DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Parts 1, 47, 48, 89, 91, and 107

[Docket No.: FAA–2019–1100; Notice No. 20–01]

RIN 2120–AL31

Remote Identification of Unmanned Aircraft Systems

AGENCY: Federal Aviation Administration (FAA), Department of Transportation (DOT).

ACTION: Notice of proposed rulemaking.

SUMMARY: This action would require the remote identification of unmanned aircraft systems. The remote identification of unmanned aircraft systems in the airspace of the United States would address safety, national security, and law enforcement concerns regarding the further integration of these aircraft into the airspace of the United States while also enabling greater operational capabilities.

DATES: Send comments on or before March 2, 2020.

ADDRESSES: Send comments identified by docket number FAA–2019–1100 using any of the following methods:

- *Federal eRulemaking Portal:* Go to *http://www.regulations.gov* and follow the online instructions for sending your comments electronically.
- *Mail:* Send comments to Docket Operations, M–30; U.S. Department of Transportation (DOT), 1200 New Jersey Avenue SE, Room W12–140, West Building Ground Floor, Washington, DC 20590–0001.
- *Hand Delivery or Courier:* Take comments to Docket Operations in Room W12–140 of the West Building Ground Floor at 1200 New Jersey Avenue SE, Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.
- *Fax:* Fax comments to Docket Operations at 202–493–2251.

Privacy: In accordance with 5 U.S.C. 553(c), DOT solicits comments from the public to better inform its rulemaking process. DOT posts these comments, without edit, including any personal information the commenter provides, to *http://www.regulations.gov.*

Docket: Background documents or comments received may be read at *http://www.regulations.gov* at any time. Follow the online instructions for accessing the docket or go to Docket Operations in Room W12–140 of the West Building Ground Floor at 1200 New Jersey Avenue SE, Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Ben Walsh, Flight Technologies and Procedures Division, Federal Aviation Administration, 470 L'Enfant Plaza SW, Suite 4102, Washington, DC 20024; telephone 1–844–FLY–MY–UA; email: *UASRemoteID@faa.gov.*

SUPPLEMENTARY INFORMATION:

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List of Abbreviations Frequently Used in This Document

AC—Advisory Circular
ADS–B—Automatic Dependent Surveillance-Broadcast
ARC—Aviation Rulemaking Committee
ATC—Air traffic control
BVLOS—Beyond visual line of sight
DOT—U.S. Department of Transportation
FAA—Federal Aviation Administration
GPS—Global Positioning System
ICAO—International Civil Aviation Organization
IFR—Instrument flight rules
MOA—Memorandum of Agreement
OMB—Office of Management and Budget
UAS—Unmanned aircraft system
USS—UAS service supplier

UTM—Unmanned aircraft systems traffic management

I. Executive Summary

A. Introduction and Overview

This proposed rule would establish requirements for the remote identification of unmanned aircraft systems (UAS) [1] operated in the airspace of the United States. Remote identification (or Remote ID) is the ability of an unmanned aircraft in flight to provide certain identification and location information that people on the ground and other airspace users can receive. This is an important building block in the unmanned traffic management ecosystem. For example, the ability to identify and locate UAS operating in the airspace of the United States provides additional situational awareness to manned and unmanned aircraft. This will become even more important as the number of UAS operations in all classes of airspace increases. In addition, the ability to identify and locate UAS provides critical information to law enforcement and other officials charged with ensuring public safety. While remote identification alone will not enable routine expanded operations such as operations over people or beyond visual line of sight, it is a critical element for building unmanned traffic management capabilities. The FAA envisions that the remote identification network will form the foundation for the development of other technologies that can enable expanded operations.

Full implementation of remote identification relies on three interdependent parts that are being developed concurrently. The first is this proposed rule, which establishes operating requirements for UAS operators and performance-based design and production standards for producers of UAS. The second is a network of Remote ID UAS Service Suppliers (Remote ID USS) that would collect the identification and location in real-time from in-flight UAS. The Remote ID USS would perform this service under contract with the FAA, based on the same model the FAA currently uses for the Low Altitude Authorization and Notification Capability (LAANC).[2] The third part of the remote identification ecosystem is the collection of technical requirements that standards-setting organizations will develop to meet the performance-based design and production requirements in this proposed rule.

All UAS operating in the airspace of the United States, with very few exceptions, would be subject to the requirements of this rule. All UAS operators would be required to comply regardless of whether they conduct recreational or commercial operations, except those flying UAS that are not otherwise required to be registered under the FAA's existing rules. All UAS produced for operation in the airspace of the United States would have to comply with the design and production requirements established in this proposal with exceptions for amateur-built UAS, UAS of the United States government, and unmanned aircraft that weigh less than 0.55 pounds.

This proposal establishes design and production requirements for two categories of remote identification: Standard remote identification UAS and limited remote identification UAS. Standard remote identification UAS would be required to broadcast identification and location information directly from the unmanned aircraft and simultaneously transmit that same information to a Remote ID USS through an internet connection. Limited remote identification UAS would be required to transmit information through the internet only, with no broadcast requirements; however, the unmanned aircraft would be designed to operate no more than 400 feet from the control station. Under this proposal, the vast majority of UAS would be required to comply with one of these two categories of remote identification. For those limited exceptions, which include certain amateur-built UAS and UAS manufactured prior to the compliance date, operators flying UAS without remote identification capabilities would be permitted to fly only at certain specific geographic areas established under this rule specifically to accommodate them.

This proposal envisions that within three years of the effective date of this rule, all UAS operating in the airspace of the United States will be compliant with the remote identification requirements. No UAS could be produced for operation in the United States after two years and no UAS could be operated after three years except in accordance with the requirements of this proposal. Details on the requirements and their applicability are in the sections that follow.

B. Purpose of the Regulatory Action

The FAA is integrating unmanned aircraft systems (UAS) operations into the airspace of the United States through a phased, incremental, and risk-based approach.[3]

On June 28, 2016, the FAA achieved a major step towards UAS integration when it published the final rule for Operation and Certification of Small Unmanned Aircraft Systems.[4] This was one of multiple UAS-related regulatory actions taken by the FAA to enable the safe integration of UAS into the airspace of the United States. As technology progresses and the utility of UAS increases, the FAA anticipates a need for further rulemaking to continue to foster the safe, secure, and efficient use of the airspace of the United States. The FAA believes that the next step in the regulatory process is to develop regulatory requirements that enable the remote identification of UAS operating in the airspace of the United States.

The remote identification of UAS is necessary to ensure public safety and the safety and efficiency of the airspace of the United States. The remote identification framework would provide UAS-specific data, which could be used in tandem with new technologies and infrastructure to facilitate future, more advanced operational capabilities (such as detect-and-avoid and aircraft-to-aircraft communications that support beyond visual line of sight operations) and to develop the necessary elements for comprehensive UAS traffic management (UTM). Furthermore, remote identification of UAS would provide airspace awareness to the FAA, national security agencies, and law enforcement entities. This information could be used to distinguish compliant airspace users from those potentially posing a safety or security risk.

Current rules for registration and marking of unmanned aircraft facilitate the identification of the owners of unmanned aircraft, but normally only upon physical examination of the aircraft. Existing electronic surveillance technologies like transponders and Automatic Dependent Surveillance-

[1] The FAA does not use the terms unmanned aircraft system and unmanned aircraft interchangeably. The FAA uses the term unmanned aircraft as defined in 14 CFR 1.1 to refer specifically to the unmanned aircraft itself. The FAA uses the term unmanned aircraft system to refer to both the unmanned aircraft and any communication links and components that control the unmanned aircraft. As explained in section VII of this proposed rule, the FAA is proposing to add the definition of unmanned aircraft system to part 1 of 14 CFR.

[2] For more information on LAANC, consult *https://www.faa.gov/uas/programs_partnerships/data_exchange/*. On December 20, 2018, the FAA issued a request for information (RFI) seeking data exchange strategies and demonstrations for potential Remote ID USS. For more information on the RFI, consult *https://faaco.faa.gov/index.cfm/announcement/view/32514*.

[3] Consult *https://www.faa.gov/uas* for additional information regarding UAS operations.

[4] 81 FR 42064.

Broadcast (ADS–B), in addition to radio communications with air traffic control (ATC), were all considered as potential solutions for the remote identification of UAS but were determined to be unsuitable due to the lack of infrastructure for these technologies at lower altitudes and the potential saturation of available radio frequency spectrum. The FAA proposes to address the identification issues associated with UAS by requiring the use of new services and technology to enable the remote identification of UAS.

The proposed remote identification requirements are consistent with the FAA's safety mission of overseeing and promoting safety in air commerce and national security as well as promoting the safe and efficient use of the navigable airspace. The newly-available information would serve the public interest of enhancing safety, efficiency, and security in air commerce by creating situational awareness of all UAS flying in the airspace of the United States, which would allow additional and more complex UAS operations to take place. Remote identification would also strengthen the FAA's oversight of UAS operations and support efforts of law enforcement and national security agencies to address and mitigate disruptive behavior and hazards, which may threaten the safety and security of the airspace of the United States, other UAS, manned aviation, and persons and property on the ground. Remote identification information provided in near real-time would also assist Federal security partners in threat discrimination—allowing them to identify an operator and make an informed decision regarding the need to take actions to mitigate a perceived security or safety risk. The proposed rule would enhance the FAA's ability to monitor compliance with applicable regulations; would contribute to the FAA's ability to undertake compliance, enforcement, and educational actions required to mitigate safety risks; and would advance the safe integration of UAS into the airspace of the United States.

C. Summary of the Proposed Rule

This proposed rule provides a framework for remote identification of all UAS operating in the airspace of the United States. The rule would facilitate the collection and storage of certain data such as identity, location, and altitude regarding an unmanned aircraft and its control station.

The FAA is proposing to tie the remote identification requirements to the registration of unmanned aircraft because the FAA and law enforcement agencies have a need to correlate remote identification and registration data. The proposed rule would therefore impose operating requirements on persons operating unmanned aircraft registered or required to be registered under title 14, Code of Federal Regulations (CFR), part 47 or part 48, and on persons operating foreign civil unmanned aircraft in the United States. The proposed rule would also impose requirements on persons applying for and using FAA-recognized identification areas (areas specifically recognized by the FAA where UAS without remote identification equipment could operate) and requirements for persons developing means of compliance (*e.g.,* standards) that describe how a UAS would be designed and produced to meet the performance requirements proposed in this rule. Finally, the proposed rule would require persons designing and producing UAS with remote identification for operations in the United States to produce them using an FAA-accepted means of compliance.

UAS owners, UAS operators (including pilots, remote pilots, recreational flyers, and other persons manipulating the flight controls of UAS), UAS designers and producers, developers of remote identification means of compliance, and Remote Identification UAS Service Suppliers (Remote ID USS) would have important roles in the remote identification of UAS. The subsections that follow describe the roles and responsibilities of each of these groups within the scope of the proposed rule.

