reasonable assurance that its personnel can fully investigate and address incidents of UAS non-compliance.

Most Inspectors and LEAP Agents Said UAS Investigations Are Hindered by Limited Communication about Local Law Enforcement's Role

Most inspectors we interviewed said they encountered challenges related to law enforcement agencies' varying levels of knowledge about FAA's expected role for them in UAS investigations. For example, inspectors at 7 of 11 district offices we met with said that law enforcement agencies may be unaware of UAS regulations and of what information FAA wants law enforcement to provide for FAA investigations. In addition, representatives of most law enforcement agencies (9 of 11) we met with said their officers on the ground did not always know how to respond to UAS incidents or what information to share with FAA. According to officials at one district office, if a local law enforcement agency is not clear about its role in UAS investigations, then it may limit the amount and quality of information that is sent to the FAA district office.

FAA has efforts under way to increase UAS knowledge among law enforcement. FAA has developed resources for state and local law enforcement agencies, and distributed them through various mechanisms:

- FAA's cross-organizational Safety Team—which includes representatives from the Office of Aviation Safety's Flight Standards and UAS Integration Office, and inspectors at district offices—conducts outreach efforts on an as-needed basis, according to FAA officials, to disseminate resources, such as printed materials discussing UAS policy changes or safety guidance specific to UAS operations. According to an FAA Safety Team representative, the team uses a variety of distribution methods for the materials, such as emails to its listserv, posts to its website and to social media, and participation at major UAS conferences and events. For example, a recent webinar on UAS safety issues intended for law enforcement agencies was communicated via an FAA email listserv.
- Officials from FAA's Office of Security and Hazardous Materials Safety told us they have also developed resources and communicated them to UAS stakeholders via various methods. For example, the office created webinars discussing various UAS safety issues, such as examples of UAS incidents resulting in enforcement actions, and posted these resources to both the

FAA website as well as on social media. In addition, the office has created a guidance document detailing how law enforcement can support UAS investigations as well as pocket-sized reference cards, which contain instructions on what types of information to obtain at the scene of a UAS incident as well as contact numbers for LEAP special agents. These materials have also been posted to FAA's website as well as given to LEAP agents and inspectors to provide to law enforcement agencies as needed.

While FAA has developed resources for law enforcement, the agency has not assured that LEAP agents and inspectors have consistently disseminated key information to law enforcement partners. While FAA guidance states that local law enforcement's participation in small UAS oversight is central to ensuring small UAS operators comply with federal regulations—and agency officials said they plan to rely on local law enforcement to support FAA's UAS investigations—we found that the selected inspectors and LEAP agents we spoke to communicated information to law enforcement to varying degrees. Specifically, 6 of 11 district offices and 5 of 8 LEAP agents told us they regularly conduct outreach to and communicate with law enforcement agencies in their jurisdiction about procedures for UAS safety incidents, whereas the remainder stated that their efforts have been limited. For example, inspectors at one district office told us they shared the reference cards and briefed local law enforcement agencies on UAS investigative processes, whereas inspectors at another district office told us that they have only provided UAS information to law enforcement after an agency has requested it. In addition, five of the LEAP agents we met with are responsible for law enforcement coordination in five or more states. A few LEAP agents told us that this large area of responsibility can make disseminating information to the hundreds of law enforcement agencies in their respective regions a challenge.

According to federal internal control standards, management should externally communicate the necessary quality information to achieve the entity's objectives.[41] FAA officials told us that the multiple resources they have developed provide the necessary information for local law enforcement and that inspectors and LEAP agents both have responsibilities for interacting with local law enforcement agencies on UAS issues, to include disseminating resources. However, as described above, we found this communication approach has not

[41] GAO-14-704G.

been consistent. Further, officials at 7 of 11 law enforcement agencies we interviewed said UAS guidance and resources should be simplified or easier to access. Two of 11 selected law enforcement agencies we interviewed had not received any of FAA's small-UAS related guidance or resources. In addition, a national law enforcement association representative from a large U.S. city's police department told us that FAA had previously communicated with his agency about how to set up a UAS program to use for public safety purposes, but the agency had not received any information or materials about how to support an FAA UAS investigation.