1. UAS Owners

The FAA proposes to revise the registration requirements to require all owners of unmanned aircraft to register each unmanned aircraft individually when registering under part 48. Furthermore, the owners of standard or limited remote identification unmanned aircraft would have to provide the serial number of all unmanned aircraft registered under part 47 or part 48, on or before the 36th month after the effective date of the final rule. The serial number would establish the unique identity of the unmanned aircraft. The serial number provided during registration or re-registration would have to be issued by the producer of the unmanned aircraft and comply with the ANSI/CTA–2063–A serial number standard.

Owners of unmanned aircraft used exclusively for limited recreational operations [5] who currently register multiple aircraft under a single registration number would be required to register each aircraft, individually by manufacturer, model, and, if the unmanned aircraft is a standard or limited remote identification unmanned aircraft, the aircraft's serial number, on or before the 36th month after the effective date of the final rule. The owners of small unmanned aircraft registered after the effective date of the final rule would have to comply with the new registration requirements prior to the operation of the unmanned aircraft.

The registration requirements are discussed in section IX of this preamble.

2. UAS Operators

i. Remote Identification Operating Requirements

Under the proposed rule, a person operating a UAS in the airspace of the United States would have to meet the remote identification requirements in one of three ways, depending upon the capabilities of the UAS, on or before the 36th month after the effective date of the final rule.

a. Standard Remote Identification UAS

For purposes of this proposed rule, a ''standard remote identification UAS'' is a UAS with remote identification equipment capable of both: (1) Connecting to the internet and transmitting through that internet connection to a Remote ID USS; and (2) broadcasting directly from the unmanned aircraft. Standard remote identification UAS are discussed further in section X.A.1 of this preamble. Any person operating a standard remote identification UAS would be required to ensure:

- The UAS was designed and produced to meet the minimum performance requirements of the rule using an FAA-accepted means of compliance for standard remote identification UAS. Persons would be able to meet this obligation by ensuring that the serial number of the standard remote identification UAS is listed on an FAA-accepted declaration of compliance. A person operating a UAS would be able to read the label on the aircraft indicating whether the UAS is a

[5] This proposal uses the term ''limited recreational operations'' when discussing current registration requirements under part 48. Part 48 uses the term ''model aircraft'' to describe recreational UAS operations. The FAA considers that model aircraft under part 48 are consistent with the ''limited recreational operations'' described in 49 U.S.C. 44809, therefore ''limited recreational operations'' has been used throughout to ensure consistency of terminology with current statutory requirements.

standard or limited remote identification UAS. Additionally, a person could determine whether the UAS is listed on an FAA-accepted declaration of compliance by verifying the status on the FAA's website. The standard remote identification UAS broadcasts the remote identification message elements directly from the unmanned aircraft from takeoff to landing.

• When the internet is available at takeoff, the standard remote identification UAS connects to the internet and transmits the required message elements through that internet connection to a Remote ID USS.

The required message elements include, among others, a UAS Identification to establish the unique identity of the UAS. Operators would have to choose whether to use the serial number of the unmanned aircraft or a session ID (*e.g.,* a randomly-generated alphanumeric code assigned by a Remote ID USS on a per-flight basis designed to provide additional privacy to the operator) as the UAS Identification. The required message elements are discussed in section XII.C of this preamble.

A person could operate a standard remote identification UAS only if: (1) It has a serial number that is listed on an FAA-accepted declaration of compliance; (2) its remote identification equipment is functional and complies with the requirements of the proposed rule from takeoff to landing; and (3) its remote identification equipment and functionality have not been disabled.

b. Limited Remote Identification UAS

For purposes of this proposed rule, a ''limited remote identification UAS'' is a UAS that: (1) Is designed and produced to restrict operation to no more than 400 feet from its control station; (2) is capable of connecting to the internet and transmitting the remote identification message elements through that internet connection to a Remote ID USS; and (3) cannot broadcast remote identification message elements. Limited remote identification UAS are discussed further in section X.A.2 of this preamble. Persons operating a limited remote identification UAS would be required to operate within visual line of sight and ensure that:

• The UAS was designed and produced to meet the minimum performance requirements of the rule using an FAA-accepted means of compliance for a limited remote identification UAS. Persons would be able to meet this obligation by ensuring that the serial number of the limited remote identification UAS is listed on an FAA-accepted declaration of compliance. Additionally, a person could determine whether the UAS is listed on an FAA-accepted declaration of compliance by verifying the status on the FAA's website.

• From takeoff to landing, the limited remote identification UAS connects to the internet and transmits the required remote identification message elements through that internet connection to a Remote ID USS.

The required message elements would include, among others, a UAS Identification to establish the unique identity of the UAS. Operators would have to choose whether to use the unmanned aircraft's serial number or a session ID assigned by a Remote ID USS as the UAS Identification. The required message elements are discussed in section XII.C of this preamble.

A person could operate a limited remote identification UAS only if: (1) it has a serial number that is listed on an FAA-accepted declaration of compliance; (2) its remote identification equipment is functional and complies with the requirements of the proposed rule from takeoff to landing; and (3) its remote identification equipment and functionality have not been disabled. Examples of the use of limited remoted identification UAS are further discussed in section X.G of this preamble.

c. UAS Without Remote Identification Equipment

Under the proposed rule, the vast majority of UAS would be required to have remote identification capability, however as discussed in section X. A. 3, a limited number of UAS would continue to not have remote identification. The FAA envisions that upon full implementation of this rule, no unmanned aircraft weighing more than 0.55 pounds will be commercially available that is not either a standard remote identification UAS or a limited remote identification UAS. However, there will be certain UAS including amateur built aircraft and previously manufactured UAS that might not have remote identification capability. A person operating a UAS without remote identification equipment would always be required to operate within visual line of sight [6] and within an FAA-recognized identification area. Under the proposed rule, an FAA-recognized identification area is a defined geographic area where UAS without remote identification can operate. An area would be eligible for establishment as an FAA-recognized identification area if it is a flying site that has been established within the programming of a community based organization recognized by the Administrator. The FAA would maintain a list of FAA-recognized identification areas at *https://www.faa.gov.* FAA-recognized identification areas are discussed further in section XV of this preamble.

ii. Prohibition Against the Use of ADS–B Out and Transponders

The proposed rule also prohibits use of ADS–B Out and transponders for UAS operations under 14 CFR part 107 and part 91 unless otherwise authorized by the FAA. The FAA is concerned that the potential proliferation of ADS–B Out transmitters on UAS may negatively affect the safe operation of manned aircraft in the airspace of the United States. The projected numbers of UAS operations have the potential to saturate available ADS–B frequencies, affecting ADS–B capabilities for manned aircraft and potentially blinding ADS–B ground receivers. The FAA is therefore proposing that UAS operators, with limited exceptions, be prohibited from using ADS–B Out or transponders. The prohibition against the use of ADS–B Out and transponders is discussed in Section XVI of this preamble.

3. UAS Designers and Producers

For each UAS designed or produced for operation in the United States, the person responsible for the design or production of the unmanned aircraft system (with limited exceptions included in the proposal) would be required to design or produce the UAS in accordance with the performance requirements for a standard remote identification UAS or limited remote identification UAS using an FAA-accepted means of compliance for remote identification on or before the 24th month after the effective date of the final rule.

A person responsible for the production of UAS (with limited exceptions) would be required to:

• Issue each unmanned aircraft a serial number that complies with the ANSI/CTA–2063–A serial number standard.

• Label the unmanned aircraft to indicate that it is remote identification compliant and indicate whether the UAS is standard remote identification or limited remote identification.

• Submit a declaration of compliance for acceptance by the FAA, declaring

[6] While this proposed rule does not propose any changes to requirements related to beyond visual line of sight (BVLOS) operations, the FAA intends for the rule to be dynamic to account for future changes related to line of sight operations. The FAA specifically notes that this rulemaking requires UAS without remote identification equipment to always be operated within line of sight.

that the UAS complies with the requirements of the proposed rule.

The FAA could ask the person responsible for the production of the UAS to submit additional information or documentation, as needed, to supplement a declaration of compliance. The FAA would notify the submitter of its acceptance of a declaration of compliance. The FAA would also provide a list of accepted declarations of compliance at *https://www.faa.gov.*

A person that submits a declaration of compliance would be required to retain certain data for as long as the UAS listed on that declaration of compliance is produced plus an additional 24 calendar months. If the FAA rescinds its acceptance of a declaration of compliance, the submitter of the FAA-accepted declaration of compliance or any person adversely affected by the rescission of the Administrator's acceptance of the declaration of compliance may petition the FAA to reconsider the rescission by submitting a request for reconsideration to the FAA within 60 calendar days of publication in the **Federal Register** of a notice of rescission.

4. Developers of Remote Identification Means of Compliance

Means of compliance, as discussed in section XII of this preamble, are developed by persons or organizations to describe methods by which a person designing or producing a UAS with remote identification may comply with the performance requirements of this proposed rule. Under the proposed rule, a means of compliance would have to be accepted by the FAA before it could be used for the design and production of UAS with remote identification. A person or entity seeking acceptance by the FAA of a means of compliance for UAS with remote identification equipment would be required to submit the means of compliance to the FAA. The FAA would review the means of compliance to determine if it meets the minimum performance requirements, and testing and validation procedures of the proposed rule. Specifically, the person or entity would have to submit a detailed description of the means of compliance, a justification for how the means of compliance meets the minimum performance requirements of the proposed rule, and any substantiating material the person or entity wishes the FAA to consider as part of the application. The minimum performance requirements, and testing and validation procedures, are discussed in sections XII.D and XII.F of this preamble. A person or entity who submits a means of compliance that is accepted by the FAA would have to retain certain data for as long as the means of compliance is accepted plus an additional 24 calendar months.

The FAA would indicate acceptance of a means of compliance by notifying the submitter of the acceptance of the proposed means of compliance. The FAA also expects to notify the public that it has accepted the means of compliance by including it on a list of accepted means of compliance at *https://www.faa.gov.* The FAA would not disclose commercially valuable information in this document.

5. Remote ID USS

The proposed rule would require persons operating UAS with remote identification to transmit the remote identification message elements to a Remote ID USS over the internet. A Remote ID USS would be a service provider qualified by the Administrator to provide remote identification services to UAS. Each Remote ID USS would be required to establish a contractual relationship with the FAA through a Memorandum of Agreement (MOA) entered into under the FAA's ''other transaction authority'' under 49 U.S.C. 106(l) and (m), and to comply with a series of terms, conditions, limitations, and technical requirements that outline how the Remote ID USS must interpret and provide data to external users, as well as store and protect such data. The Remote ID USS would also be contractually required to meet quality-of- service metrics that would establish the minimum requirements for providing remote identification services, including availability of the service and what happens when various failures occur. To implement remote identification, the FAA anticipates establishing a cooperative data exchange mechanism between the FAA and Remote ID USS, as discussed in section XIV of this preamble.

Remote ID USS would be required to demonstrate four primary capabilities: (1) The ability to share the remote identification message elements in near real-time with the FAA upon request; (2) the ability to maintain remote identification information securely and to limit access to such information; (3) the ability to meet contractually-established technical parameters; and (4) the ability to inform the FAA when their services are active and inactive. Another capability of a Remote ID USS may be to generate and provide UAS operators with a UAS Identification known as a session ID. A session ID would be a randomly-generated alphanumeric code that is used only for one flight. UAS operators would have the option to use a Session ID to identify the UAS instead of the serial number, to provide a greater level of privacy. This capability would be defined in the technical requirements agreed to in the MOA.

To become an FAA-qualified Remote ID USS, a prospective Remote ID USS would enter into an MOA with the FAA, demonstrate it meets the technical requirements, and successfully test the end-to-end system and connections. Prospective Remote ID USS would also be reviewed for consistency with national security and cybersecurity requirements and export administration regulations. FAA-qualified Remote ID USS would be subject to ongoing FAA review to ensure compliance and quality-of-service.

6. Table of Major Provisions

Table 1 provides a summary of the major provisions of this proposed rule.

TABLE 1—SUMMARY OF MAJOR PROVISIONS

Issue	Proposed requirement	CFR section
Registration Requirements		
Individual registration of unmanned aircraft and conforming changes.	Requires the individual registration of all unmanned aircraft registered under part 48.	48.100 48.110
	Requires each unmanned aircraft to be registered under a unique registration number. Eliminates existing option to allow multiple recreational unmanned aircraft to register under a single registration number.	48.5 48.30 48.115 48.200

TABLE 1—SUMMARY OF MAJOR PROVISIONS—Continued

Issue	Proposed requirement	CFR section
Serial numbers for unmanned aircraft	The unmanned aircraft serial number provided as part of an application for aircraft registration for a standard remote identification or limited remote identification unmanned aircraft would be the serial number issued by the manufacturer in accordance with the requirements of part 89.	47.14
	The owner of a small unmanned aircraft would have to include the manufacturer and model name of the unmanned aircraft during the registration or registration renewal process, and for any standard or limited remote identification unmanned aircraft, the serial number issued by the manufacturer.	48.100
	Adds clarifying language for existing registration requirements for part 107 operators.	48.15
Telephone number(s) for applicant for registration.	Requires telephone number(s) of applicant at time of registration	48.100
	Operating Requirements	
Applicability of operating requirements	The remote identification operating requirements would apply to: (1) Persons operating unmanned aircraft registered or required to be registered under parts 47 or 48; and (2) persons operating foreign civil unmanned aircraft in the United States.	89.101
Remote identification requirements generally.	No person would be allowed to operate a UAS within the airspace of the United States unless the operation is conducted under one of the following: (1) The UAS is a standard remote identification UAS and that person complies with the requirements of § 89.110; (2) the UAS is a limited remote identification UAS and that person complies with the requirements of § 89.115; or (3) the UAS does not have remote identification equipment and that person complies with the requirements of § 89.120.	89.105
Standard remote identification UAS	*Remote identification* ..... If the internet is available at takeoff, the UAS would have to do the following from takeoff to landing: (1) Connect to the internet and transmit the required remote identification message elements through that internet connection to a Remote ID USS; and (2) broadcast the message elements directly from the unmanned aircraft. If the internet is unavailable at takeoff, or if during the flight, the unmanned aircraft can no longer transmit through an internet connection to a Remote ID USS, the UAS would have to broadcast the message elements directly from the unmanned aircraft from takeoff to landing. *In-flight loss of broadcast capability:* A person manipulating the flight controls of a standard remote identification UAS that can no longer broadcast the message elements would have to land as soon as practicable. *Operation of standard remote identification UAS:* A person would be allowed to operate a standard remote identification UAS only if it meets the following requirements: (1) Its serial number is listed on an FAA-accepted declaration of compliance; (2) its remote identification equipment is functional and complies with the requirements of proposed part 89 from takeoff to landing; and (3) its remote identification equipment and functionality have not been disabled.	89.110
Limited remote identification UAS	*Remote identification* ..... The UAS would have to do the following from takeoff to landing: (1) Connect to the internet and transmit the required remote identification message elements through that internet connection to a Remote ID USS; and (2) be operated within visual line of sight. *In-flight loss of remote identification:* A person manipulating the flight controls of a limited remote identification UAS would have to land as soon as practicable when it cannot transmit the message elements through an internet connection to a Remote ID USS. *Operation of limited remote identification UAS:* A person would be allowed to operate a limited remote identification UAS only if it meets the following requirements: (1) Its serial number is listed on an FAA-accepted declaration of compliance; (2) its remote identification equipment is functional and complies with the requirements of proposed part 89 from takeoff to landing; and (3) its remote identification equipment and functionality have not been disabled.	89.115
UAS without remote identification	The limited number of UAS that do not have remote identification equipment would be allowed to operate within visual line of sight and within an FAA-recognized identification area.	89.120

TABLE 1—SUMMARY OF MAJOR PROVISIONS—Continued

Issue	Proposed requirement	CFR section
	With authorization from the Administrator, a person may operate a UAS that does not have remote identification for the purpose of aeronautical research or to show compliance with regulations.	
Transponder and Automatic Dependent Surveillance-Broadcast (ADS–B) use.	ADS–B Out equipment may not be used to comply with the remote identification requirements.	89.125
	ATC transponder and altitude-reporting equipment and use requirements do not apply to persons operating UAS unless the operation is conducted under a flight plan and the person operating the UAS maintains two-way radio communication with ATC, or the use of a transponder is otherwise authorized by the Administrator.	91.215
	No person would be allowed to operate a small UAS with a transponder on, unless otherwise authorized by the Administrator.	107.52
	ADS–B equipment and use requirements do not apply to persons operating UAS unless the operation is conducted under a flight plan and the person operating the UAS maintains two-way radio communication with ATC, or the use of ADS–B Out is otherwise authorized by the Administrator.	91.225
	No person would be allowed to operate a small UAS with ADS–B Out equipment in transmit mode, unless otherwise authorized by the Administrator.	107.53
Confirmation of identification for foreign registered civil unmanned aircraft operated in the United States.	No person would be allowed to operate a foreign registered civil unmanned aircraft in the United States unless, prior to the operation, the person submits a notice of identification that includes basic information regarding the unmanned aircraft and the person responsible for the operation.	89.130
Record Retention	The Administrator shall require any Remote ID USS to retain any remote identification message elements for 6 months from the date when the remote identification message elements are received or otherwise come into the possession of the Remote ID USS.	89.135
	FAA-recognized identification areas	
Applicability	Prescribes procedural requirements to establish an FAA-recognized identification area.	89.201
Eligibility	Only a community based organization (CBO) recognized by the Administrator would be allowed to apply for the establishment of an FAA-recognized identification area.	89.205
Requests for establishment	*Application* A CBO requesting establishment of an FAA-recognized identification area would have to submit an application within 12 calendar months from the effective date of the final rule. The FAA will not consider any applications submitted after that date.	89.210
	Required documentation A request for establishment of an FAA-recognized identification area would have to contain the following information: • Name of the CBO making the request. • Declaration that the person making the request has the authority to act on behalf of the CBO. • Name and contact information, including telephone number(s), of the primary point of contact for communications with the FAA. • Physical address of the proposed FAA-recognized identification area. • Latitude and longitude coordinates delineating the geographic boundaries of the proposed FAA-recognized identification area. • If applicable, a copy of any existing letter of agreement regarding the flying site.	89.210
	Approval of an FAA-recognized identification area FAA would approve or deny applications for FAA-recognized identification areas, and may take into consideration matters including but not limited to: the effects on existing or contemplated airspace capacity, critical infrastructure, existing or proposed manmade objects, natural objects, or the existing use of the land, within or close to the proposed FAA-recognized identification area; the safe and efficient use of airspace by other aircraft; and the safety and security of persons or property on the ground.	89.215
	Amendment Any change to the information submitted in the application for establishment of an FAA-recognized identification area would have to be submitted to the FAA within ten calendar days of the change. Such information includes, but would not be limited to, a change to the point of contact for the FAA-recognized identification area, or a change to the community based organization's affiliation with the FAA-recognized identification area.	89.220

TABLE 1—SUMMARY OF MAJOR PROVISIONS—Continued

Issue	Proposed requirement	CFR section
	If the community based organization wishes to change the geographic boundaries of the FAA-recognized identification area, the organization must submit the request to the FAA for review. The geographic boundaries of the FAA-recognized identification area will not change until they have been approved or denied in accordance with § 89.215. *Duration of an FAA-recognized identification area* An FAA-recognized identification area would be in effect for 48 calendar months after the date the FAA approves the request for establishment of an FAA-recognized identification area. *Renewal* A request for renewal would have to be submitted no later than 120 days prior to the expiration of the FAA-recognized identification area in a form and manner acceptable to the Administrator. The Administrator may deny requests submitted after that deadline or requests submitted after the expiration of the FAA-recognized identification area.	89.225 89.225
Expiration and termination	*Expiration* Unless renewed, an FAA-recognized identification area would be automatically cancelled and have no further force or effect as of the day immediately after its expiration date. *Termination prior to expiration (by request):* A CBO may submit a request to the Administrator to terminate an FAA-recognized identification area. Once an FAA-recognized identification area is terminated, that CBO may not reapply to have that flying site reestablished as an FAA-recognized identification area. *Termination by FAA:* FAA would be able to terminate an FAA-recognized identification area for cause or upon a finding that the FAA-recognized identification area could pose a risk to aviation safety, public safety, or national security or that the person who submitted a request for establishment of an FAA-recognized identification area provided false or misleading information during the submission process. Once an FAA-recognized identification area is terminated, that CBO may not reapply to have that flying site reestablished as an FAA-recognized identification area. *Petition to reconsider the FAA's decision to terminate an FAA recognized identification area:* A CBO whose FAA-recognized identification area has been terminated by the FAA would be able to petition for reconsideration by submitting a request for reconsideration and establishing the grounds for such reconsideration within 30 calendar days of the date of issuance of the termination.	89.230
	Requirements for UAS with Remote Identification	
Applicability	Prescribes the minimum message elements set and minimum performance requirements for standard remote identification UAS and limited remote identification UAS.	89.301
Message elements broadcast and transmitted by standard remote identification UAS.	Standard remote identification UAS would have to broadcast and transmit the following remote identification message elements: • The identity of the UAS consisting of one of the following: ○ The serial number assigned to the unmanned aircraft by the producer. ○ Session ID assigned by a Remote ID USS. • An indication of the latitude and longitude of the control station and unmanned aircraft. • An indication of the barometric pressure altitude of the control station and unmanned aircraft. • A Coordinated Universal Time (UTC) time mark. • An indication of the emergency status of the UAS, which could include lost-link or downed aircraft.	89.305
Minimum performance requirements for standard remote identification UAS.	Standard remote identification UAS would have to meet minimum performance requirements related to the following: • Control station and unmanned aircraft location. • Automatic Remote ID USS connection. • Time mark. • Self-testing and monitoring. • Tamper resistance. • Connectivity. • Error correction. • Interference considerations.	89.310