FAA's Office of Security and Hazardous Materials Safety was required to develop a plan for educating local law enforcement agencies.[42] In response, FAA released a Public Safety Community Support and Engagement Plan in August 2019, consisting of tools, including webinars and guidance, for law enforcement and public safety entities. However, the plan does not outline a strategy regarding how the agency will direct inspectors and LEAP agents to communicate and disseminate key information to local law enforcement agencies in a manner that ensures these agencies can help FAA achieve its UAS safety goals. In addition, the plan does not outline a communication strategy to law enforcement beyond the approximately 15 LEAP agents, some of whom identified challenges in broadly disseminating information to the approximately 20,000 law enforcement agencies across the country. Absent such a strategy, FAA would not have reasonable assurance that law enforcement agencies know about the resources FAA has developed to help them identify potentially non-compliant small UAS operators. In addition, a formal strategy to communicate key information would enable FAA, given its limited resources, to determine how best to prioritize its outreach efforts to the tens of thousands of law enforcement agencies in the U.S.

[42]Section 366 of the FAA Reauthorization Act of 2018 requires FAA to develop a comprehensive strategy to provide guidance for local law enforcement agencies with respect to how to identify and respond to public safety threats posed by unmanned aircraft systems, among other things, within one year after the date of enactment of the Act.

FAA Plans to Adjust Small UAS Oversight Activities as Needed Moving Forward but Has Not Fully Identified Data Needed to Assess and Adapt Its Approach

According to FAA's newly developed *Oversight Plan* and officials we interviewed, the agency plans to continue its existing approach for small UAS safety oversight. In February 2019, FAA developed an *Oversight Plan* for small UAS, which states that FAA will continue to use the Compliance Program as an overarching framework to address unsafe UAS operations.[43] The plan formalizes the agency's existing approach, stating that FAA will continue UAS oversight efforts in three primary areas: (1) educating current and potential UAS operators about safe flying rules; (2) conducting targeted surveillance activities for proactive oversight; and (3) working with state and local law enforcement to gather evidence for UAS investigations of reports of noncompliant activity. FAA officials told us that they will apply and adapt this approach as increasingly complex operations for small UAS are approved under future regulations—such as forthcoming rules that will allow UAS to operate routinely at night and over people.

To inform these efforts, FAA officials told us they have conducted analyses of sightings report data as well as data from PTRS on UAS-related records. Agency officials told us that analyses of UAS sightings reports showed an increased amount of reported sightings near airports. The results of this analysis—coupled with the agency's determination that the risk of collision between a UAS and manned aircraft is greatest when a UAS is flying within the vicinity of an airport—led FAA to add new surveillance requirements, as discussed earlier.[44] In addition, FAA officials conducted a manual review of

[43]In 2016, DOT's Inspector General recommended that to enhance FAA's oversight of civil UAS, the agency should, among other things, design and implement a risk-based and prioritized oversight plan for UAS to help ensure safe operations of UAS. See Department of Transportation, Office of Inspector General, *FAA Lacks a Risk-Based Oversight Process for Civil Unmanned Aircraft Systems*, Report No. AV-2017-018 (Washington, D.C.: Dec. 1, 2016).

[44]According to FAA, in 2018 the agency reviewed surveillance data, UAS sightings, and PTRS and EIS entries resulting from UAS investigations to develop a more robust risk profile for UAS. Agency officials told us that the resulting analysis indicated UAS pose potential risks to air transport due to UAS sightings in communities bordering airport approach and departure paths. Additional potential risks were also identified, such as potential risks to firefighting, law enforcement, and emergency response efforts. In consideration of these potential risks, FAA said that specific actions were determined

a sample of a few hundred UAS investigations and compliance actions in which an operator was identified from PTRS to determine whether an operator's ignorance of UAS rules was the greatest contributing factor to noncompliance. Based on a manual read of the information in the narrative field, FAA officials determined that UAS operators in most investigations and compliance actions that they reviewed unknowingly violated FAA regulations. This finding, FAA concluded, supported the agency's focus on education as a key component of its oversight approach. FAA's analyses, however, did not include analyzing PTRS data for potential trends in UAS occurrences, investigations, or compliance and enforcement actions based on certain locations, times of day, or types of violations, for example.