TABLE 1—SUMMARY OF MAJOR PROVISIONS—Continued

Issue	Proposed requirement	CFR section
	• Message transmission requirements for broadcast and Remote ID USS transmission. • Message elements performance requirements for broadcast and Remote ID USS transmission. • Cybersecurity.	
Message elements transmitted by limited remote identification UAS.	Limited remote identification UAS would have to transmit the following remote identification message elements: • The identity of the UAS consisting of one of the following: ○ The serial number assigned to the unmanned aircraft by its producer. ○ Session ID assigned by a Remote ID USS. • An indication of the latitude and longitude of the control station. • An indication of the barometric pressure altitude of the control station. • A Coordinated Universal Time (UTC) time mark. • An indication of the emergency status of the UAS, which could include lost-link or downed aircraft.	89.315
Minimum performance requirements for limited remote identification UAS.	Limited remote identification UAS would have to meet minimum performance requirements related to the following: • Control station location. • Automatic Remote ID USS connection. • Time mark. • Self-testing and monitoring. • Tamper resistance. • Connectivity. • Error correction. • Interference considerations. • Message transmission requirements for Remote ID USS transmission. • Message elements performance requirements for Remote ID USS transmission. • Cybersecurity. • Range limitation. • Broadcast limitation.	89.320
Means of Compliance		
Applicability	Prescribes the following: • Requirements for means of compliance. • Procedural requirements for the submission and acceptance of means of compliance. • Rules governing persons submitting means of compliance for FAA acceptance.	89.401
Submitting a means of compliance for FAA acceptance.	Any person would be able to submit a means of compliance for acceptance by the FAA by submitting certain specified information to the FAA in a form and manner acceptable to the Administrator. A means of compliance would have to include testing and validation procedures for persons designing and producing standard remote identification UAS or limited remote identification UAS to demonstrate through analysis, ground test, or flight test, as appropriate, how the standard remote identification UAS or limited remote identification UAS performs its intended functions and meets the requirements for UAS with remote identification.	89.405
Acceptance of a means of compliance	A person requesting acceptance of a means of compliance would have to demonstrate to the FAA that the means of compliance addresses all applicable requirements and that any UAS with remote identification designed and produced in accordance with such means of compliance would meet the performance requirements of proposed part 89.	89.410
Rescission	*Rescission of FAA's acceptance of a means of compliance* FAA would be able to rescind its acceptance of a means of compliance if it finds that the means of compliance does not meet any of the applicable requirements for a means of compliance.	89.415
Record retention	A person who submits a means of compliance that is accepted by the Administrator would have to retain certain specified data for as long as the means of compliance is accepted plus an additional 24 calendar months.	89.420

TABLE 1—SUMMARY OF MAJOR PROVISIONS—Continued

Issue	Proposed requirement	CFR section
Design and Production of UAS with Remote Identification		
Applicability	Applies to the design and production of UAS operating in the United States *except* for the design and production of the following (*unless* they are standard remote identification UAS or limited remote identification UAS, in which case they would have to comply with the design and production requirements of the proposed rule): • Amateur-built UAS. • UAS of the United States Government. • UAS where the unmanned aircraft weighs less than 0.55 pounds including the weight of anything attached to or carried by the aircraft. • UAS produced for the purpose of aeronautical research or showing compliance with regulations. Prescribes the following: • Requirements for design and production of UAS operating in the United States. • Procedural requirements for the submission and acceptance of declarations of compliance. • Rules governing persons holding FAA-accepted declarations of compliance or operating UAS with remote identification.	89.501
Serial numbers	Producers of UAS with remote identification would have to issue each unmanned aircraft a serial number that complies with ANSI/CTA–2063–A.	89.505
Design and production requirements	No person would be allowed to produce a UAS unless • The UAS is designed and produced to meet the minimum performance requirements for standard remote identification UAS or limited remote identification UAS using an FAA-accepted means of compliance. • The UAS meets the requirements of proposed subpart F. • The FAA has accepted a declaration of compliance for that UAS. Producers of UAS would have to: • Allow the Administrator to inspect their facilities, technical data, and any standard remote identification UAS or limited remote identification UAS the person produces, and to witness any tests necessary to determine compliance with subpart F. • Perform independent audits on a recurring basis, and whenever the FAA provides notice of noncompliance or of potential noncompliance, to demonstrate the UAS listed under a declaration of compliance meet the requirements of subpart F. The person responsible for the production of standard remote identification UAS or limited remote identification UAS must provide the results of all such audits to the FAA upon request. • Maintain product support and notification procedures to notify the public and the FAA of any defect or condition that causes a UAS to no longer meet the requirements of subpart F, within 15 calendar days of the date the person becomes aware of the defect or condition.	89.510
Labeling	Persons responsible for the production of UAS with remote identification would have to include a label on the UAS to indicate that it meets the remote identification requirements and whether the unmanned aircraft system is a standard remote identification UAS or limited remote identification UAS. The label would have to be in English and be legible, prominent, and permanently affixed to the unmanned aircraft.	89.515
Submission of declaration of compliance for FAA acceptance.	The person responsible for the production of a UAS with remote identification equipment would have to submit a declaration of compliance for acceptance by the FAA. The declaration of compliance would have to include certain specified information, including a declaration that: • The UAS was designed and produced using an FAA-accepted means of compliance. • The person responsible for the production of the UAS complies with the requirements of § 89.510(b).	89.520
Acceptance of a declaration of compliance.	The FAA would notify the submitter of its decision to accept or reject a declaration of compliance.	89.525
Rescission and reconsideration	*Rescission of FAA's acceptance of a declaration of compliance*	89.530

TABLE 1—SUMMARY OF MAJOR PROVISIONS—Continued

Issue	Proposed requirement	CFR section
	The FAA would be able to rescind its acceptance of a declaration of compliance if it determines any of the following: (1) A UAS with remote identification listed under an FAA-accepted declaration of compliance does not meet the applicable minimum performance requirements; (2) an FAA-accepted declaration of compliance does not meet any of the relevant requirements of proposed part 89; or (3) the FAA rescinded its acceptance of the means of compliance listed in an FAA-accepted declaration of compliance. If the FAA determines it is in the public interest, prior to rescission, it would be able to provide a reasonable period of time for the person holding the declaration of compliance to remediate the noncompliance. *Petition for reconsideration:* The person who submitted the FAA-accepted declaration of compliance or any person adversely affected by the rescission would be able to petition for reconsideration within 60 days of the rescission. The petition would have to show that the petitioner is an interested party and has been adversely affected by the rescission. The petition would also have to demonstrate one of the following: (1) The petitioner has a significant additional fact not previously presented to the FAA; (2) the Administrator made a material error of fact in the decision to rescind its acceptance; or (3) that the Administrator did not correctly interpret a law, regulation, or precedent.	
Record retention	A person who submits a declaration of compliance that is accepted by the Administrator would have to retain certain specified data for as long as the UAS listed on that declaration of compliance are produced plus an additional 24 calendar months. That person would have to also make certain information available for inspection by the FAA, including: (1) The means of compliance, all documentation, and substantiating data related to the means of compliance used; (2) records of all test results; and (3) any other information necessary to demonstrate compliance with the means of compliance so that the UAS meets the remote identification requirements and the design and production requirements of this part.	89.535
	Definitions and Abbreviations	
Definitions	• Unmanned aircraft system • UAS service supplier. • Visual line of sight. • Amateur-built unmanned aircraft system • Broadcast. • Remote ID USS.	1.1 89.1
Abbreviations	• USS means a UAS service supplier	1.2
	Falsification, Reproduction, Alteration, or Omission	
Falsification, reproduction or alteration	No person would be allowed to make or cause to be made any of the following • Any fraudulent or intentionally false statement in any document related to any acceptance, application, approval, authorization, certificate, declaration, designation, qualification, record, report, request for reconsideration, or similar, submitted under this part. • Any fraudulent or intentionally false statement in any document required to be developed, provided, kept, or used to show compliance with any requirement under this part. • Any reproduction or alteration, for fraudulent purpose, of any document related to any acceptance, application, approval, authorization, certificate, declaration, designation, qualification, record, report, request for reconsideration, or similar, submitted or granted under this part. No person may conceal a material fact in: • Any document related to any acceptance, application, approval, authorization, certificate, declaration, designation, qualification, record, report, request for reconsideration, or similar, submitted under this part. • Any document required to be developed, provided, kept, or used to show compliance with any requirement under this part. The commission of a prohibited act would result in: • Suspension, rescission, or revocation of any acceptance, application, approval, authorization, certificate, declaration, declaration of compliance, designation, document, filing, qualification, means of compliance, record, report, request for reconsideration, or similar instrument issued or granted by the Administrator and held by that person. • A civil penalty.	89.5

D. Summary of Costs and Benefits

This proposed rule would provide remote identification of UAS in the airspace of the United States to address safety, security, and law enforcement concerns regarding the further integration of these aircraft into the airspace of the United States while also enabling greater operational capabilities. This proposal would promote public safety and the safety and efficiency of the airspace of the United States. The remote identification framework would provide UAS-specific data, which may be used in tandem with new technologies and infrastructure to facilitate more advanced operational capabilities (such as detect-and-avoid and aircraft-to-aircraft communications that support beyond visual line of sight operations) and to develop the necessary elements for comprehensive UAS traffic management (UTM). Furthermore, remote identification of UAS provides airspace awareness to the FAA, national security agencies, and law enforcement entities. This information could be used to distinguish compliant airspace users from those potentially posing a safety or security risk fulfilling a key requirement for law enforcement and national security agencies charged with protecting public safety.

This proposed rule would result in additional costs for persons responsible for the production of UAS, owners and operators of registered unmanned aircraft, community based organizations, Remote ID USS, and the FAA. This proposal would provide cost savings for the FAA and law enforcement resulting from a reduction in hours and associated costs expended investigating UAS incidents.[7] Additionally, part 107 allows individuals to request waivers from certain provisions, including those prohibiting operations at night and over people. This proposed rule, in concert with the FAA's proposed rule for operations over people would create cost savings for the FAA and part 107 operators by avoiding the time expended processing waivers for these activities.[8]

The analysis of this proposed rule is based on the fleet forecast for small unmanned aircraft as published in the FAA Aerospace Forecast.[9] The forecast includes base, low, and high scenarios. This analysis provides a range of net impacts from low to high based on these forecast scenarios. The FAA considers the primary estimate of net impacts of the proposed rule to be the base scenario. For the primary estimate, over a 10-year period of analysis this proposed rule would result in net present value costs of about $582 million at a three percent discount rate with annualized net costs of about $68 million. At a seven percent discount rate, the net present value costs are about $474 million with annualized net costs of $67 million. The following table presents a summary of the primary estimates of the quantified costs and cost savings of this proposed rule. Additional details, including low and high estimates of quantified net costs, are provided in the Regulatory Evaluation section of this proposal and in the Preliminary Regulatory Impact Analysis available in the docket for this rulemaking.

TABLE 2—PRELIMINARY ESTIMATES OF COSTS AND COST SAVINGS OF PROPOSED RULE ($MILLIONS) * BASE SCENARIO—PRIMARY ESTIMATE

Affected entity/category	10-year present value (at 3%)	Annualized (at 3%)	10-year present value (at 7%)	Annualized (at 7%)
UAS Owners/Operators	$145.87	$17.10	$117.48	$16.73
Remote ID USS Subscription	241.72	28.34	191.74	27.30
UAS Producers (US and Foreign)	134.58	15.78	111.58	15.89
Developers of Remote ID Means of Compliance	2.85	0.33	2.36	0.34
Remote ID USS Memoranda of Agreement	1.60	0.19	1.43	0.20
Community Based Organizations	0.39	0.05	0.35	0.05
FAA Costs	56.96	6.68	50.33	7.17
Total Costs	583.98	68.46	475.27	67.67
Cost Savings (reduced hours for FAA investigations)	(2.45)	(0.29)	(1.82)	(0.26)
Net Costs	581.52	68.17	473.46	67.41

* **Table notes:** Column totals may not sum due to rounding and parenthesis, "( )", around numbers to indicate savings.

The FAA expects this proposed rule will result in several important benefits and enhancements to support the safe integration of expanded UAS operations in the airspace of the United States. The proposal would provide situational awareness of UAS operations to other aircraft and airport operators. The proposed rule would provide information to distinguish compliant UAS users from those potentially posing a safety or security risk. The following table summarizes the benefits of the proposed rule.

TABLE 3—SUMMARY OF BENEFITS OF PROPOSED RULE

Safety and Security	• Provides situational awareness of UAS flying in the airspace of the United States to other aircraft in the vicinity of those operations and airport operators.

[7] This analysis includes quantified savings to the FAA only. A variety of other entities involved with airport operations, facility and infrastructure security, and law enforcement would also save time and resources involved with UAS identification and incident reporting, response and investigation. The FAA plans to update its estimates of savings for additional information and data identified during the comment period and development of the final rule.

[8] On February 13, 2019, the FAA published a notice of proposed rulemaking titled "Operation of Small Unmanned Aircraft Systems over People," (84 FR 3856) in which the FAA proposed to allow operations of small unmanned aircraft over people in certain conditions and operations of small UAS at night without obtaining a waiver.

[9] FAA Aerospace Forecast Fiscal Years 2019–2039, *available at https://www.faa.gov/data_research/aviation/aerospace_forecasts/media/FY2019–39_FAA_Aerospace_Forecast.pdf.* The forecast provides a base (*i.e.,* likely) with high (or optimistic) and low (or pessimistic) scenarios. The low and high forecast scenarios are not symmetric around the base—please see the forecast report for more information.

TABLE 3—SUMMARY OF BENEFITS OF PROPOSED RULE—Continued

Enables Expanded Operations and UAS Integration.	• Provides information to distinguish compliant UAS users from those potentially posing a safety or security risk. • Enables the FAA, national security agencies, and law enforcement entities to obtain situational awareness of UAS in the airspace of the United States in near real-time. • Provides additional registration and notification requirements for identifying aircraft and promoting accountability and the safe and efficient use of the airspace of the United States. • Assists in the implementation of operations of small UAS over people and at night. A final rule for operation of small UAS over people and at night is contingent upon a final action for UAS with remote identification being in effect. • Provides UAS-specific data to facilitate future, more advanced operational capabilities, such as detect-and-avoid and aircraft-to-aircraft communications that support beyond visual line of sight (BVLOS) operations. • Provides UAS-specific data to develop a comprehensive UAS traffic management (UTM) system that would facilitate the safe expansion of operations.

In addition, the proposed rule provides flexibility through minimum performance requirements that would accommodate future innovation and improve the efficiency of UAS operations. The proposal also does not preclude early compliance for UAS producers or operators to realize earlier expanded operations and commercial opportunities.

E. Structure of This Proposed Rule

This proposed rule addresses remote identification of UAS from a number of perspectives: UAS owners, UAS operators, UAS designers and producers, developers of remote identification means of compliance, and Remote ID USS. The FAA recognizes that certain persons may only be interested in certain topics. Therefore, the following provides the structure of this proposed rule.

Section II of this preamble discusses the FAA's legal authority for promulgating this proposed rule.

Section III of this preamble discusses the integration of UAS into the airspace of the United States. The complexities surrounding the full integration of UAS into the airspace of the United States has led the FAA to engage in a phased, incremental, and risk-based approach to rulemaking based on the statutory authorities delegated to the agency.

Section IV of this preamble discusses the need for remote identification of UAS operating in the airspace of the United States. The section addresses the role of the FAA as the United States civil aviation authority and air navigation service provider, current registration requirements and how those requirements do not provide information responsive to remote identification, current cooperative surveillance for manned aircraft, and the need for situational awareness. The section further explains how remote identification of UAS fits within the FAA's compliance and enforcement programs. The section describes how the FAA envisions remote identification may facilitate beyond visual line of sight (BVLOS) operations in the future. The potential benefits of remote identification of UAS to national security and law enforcement agencies are noted.

Section V of this preamble discusses related international activities.

Section VI of this preamble provides a summary of the Unmanned Aircraft Systems (UAS) Identification (ID) and Tracking Aviation Rulemaking Committee (ARC) (UAS–ID ARC) report and the FAA's response to that report.

Section VII of this preamble discusses the new terms to be defined as part of this proposed rule.

Section VIII of this preamble describes the applicability of the proposed rule. It also discusses the framework of the following sections: Operating requirements for UAS with remote identification, means of compliance, and design and production requirements.

Section IX of this preamble discusses the current registration requirements for unmanned aircraft under part 47 and part 48 and the issues with the current registration requirements in light of the need for remote identification of UAS. The section also discusses the FAA's proposed revision of the registration requirements of part 48 to require the individual registration of unmanned aircraft and the proposed use of unmanned aircraft serial numbers as unique identifiers for remote identification purposes.

Section X of this preamble explains the operating requirements related to remote identification of UAS. It describes the requirements for standard remote identification UAS and limited remote identification UAS. It also discusses the proposed requirements for UAS without remote identification. The section provides the proposed requirements to transmit and broadcast, as appropriate, message elements. It discusses the FAA's proposal to prohibit the use of ADS–B Out to satisfy remote identification of UAS. Finally, it discusses UAS operators' requirement to operate a UAS with remote identification only if that UAS is listed on a valid FAA-accepted declaration of compliance.

Section XI of this preamble discusses law enforcement access to remote identification information.

Section XII of this preamble discusses the FAA's proposed requirements for what an FAA-accepted means of compliance for remote identification would contain. The FAA is proposing that any FAA-accepted means of compliance contain requirements regarding the message elements to be transmitted and the minimum performance requirements for the transmission and broadcast, as appropriate, of those elements. The section discusses the process to submit and have the FAA accept a means of compliance, and data retention requirements for submitters of means of compliance. The section also discusses other requirements the FAA considered in the development of this proposed rule.

Section XIII of this preamble provides the proposed design and production requirements. It discusses the proposed requirement that producers of standard remote identification UAS and limited remote identification UAS issue serial numbers for UAS and that persons producing UAS with remote identification would be required to do so in accordance with the minimum performance requirements of the proposed rule using an FAA-accepted means of compliance. The section also describes the requirement for producers to submit a declaration of compliance, followed by a description of the process for FAA acceptance of declarations of compliance, rescission of those declarations, and the right of a person who submitted the FAA-accepted declaration of compliance or any person adversely affected by the rescission of the Administrator's acceptance of a declaration of compliance to petition for reconsideration of a rescission. Finally, the section discusses data retention requirements for producers submitting FAA-accepted declarations of compliance.

Section XIV of this preamble discusses the role of Remote ID USS. The section describes the FAA's vision regarding the role of Remote ID USS in

providing remote identification services as well as how they will be established and what data provided to them will be publicly available. The section also describes the FAA's vision for data privacy and information security.

Section XV of this preamble provides the overarching requirements for FAA-recognized identification areas to be used by UAS that cannot, or do not, comply with the proposed remote identification requirements.

Section XVI of this preamble discusses the circumstances under which the use of ADS–B Out and transponders for UAS would be prohibited.

Section XVII of this preamble provides the proposed effective dates and compliance dates.

Section XVIII of this preamble discusses the proposed guidance documents.

Sections XIX and XX of this preamble address the FAA's requirements to comply with various statutes and Executive Orders pertaining to all regulations.

Section XXI of this preamble discusses the tribal considerations related to this proposed rule.

Section XXII of this preamble discusses the privacy impact analysis the FAA conducted as part of this proposed rule.

Section XXIII of this preamble provides additional information to persons wishing to provide comments to this proposed rule.

II. Authority for This Rulemaking

The FAA's authority to issue rules on aviation safety is found in Title 49 of the United States Code (49 U.S.C.). Subtitle I, section 106 describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the Agency's authority.

This rulemaking is promulgated pursuant to 49 U.S.C. 40103(b)(1) and (2), which direct the FAA to issue regulations: (1) To ensure the safety of aircraft and the efficient use of airspace; and (2) to govern the flight of aircraft for purposes of navigating, protecting and identifying aircraft, and protecting individuals and property on the ground. In addition, 49 U.S.C. 44701(a)(5) charges the FAA with promoting safe flight of civil aircraft by prescribing regulations the FAA finds necessary for safety in air commerce and national security.

Section 2202 of Public Law 114–190 requires the Administrator to convene industry stakeholders to facilitate the development of consensus standards for remotely identifying operators and owners of UAS and associated unmanned aircraft and to issue regulations or guidance based on any standards developed.

The Administrator is granted the authority under 49 U.S.C. 44805 to establish a process for, among other things, accepting risk-based consensus safety standards related to the design and production of small UAS. Under 49 U.S.C. 44805(b)(7), one of the considerations the Administrator must take into account prior to accepting such standards is any consensus identification standard regarding remote identification of unmanned aircraft developed pursuant to section 2202 of Public Law 114–190.