FAA stated in the *Oversight Plan* that it had recently accumulated sufficient data from sightings reports and PTRS, among other sources, to conduct analyses. However, FAA has acknowledged that these two data sources have limitations. With respect to reported UAS sightings, agency officials have stated that reported sightings of unsafe UAS use are unreliable, because it cannot be verified whether the sighted object was a UAS, and if it was, whether it was flying in compliance with current regulations.[45] With respect to PTRS data, FAA officials explained that because the system was designed to track inspectors' work activities, not aircraft type, there is no existing mechanism to run UAS-specific data queries that would allow the agency to quickly identify trends. For example, to pull data on UAS-related investigations, FAA officials told us they had to compile a list from a variety of UAS keywords. Further, as discussed above, agency officials developing the *Oversight Plan* had to read PTRS entries to determine how many operators did not know they were violating FAA rules, since there is no specific field in the database that captures the reason for noncompliance.

Despite FAA officials' acknowledging the limitations of existing UAS data, the *Oversight Plan* states that moving forward, FAA intends to review UAS sightings reports and data from PTRS semi-annually to determine whether it needs to adjust its oversight activities. FAA officials told us these data are some of the best available to monitor the safety of small UAS and manage the risks they pose. However,

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to be the best risk-based approach to expanding UAS surveillance opportunities, as outlined in FAA Order 1800.56S National Flight Standards Work Program Guidelines.

[45]We previously reported the data from sightings reports and reports of UAS accidents and incidents submitted to the agency are unreliable. This lack of reliable reporting limits FAA's ability to understand the extent to which unsafe UAS operations are occurring in the national airspace. See GAO-18-110.

FAA has not identified how it will use or improve existing data from sightings reports and PTRS, nor has it considered whether additional data or information may be needed to move forward with its *Oversight Plan*. Neither the *Oversight Plan* nor other FAA planning documents discuss how data captured in PTRS or information from other sources will allow the agency to understand whether its oversight activities or approach need to be adjusted. Also, FAA officials told us that there are no specific plans to adjust PTRS fields to capture additional UAS information. In addition, in 2018, DOT's Inspector General reported that FAA's Air Traffic Organization maintains some information on where and when certain UAS will be operating, information that could be useful for planning oversight activities, but this information has not been readily provided to inspectors.[46] According to FAA, while the rising trend in UAS sightings merit concern, the agency has not yet taken steps to assess its data and information collection efforts because it views the majority of small UAS operations as lower risk to safety (relative to manned aircraft) and as not currently warranting additional oversight.

According to federal internal control standards, agencies should use quality information to achieve objectives. Quality information is appropriate, complete and accessible. An attribute that contributes to the effectiveness of this internal control standard calls for management to undertake an iterative and ongoing process to identify what information is needed, and to obtain relevant information. Also, FAA's safety management system policy states that access to complete and meaningful data allows for hazard identification and risk mitigation. Without identifying existing or additional data and information necessary to evaluate the agency's efforts, FAA may be limited in its ability to effectively adjust oversight activities as needed. For example, FAA does not have reasonable assurance that it is positioned to make informed decisions about (a) targeting activities in locations identified as having increased non-compliant operations and (b) focusing oversight efforts to address identified trends in regulatory infractions. In particular, identifying and assessing necessary data could allow FAA to identify other trends that might help direct or target its ongoing compliance and enforcement efforts—such as analyzing potential trends in UAS occurrences, investigations, or compliance and enforcement actions based on certain locations, times of day, or types of regulatory

[46]Department of Transportation, Office of Inspector General, *Opportunities Exist for FAA To Strengthen Its Review and Oversight Processes for Unmanned Aircraft System Waivers*, Report No. AV2019005 (Washington, D.C.: Nov. 7, 2018).

violation (e.g., operating over people without permission). If FAA were to do this type of assessment and find that a significant number of incidents occurred at public outdoor events, for example, it could identify opportunities to share additional information with inspectors and law enforcement to better position them to contribute to UAS investigations.

Further, more fully identifying and capturing data necessary to enable FAA to assess and adjust efforts in the future will be particularly important as the number and type of UAS operations the agency is responsible for overseeing expands. For example, commercial entities have begun to seek authority from FAA to fly UAS for package deliveries beyond the operator's visual line of sight, developments that could increase the safety risk UAS operations pose and necessitate changes in the agency's approach for small UAS oversight.