Additionally, section 44809(f) of 49 U.S.C. provides that the Administrator is not prohibited from promulgating rules generally applicable to unmanned aircraft, including those unmanned aircraft eligible for the exception for limited recreational operations of unmanned aircraft. Among other things, this authority extends to rules relating to the registration and marking of unmanned aircraft and the standards for remotely identifying owners and operators of UAS and associated unmanned aircraft.

The FAA has authority to regulate registration of aircraft under 49 U.S.C. 44101–44106 and 44110–44113, which require aircraft to be registered as a condition of operation and establish the requirements for registration and registration processes.

Finally, this rulemaking is promulgated under the authority described in 49 U.S.C. 106(f), which establishes the authority of the Administrator to promulgate regulations and rules, and 49 U.S.C. 40101(d), which authorizes the FAA to consider in the public interest, among other things, the enhancement of safety and security as the highest priorities in air commerce, the regulation of civil and military operations in the interest of safety and efficiency, and assistance to law enforcement agencies in the enforcement of laws related to regulation of controlled substances, to the extent consistent with aviation safety.

III. Integration of UAS Into the Airspace of the United States

The rapid proliferation of UAS has created significant opportunities and challenges for their integration into the airspace of the United States. The relatively low cost of highly capable UAS technology has allowed for hundreds of thousands of new operators to enter the aviation community.

The complexities surrounding the full integration of UAS into the airspace of the United States have led the FAA to engage in a phased, incremental, and risk-based approach to rulemaking based on the statutory authorities delegated to the agency. On December 16, 2015, the FAA and DOT jointly published an interim final rule in the **Federal Register** titled Registration and Marking Requirements for Small Unmanned Aircraft (''Registration Rule''),[10] which provided for a web-based aircraft registration process for small unmanned aircraft in 14 CFR part 48, to serve as an alternative to the registration requirements for aircraft established in 14 CFR part 47. The Registration Rule imposed marking requirements on small unmanned aircraft registered under part 48 to display a unique identifier in a manner that is visible upon inspection. This unique identifier could be the registration number issued to an individual or to the aircraft by the FAA Registry or the small unmanned aircraft's serial number if authorized by the Administrator and provided with the application for the certificate of aircraft registration.

On June 28, 2016, the FAA and DOT jointly published the final rule for Operation and Certification of Small Unmanned Aircraft Systems (''The 2016 Rule'') in the **Federal Register**.[11] This was an important step towards the integration of civil small UAS operations (for aircraft weighing less than 55 pounds) into the airspace of the United States. The 2016 Rule set the initial operational structure and certain restrictions to allow routine civil operations of small UAS in the airspace of the United States in a safe manner. Prior to the 2016 Rule, the FAA authorized commercial UAS operations, including real estate photography, precision agriculture, and infrastructure inspection, under section 333 of Public Law 112–95. Over 5,500 operators received this authorization. The FAA also issued over 900 Certificates of Waiver or Authorization (COA), allowing Federal, State, and local governments, law enforcement agencies, and public universities to perform numerous tasks with UAS, including search-and-rescue, border patrol, and research. The 2016 Rule allows for certain operations of small UAS in the airspace of the United States without the need for airworthiness certification, exemptions, or certificates of waiver or authorization.

[10] 80 FR 78594.

[11] 81 FR 42064.

The 2016 Rule also imposed certain restrictions on small UAS operations. The restrictions include a prohibition on nighttime operations, limitations on operations conducted during civil twilight, restrictions on operations over people, a requirement for all operations to be conducted within visual line of sight, and other operational, airspace, and pilot certification requirements. Since the rule took effect on August 29, 2016, most low-risk small UAS operations that were previously authorized on a case-by-case basis under Public Law 112–95 section 333 are now considered routine operations. These operations are now permitted within the requirements of part 107 without further interaction with the FAA. Publishing Part 107 was the first significant regulatory step to enable lower risk, less complex UAS operations.

Part 107 opened the airspace of the United States to the vast majority of routine small UAS operations, allowing flight within visual line of sight while maintaining flexibility to accommodate future technological innovations. Part 107 allows individuals to request waivers from certain provisions, including those prohibiting operations over people and beyond visual line of sight. Petitions for waivers from the provisions of part 107 must demonstrate that the petitioner has provided sufficient mitigations to safely conduct the requested operation.

On October 5, 2018, Congress enacted Public Law 115–254, also known as the FAA Reauthorization Act of 2018. The FAA Reauthorization Act of 2018 amended Part A of subtitle VII of title 49, United States Code by inserting a new chapter 448 titled Unmanned Aircraft Systems and incorporating additional authorities and mandates to support the further integration of UAS into the airspace of the United States, including several provisions that specifically deal with the need for remote identification of UAS. Section 376 of the FAA Reauthorization Act of 2018 requires the FAA to perform testing of remote identification technology and to assess the use of remote identification for the development of UTM.

Additionally, congressional action supports the implementation of remote identification requirements for most UAS. Section 349 of the FAA Reauthorization Act of 2018 included a provision indicating that the Administrator is not prohibited from promulgating rules relating to the standards for remotely identifying owners and operators of UAS and associated unmanned aircraft.[12] The provision denotes Congress's acknowledgment that remote identification is an essential part of the UAS regulatory framework. Section 349 also does not prohibit the Administrator from promulgating rules generally applicable to unmanned aircraft related to updates to the operational parameters for unmanned aircraft used for limited recreational operations, the registration and marking of unmanned aircraft, and other standards consistent with maintaining the safety and security of the airspace of the United States.[13]

Lastly, on February 13, 2019, the FAA published three rulemaking documents in the **Federal Register** as part of the next phase for integrating small UAS into the airspace of the United States. The first of such documents was an interim final rule titled ''External Marking Requirement for Small Unmanned Aircraft,'' [14] in which the FAA required small unmanned aircraft owners to display the registration number assigned by the FAA on an external surface of the aircraft. The second rulemaking document was a notice of proposed rulemaking titled ''Operation of Small Unmanned Aircraft Systems Over People,'' [15] in which the FAA proposed to allow operations of small unmanned aircraft over people in certain conditions and operations of small UAS at night without obtaining a waiver. The third rulemaking document was an advance notice of proposed rulemaking titled ''Safe and Secure Operations of Small Unmanned Aircraft Systems,'' [16] in which the FAA sought information from the public on whether and under which circumstances the FAA should promulgate new rules to require stand-off distances, additional operating and performance restrictions, the use of UAS Traffic Management (UTM), additional payload restrictions, and whether the agency should prescribe design requirements and require that unmanned aircraft be equipped with critical safety systems.

IV. Need for Remote Identification of UAS Operating in the Airspace of the United States

A. Maintaining the Safety and Efficiency of the Airspace of the United States

The FAA is both the civil aviation authority and the air navigation service provider (ANSP) for the United States. The FAA has statutory responsibilities to set standards and certify aircraft, airmen, and facilities. In addition, the FAA is responsible for ensuring the safe and efficient use of navigable airspace. The FAA carries out its responsibilities by developing air traffic rules, assigning the use of airspace, and controlling air traffic through a complex network of airport towers, air route traffic control centers, and flight service stations.

The FAA is responsible for serving tens of thousands of commercial and private aircraft operating in 29 million square miles of airspace each day. Through its air traffic management (ATM) system, the FAA coordinates the movements of these aircraft to ensure they operate at safe distances from each other and manages disruptions to normal air traffic flow. The FAA's ability to manage air traffic in the airspace of the United States is predicated on the agency knowing who is operating in the airspace and, if necessary, on being able to communicate with those airspace users.

1. Existing Cooperative Surveillance System

The ATM system relies on appropriately equipped aircraft to provide the surveillance services necessary to ensure the safety and efficiency of the airspace of the United States. In addition to ground-based equipment such as primary and secondary radar, participating aircraft use ATC transponders and ADS–B Out to participate in the ATM's cooperative surveillance environment. Transponders emit a radio frequency response when they are interrogated by ground-based secondary radar systems. Part of the response is the Mode 3/A code which is a four digit number ranging from 0000 to 7777 that allows ATC to identify aircraft under radar surveillance and correlate the target to a flight plan. Other information provides ATC with the location of the aircraft, which is shown on ATC radar displays. After January 1, 2020, aircraft will be required to equip with ADS–B Out to operate in certain airspace.

Some UAS, such as those operating in Class A airspace, are already equipped with transponders and ADS–B Out and operate in accordance with existing rules. But for the majority of UAS, especially those operating at low altitudes, the existing cooperative surveillance system is not capable of providing the necessary services.

Currently, there is no regulatory requirement mandating the remote identification of unmanned aircraft other than the existing equipment rules in part 91 for transponders that are applicable to aircraft in certain airspace and ADS–B Out, which will be required

[12] See 49 U.S.C. 44809.

[13] Id.

[14] 84 FR 3669.

[15] 84 FR 3856.

[16] 84 FR 3732.

for aircraft in certain airspace after January 1, 2020. Because the majority of UAS operations occur at low altitudes, the existing rules do not adequately provide for awareness of who is operating in the airspace. The FAA is therefore proposing to require the remote identification of UAS to enable the agency to identify unmanned aircraft flying in the airspace of the United States and locate the operators of those aircraft. Remote identification equipment would provide identifying information for UAS similar to how ADS–B and transponders provide identifying information for manned aircraft. This information would also be essential for the management of the flow of air traffic as more UAS integrate into the airspace of the United States.

The FAA does not propose the use of transponders or ADS–B Out for remote identification for three primary reasons. First, the use of these technologies would require significant additional infrastructure, including radars and receivers, to cover the lower altitudes of the airspace of the United States where unmanned aircraft are expected to primarily operate. Second, the FAA expects that, due to the volume of unmanned aircraft operations projected, the additional radio frequency signals would saturate the available spectrum and degrade the overall cooperative surveillance system. Finally, transponders and ADS–B Out do not provide any information about the location of control stations, as these systems were designed for manned aircraft. For these reasons, the FAA has determined that existing cooperative surveillance systems are incapable of supporting UAS remote identification and is proposing a new cooperative surveillance technology specifically for UAS. However, the proposal does not prohibit the use of ADS–B In, if the ADS–B In equipment is manufactured and installed in accordance with FAA requirements and guidance.[17]

2. Current Challenges With Associating UAS With Their Owners and Operators

All manned aircraft, unmanned aircraft weighing over 0.55 pounds, and any unmanned aircraft operated pursuant to 14 CFR part 107 or part 91 (irrespective of weight) are subject to FAA's aircraft registration and marking requirements. These requirements are the fundamental means for the FAA to physically identify manned and unmanned aircraft operating in the airspace of the United States and to associate them with their owners. The FAA recognizes that current registration and marking requirements are most useful when the aircraft is static or when information regarding the aircraft and its owner is needed without a direct link to the aircraft itself. In the case of unmanned aircraft in flight, however, registration and marking alone are insufficient to identify the aircraft and to locate the person manipulating the flight controls of a UAS. This is due to both the small size of most unmanned aircraft and to the fact that the person manipulating the flight controls of the UAS is not co-located with the aircraft. The Registration Rule acknowledged that the registration of small unmanned aircraft would provide a means by which to quickly identify the aircraft in the event of an incident or accident involving a small UAS. The Registration Rule also acknowledged that registration of small unmanned aircraft would provide an immediate and direct opportunity for the FAA to educate small UAS owners on safety requirements before they begin operating. The Registration Rule did not, however, envision the use of registration numbers as a means to identify or locate the small UAS owner or the person manipulating the flight controls of the UAS during real-time flight operations.

The small size of most unmanned aircraft makes it difficult—if not impossible—to read their registration numbers from the ground, preventing proper identification of the unmanned aircraft while it is in flight. Although it is true that manned aviation faces similar identification issues (since aircraft registration marks may be impossible to read from the ground when the aircraft is flying at certain altitudes or speeds), there is an important distinction between manned and unmanned aviation that makes the inability to read a registration number from the ground less problematic in manned aviation. In manned aviation, the pilot-in-command is co-located with the aircraft and is therefore more easily identifiable, even if such identification occurs after landing.

In addition, pilots of manned aircraft are often required to, or choose to, maintain two-way communications with air traffic control (ATC) for purposes of receiving air traffic services. This communication helps ascertain the identity and intent of the pilot in command. Furthermore, transponders and ADS–B Out systems transmit unique codes that allow ATC to identify and distinguish aircraft from others flying in the airspace of the United States, as discussed in the preceding section. These means of identification are not currently required or feasible for UAS. The challenge of identifying UAS would only increase with the proliferation of BVLOS operations—when pilots will likely be located far away from the unmanned aircraft location.

3. Situational Awareness

The ability to know the location of unmanned aircraft operating in the airspace of the United States and to identify and locate their operators creates situational awareness of operations conducted in the airspace of the United States, fosters accountability of the operators and owners of UAS, and improves the capabilities of the FAA and law enforcement to investigate and mitigate careless, hazardous, and noncompliant operations. This contributes to safety in air commerce and the efficient use of the airspace of the United States.

Remote identification would provide greater situational awareness of UAS operating in the airspace of the United States to other aircraft in the vicinity of those operations and also provide information to airport operators. Manned aircraft, especially those operating at low altitudes where UAS operations are anticipated to be the most prevalent, such as helicopters and agricultural aircraft, could carry the necessary equipment to display the location of UAS operating nearby. Facility operators could use remote identification information to know about UAS operating near an airport, airfield, or heliport, regardless of the airspace in which the facility is located. This would provide a level of awareness that is currently unavailable for those facilities and the aircraft operating nearby. For example, an aircraft preparing to take off from an airport in Class G airspace may have access to greater information (*e.g.,* number and location of UAS, types of operations conducted in the airspace, etc.) than currently available.

4. Compliance and Enforcement

The safety of the airspace of the United States largely depends on aircraft operators following the prescribed rules and being accountable for their actions. The FAA needs the ability to identify aircraft and their owners to ensure adequate oversight of the operations (*e.g.,* facilitate the identification of noncompliant or unauthorized operations). When unsafe operations are discovered, the FAA is required to adequately address safety issues that may adversely affect the airspace of the United States as well as people and property on the ground. To accomplish this, the FAA needs a means

[17] See Advisory Circulars 20–172B and 90–114A.

to locate UAS operators—in near real-time, if necessary—to take immediate or subsequent action to mitigate safety issues or security threats. Thus, the FAA believes that the remote identification requirements in this proposed rule are necessary to ensure the safety of the airspace of the United States.

If an operator is unwilling or unable to comply with, or is deliberately flouting regulations, the FAA could employ legal enforcement action, including civil penalties and certificate actions, as appropriate, to address violations and help deter future violations. Civil penalties for violations of the federal aviation regulations range from a maximum per violation penalty of $1,466, for individual operators, to $33,333 for large companies. In addition, Congress granted the FAA authority to assess civil penalties of up to $20,000 against an individual who operates a UAS and in so doing knowingly or recklessly interferes with a law enforcement, emergency response, or wildfire suppression activity. The FAA may take enforcement action against anyone who conducts an unauthorized UAS operation or operates a UAS in a way that endangers the safety of the airspace of the United States. This authority is designed to protect users of the airspace as well as people and property on the ground.

B. Unmanned Aircraft Systems Traffic Management (UTM)

The FAA, in an effort to further integrate UAS into the airspace of the United States, is collaborating with other government agencies and industry stakeholders to develop unmanned aircraft systems traffic management (UTM) separate from, but complementary to, the ATM system. The term ''UTM'' refers to a set of third-party services and an all-encompassing framework for managing multiple UAS operations. This vision for UTM includes services for flight planning, communications, separation, and weather, among others. The FAA believes that remote identification facilitates the long-term implementation of UTM by providing greater awareness of all aircraft, including unmanned aircraft, operating in a particular area. UTM would help enable increased UAS operations in both controlled and uncontrolled airspace, including airspace where no air traffic separation services are currently provided.

The vision for UTM[18] relies on third parties' ability to supply services, under FAA's regulatory authority, where such services do not currently exist. The FAA envisions community-based traffic management, where UAS operators have the responsibility for the coordination, execution, and management of a safe operating environment. UTM would be designed to support the demand and expectations for a broad spectrum of UAS operations with ever-increasing complexity and risk.

The concept of UTM is predicated on layers of information sharing and exchange, from operator to operator, aircraft to aircraft, and operator to the FAA, to achieve safe operations. Operators would share their flight intent with each other and coordinate to de-conflict and safely separate trajectories. Remote identification is a crucial first step in the development of these UTM services.

C. Facilitating Beyond Visual Line of Sight Operations

Providing a means to conduct routine BVLOS operations is a critical step in the integration of UAS operations in the airspace of the United States. The technologies and procedures necessary to enable BVLOS operations have been the focus of past and current research by the FAA and others.[19] The research indicated that for UAS to conduct safe, routine BVLOS operation, UAS should be able to detect both cooperative and non-cooperative aircraft (manned and unmanned) so they can maintain a safe distance from those aircraft. Cooperative aircraft are those that are providing information that identifies the location of the aircraft, typically through a standardized and receivable electronic radio frequency broadcast or other type of transmission. Non-cooperative aircraft are those that are not providing any information regarding their location.

A UAS that broadcasts or transmits remote identification information would contribute to a cooperative operating environment. Operators of UAS could use remote identification information available from a Remote ID USS or broadcast directly from other unmanned aircraft to know the location of UAS operating nearby. Such data could be used in UAS detect-and-avoid and aircraft-to-aircraft communication systems to aid in unmanned aircraft collision avoidance. Under UTM, when the locations of other unmanned aircraft become known, the UAS operators would be able to maintain a safe distance from those aircraft.

Although remote identification of UAS does not, in and of itself, permit BVLOS operations, it is a key stepping stone to the future ability to conduct those operations. Without remote identification of UAS, BVLOS operations on a large scale are not feasible, and the foundational building blocks of UTM—which is necessary to enable routine BVLOS operations—are not established.

D. National Security and Law Enforcement Efforts

This proposed rule would serve the public interest by assisting government efforts to address illegal activity and protect national security. The safety and security benefits described in this section are consistent with the FAA's responsibilities to assist law enforcement agencies in their efforts to enforce laws related to regulation of controlled substances, to the extent consistent with aviation safety,[20] and to prescribe regulations necessary for safety in air commerce and national security.[21]

Federal, State, and local law enforcement and national security agencies have expressed their desire for new regulations to reduce and address the security threats associated with illegal or threatening UAS operations as well as the ability to discriminate between compliant and non-compliant operations. The FAA recognizes the increasing availability and potential use of UAS for illegal activities such as the carrying and smuggling of controlled substances, illicit drugs, and other dangerous or hazardous payloads; the unlawful invasion of privacy; illegal surveillance and reconnaissance; the weaponization of UAS; sabotaging of critical infrastructure; property theft; disruption; and harassment. The misuse of UAS for these purposes presents a direct threat to public safety. Such misuse also presents a hazard to safety in air commerce. Such risks are multiplied with the increasing sophistication of technology, the availability of UAS equipment, and the proliferation of UAS operations across the airspace of the United States.

Unmanned aircraft operators who know they cannot easily be identified are more likely to engage in careless, reckless, or dangerous behavior because they believe they will not be caught. These operators could engage in evasive maneuvering to avoid pursuit, violate airspace restrictions, engage in unauthorized night or BVLOS operations, fly too close to other aircraft,

[18] *https://utm.arc.nasa.gov/docs/2018-UTM-ConOps-v1.0.pdf*

[19] *https://www.faa.gov/uas/programs_partnerships/integration_pilot_program/; https://www.faa.gov/uas/programs_partnerships/completed/; http://www.assureuas.org/projects/detectandavoid.php*

[20] 49 U.S.C. 40101(d).

[21] 49 U.S.C. 44701(a)(5).

or operate in weather conditions beyond the capability of the unmanned aircraft or the person flying it. Such behavior could create severe safety hazards not only to other manned and unmanned aircraft in the surrounding airspace, but also to persons and property on the ground.

Additionally, UAS operators that do not comply with applicable law create a unique security challenge. On average, six sightings of UAS allegedly conducting unauthorized operations are reported to the FAA each day. Additionally, based on information provided by other U.S. Government agencies, there may be many additional UAS sightings involving unauthorized or illegal operations not reported to the FAA. Although collisions with aircraft are rare, there have been two confirmed unmanned aircraft collisions with manned aircraft: an Army Blackhawk helicopter in New York City in September 2017, and a small twin-engine passenger aircraft approaching Quebec City's Jean Lesage International Airport in October 2017. In all of these circumstances, remote identification could have enabled immediate identification of the UAS and enabled law enforcement to find the location of the control station for near real-time response and investigation.

Owners of critical infrastructure, airports, and venues for mass gatherings have expressed concern over the security of their facilities after sightings of UAS of unknown identity and intent. Many sightings are at night, when it may be more difficult to see and identify the unmanned aircraft or find the operator. Owners and facility managers of sports stadiums and other open-air venues are particularly concerned, given the concentration of people present during an event. Malicious UAS activities designed to disrupt and gain media attention are a distinct threat with the potential to inflict delays, fear, injuries, and significant economic losses across a variety of critical infrastructure sectors, including airports, public facilities, and energy production infrastructure.

On April 11, 2019, numerous spectators visually spotted a UAS operating during a Major League Baseball game.[22] Although law enforcement were able to eventually identify the operator within 24 hours due to a municipally-owned detection system, remote identification would likely have allowed them to find the operator and control station much more quickly and address the issue in real time. After law enforcement confiscated the UAS involved in the April 2019 incident and were able to review its flight log, they learned that the operator had flown over a previous World Series game at the same stadium—violating an FAA Temporary Flight Restriction and numerous safety regulations.