Conclusions

As the use of small UAS expands and FAA continues to develop regulations authorizing additional types of UAS operations, the agency has engaged in a variety of activities to further the integration of small UAS. However, if FAA does not more fully address training and law enforcement coordination challenges, inspectors might not be positioned to effectively respond to UAS incidents. For example, without sufficient training, inspectors may not be equipped with the information they need to investigate and ensure compliance with relevant small UAS regulations. In addition, because law enforcement agencies are unfamiliar with FAA's expectations of their role in small UAS compliance and enforcement, it is important that FAA effectively communicate and disseminate key information to the thousands of law enforcement agencies across the country. Without assurance that local law enforcement agencies know how to share information about unsafe UAS use with the FAA, the agency may be missing opportunities to address incidents that could endanger public safety. Finally, FAA has not fully taken steps necessary to assess and adjust its oversight activities moving forward. More fully identifying data and information needs and developing a mechanism to capture this data, if needed, would better position the agency to adapt to the changing dynamics of an evolving UAS environment. Identifying and using quality, relevant, and accessible data to assess compliance and enforcement activities will better position FAA to track its progress, identify trends, and determine whether to adjust or tailor efforts in maintaining the safety of the national airspace as increasingly complex UAS operations are allowed.

Agency Comments

We provided a draft of this product to the Department of Transportation (DOT) for review and comment. In its comments, reproduced in appendix I, DOT concurred with our three recommendations. FAA also provided technical comments, which we incorporated as appropriate.

We are sending copies of this report to the appropriate congressional committees, the Secretary of the Department of Transportation, and other interested parties. In addition, the report is available at no charge on the GAO website at http://www.gao.gov.

If you or your staff have any questions about this report, please contact me at (202) 512-2834 or krauseh@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix II.

Sincerely yours,

Heather Krause

Director, Physical Infrastructure Issues

Congressional Addressees

The Honorable Sam Graves
Ranking Member
Committee on Transportation and Infrastructure
House of Representatives

Appendixes

Appendix I: Agency Comments

U.S. Department of Transportation
Office of the Secretary of Transportation

Assistant Secretary for Administration

1200 New Jersey Avenue, SE
Washington, DC 20590

Heather Krause
Director, Physical Infrastructure Issues
U.S. Government Accountability Office (GAO)
441 G Street NW
Washington, DC 20548

Dear Ms. Krause:

The Federal Aviation Administration's (FAA) mandate is to ensure the safety of aircraft and the efficient use of the National Airspace System (NAS), including the safe integration of unmanned aircraft systems (UAS) operations into the NAS. The FAA employs a compliance, enforcement, and risk-based approach to safety oversight, focusing its efforts upon areas of greatest risk.

FAA actions to support safe integration of UAS operations include the following:

- published Notice 8900.504, UAS Oversight Plan, in February 2019. In August 2019, FAA's analyses of UAS data led to an in-depth review of the Oversight Plan, which enabled FAA to make enhancements to data collection, surveillance activities, and inspector briefings.
- developed and disseminated a plan that addresses how the FAA will provide information and guidance to local law enforcement agencies regarding identification and response to UAS risks, as well as how to utilize UAS to support their law enforcement and public safety missions, as directed by Section 366 of the FAA Reauthorization Act of 2018.

Upon review of the GAO's draft report, we concur with the three recommendations to improve upon solutions to address UAS-related risk. We will provide a detailed response to the recommendations within 180 days of the final report's issuance.

We appreciate the opportunity to respond to the GAO draft report. Please contact Madeline Chulumovich, Audit Relations and Program Improvement, at (202) 366-6512 with any questions.

Sincerely,

Keith Washington
Deputy Assistant Secretary for Administration

Appendix II: GAO Contact and Staff Acknowledgments

GAO Contact

Heather Krause, (202) 512-2834 or krauseh@gao.gov.

Staff Acknowledgments

In addition to the individual named above, Susan Zimmerman (Assistant Director); Maria Wallace (Analyst-in-Charge); Camilo Flores; Melissa Greenaway; Richard Hung; Delwen Jones; Malika Rice; Alexandra Rouse; David Sausville; Suzanne Spencer; Laurel Voloder; and Elizabeth Wood made key contributions to this report.

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