A UAS that was not approved to operate over people was used to drop pamphlets over large crowds outside a concert venue and a university event in May, 2019, in Sacramento, California.[23] This event was similar to two incidents in 2017 when a UAS was used to drop leaflets at two California National Football League games.[24] Although security and law enforcement personnel at the stadium used rudimentary tactics to eventually identify the accused operator, the lack of remote identification made real-time location of the operator impossible.[25] Security professionals have raised concerns that unmanned aircraft that have not been determined to be safe to fly over a large gathering of people may pose a safety hazard, and a UAS dropping objects could potentially pose a greater threat by releasing hazardous substances or creating a stampede of frightened spectators fleeing the area. Although social media postings helped identify the operator in some cases, such information rarely helps law enforcement officers address a potential threat in real time.

Multiple pilot reports of a UAS approximately 10 miles away from Newark Airport led to a disruption in arrivals in January 2019 that impacted other airports on the East Coast for several hours.[26] The more than 30-hour disruption of flights at London's Gatwick Airport in December 2018,[27] as well as brief disruptions at airports in Dubai,[28] Dublin,[29] and Frankfurt [30] within the last year, further demonstrate the potential for significant operational and financial impact from the presence of an unauthorized UAS in and around an airport. UAS operators have not been identified in any of these airport events. Remote identification of UAS would potentially prevent disruptions such as these by enabling real time action by the FAA, airport facilities, and law enforcement.

Remote identification would also aid in preventing terrorist attacks. Recent reports in the news including the Islamic State of Iraq and Ash-Sham's modifications of commercial UAS,[31] the assassination attempt of Nicolás Maduro in Venezuela,[32] a foiled plot in the United Kingdom to fly an unmanned aircraft into an airliner,[33] and a bomb-laden unmanned aircraft flown by Huthi forces and detonated over a military parade in Yemen [34] illustrate the ways in which UAS may be used to threaten life, critical infrastructure, and national security. Remote identification of UAS would enable national security agencies and law enforcement to quickly identify potential threats and act to prevent such incidents.

The use of UAS to smuggle contraband into correctional facilities is also increasingly common.[35] Even inexpensive consumer-grade UAS models have sufficient payload and technical capabilities to carry illicit and dangerous items over prison walls. Recent efforts by law enforcement, for example, have included the investigation and prosecution of an individual who illegally operated a consumer-grade UAS with the intent to deliver contraband (marijuana) into a

[22] *https://www.usatoday.com/story/sports/mlb/redsox/2019/04/13/drone-fenway-park-juvenile/3457190002/.* Accessed June 11, 2019.

[23] *https://www.newsweek.com/drone-used-drop-nazi-leaflets-ariana-grande-concert-sacramento-bites-bridge-1414933.* Accessed June 11, 2019.

[24] *https://www.justice.gov/usao-ndca/pr/sacramento-area-resident-charged-flying-drone-over-nfl-games-violation-national-defense.* Accessed June 10, 2019.

[25] Id.

[26] *https://www.washingtonpost.com/transportation/2019/01/22/drone-activity-halts-air-traffic-newark-liberty-international-airport/?noredirect=on&utm_term=.c0e920a9e756.* Accessed June 11, 2019.

[27] *https://www.theguardian.com/uk-news/2018/dec/21/gatwick-airport-reopens-limited-number-of-flights-drone-disruption.* Accessed June 11, 2019.

[28] *http://www.digitaljournal.com/tech-and-science/technology/q-a-recent-airport-shutdowns-need-drone-interdiction-technology/article/543680.* Accessed June 11, 2019.

[29] *https://dronelife.com/2019/02/22/flights-were-grounded-at-dublin-airport-after-another-drone-sighting/.* Accessed June 11, 2019.

[30] *https://www.ecnmag.com/news/2019/03/drone-sightings-interrupt-germanys-frankfurt-airport.* Accessed June 10, 2019.

[31] *https://ctc.usma.edu/app/uploads/2018/07/Islamic-State-and-Drones-Release-Version.pdf.* Accessed June 11, 2019.

[32] *https://www.bbc.com/news/world-latin-america-45073385.* Accessed June 9, 2019.

[33] *https://www.dailystar.co.uk/news/latest-news/724185/Terror-drone-plot-Britain-UK-spies-foil.* Accessed June 11, 2019.

[34] *https://www.reuters.com/article/us-yemen-security/houthi-drones-kill-several-at-yemeni-military-parade-idUSKCN1P40N9.* Accessed June 11, 2019.

[35] *https://www.washingtonpost.com/local/prisons-try-to-stop-drones-from-delivering-drugs-porn-and-cellphones-to-inmates/2016/10/12/645fb102–800c-11e6–8d0c-fb6c00c90481_story.html?utm_term=.22b0427db4d0.* Accessed June 11, 2019.

Georgia state prison. The prosecution ultimately resulted in a guilty plea in the Middle District of Georgia to a charge of operating an aircraft eligible for registration knowing that the aircraft is not registered to facilitate a controlled substance offense. The defendant received a sentence of 48 months in prison.[36] Remote identification will assist law enforcement in their efforts to find and stop operators who attempt to engage in similar conduct.

Four Federal departments [37] have the authority to deploy counter-UAS systems to detect and mitigate credible threats posed by UAS.[38] Remote identification of UAS would provide these departments with increased awareness of UAS operations conducted across certain geographical areas of interest. That information would aid the determination of whether UAS represent a threat that must be met with counter-UAS capabilities. In particular, remote identification would provide these departments with crucial information about the owner of the UAS, and the control station's location in near real-time, supplementing and enriching information obtained via UAS detection capabilities. The FAA believes that the ability to identify the owner and the location of the control station would help these Federal agencies to more accurately assess risk and take action commensurate with that risk.

In addition, certain public safety activities have been hampered by the inability to identify UAS and their locations. While there are numerous examples, in one case, a UAS interfered with a police helicopter assisting with a cliff rescue; [39] in another case, a UAS interfered with a police helicopter assisting a fire response.[40] In 2017, a helicopter performing security for the United Nations General Assembly struck an unmanned aircraft, causing more than $100,000 worth of damage to the helicopter.[41] Remote identification would enable the FAA, first responders, and law enforcement officers to more easily determine who is operating in the airspace, providing important information to help determine appropriate responses to ensure the safety and security of the airspace of the United States and the people on the ground.

Although Federal, State, and local law enforcement agencies are responsible for the investigation and prosecution of illegal activities, the FAA retains the regulatory and civil enforcement authority and oversight over aviation activities that create hazards and pose threats to the safety of flight in air commerce. Both safety and security enforcement are extremely difficult absent a remote identification requirement that enables the prompt and accurate identification of UAS and operators.

V. Related International Activities

The International Civil Aviation Organization (ICAO) does not prescribe any remote identification equipage for UAS. However, as of the date of publication of this proposed rule, ICAO advisory groups are developing material addressing UTM and UAS operations under instrument flight rules (IFR). The European Union, the Direction Générale de l'Aviation Civile (France Civil Aviation Authority), and the Civil Aviation Administration Denmark (Denmark Civil Aviation Authority) have also proposed various actions and advisory group activity for remote identification.

With the exception of Italy and Qatar, no individual ICAO-member Civil Aviation Authority has remote identification requirements for UAS. The Italian Civil Aviation Authority requires aircraft with a maximum takeoff weight of more than 55 pounds (25kg) to have certain equipage that transmits flight parameters and owner/operator data. Aircraft compliant with these requirements must also meet data storage standards. The Qatar Civil Aviation Authority requires that certain UAS operations be conducted with prescribed geo-fencing and electronic identification systems.

In May 2017, the European Commission published a notice of proposed amendment which included proposed rules for remote identification. That proposed amendment would require UAS to broadcast a unique physical serial number of the unmanned aircraft compliant with standard ANSI/CTA–2063, the geographical position of the unmanned aircraft and its height above the takeoff point, the direction and speed of the unmanned aircraft, and the geographical position of the unmanned aircraft takeoff point. During the first half of 2019, the European Commission finalized and adopted the following rules for remote identification: (1) The Commission Delegated Regulation (EU) 2019/945 of 12 March 2019 on unmanned aircraft systems and on third-country operators of unmanned aircraft systems, and (2) the Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures for the operation of unmanned aircraft. The regulations address the design and operational requirements for unmanned aircraft and include a requirement for unmanned aircraft to be individually identifiable, but do not impose a European standard for remote identification.

As adopted, the regulations require the local broadcast of information about an unmanned aircraft in operation, including the marking of the unmanned aircraft to demonstrate conformity with the applicable requirements, so that the information may be obtained without physical access to the unmanned aircraft. The remote identification requirements adopted by the European Commission include the following:

(a) Allowing the upload of the UAS operator registration number in accordance with Article 14 of Implementing Regulation (EU) 2019/947 and exclusively following the process provided by the registration system;

(b) Ensuring, in real time during the whole duration of the flight, the direct periodic broadcast from the unmanned aircraft using an open and documented transmission protocol, of the following data, in a way that they can be received directly by existing mobile devices within the broadcasting range:

(1) the UAS operator registration number;

(2) the unique physical serial number of the unmanned aircraft compliant with standard ANSI/CTA–2063;

(3) the geographical position of the unmanned aircraft and its height above the surface or take-off point;

(4) the route course measured clockwise from true north and ground speed of the unmanned aircraft; and

(5) the geographical position of the remote pilot or, if not available, the take-off point.

(c) Ensuring that the user cannot modify the data mentioned under paragraph (b)(2) through (5).

VI. Aviation Rulemaking Committee

On July 15, 2016, Congress passed the FAA Extension, Safety, and Security Act of 2016 (Pub. L. 114–190). Pursuant to section 2202 of that Act, the Administrator and the Secretary were tasked with convening industry stakeholders to facilitate the development of consensus standards for

[36] *https://www.justice.gov/usao-mdga/pr/illegal-drone-operator-sentenced-attempting-drop-drugs-georgia-state-prison.*

[37] Department of Defense, Department of Energy, Department of Homeland Security, and the Department of Justice.

[38] 10 U.S.C. 130i; 50 U.S.C. 2661; 6 U.S.C. 124n.

[39] *https://www.mercurynews.com/2017/01/30/pacifica-drone-operator-arrested-for-interfering-with-helicopter-rescue-mission/.*

[40] *https://www.nbcwashington.com/news/local/College-Park-Man-Arrested-For-Flying-Drone-Near-5-Alarm-Fire-Monday-420369903.html.*

[41] *https://www.reuters.com/article/us-usa-military-drone/u-s-probing-collision-between-civilian-drone-army-helicopter-idUSKBN1CA1Z0.*

remotely identifying operators and owners of UAS and associated unmanned aircraft. As part of the standards development, the Administrator was directed to consider: (1) Requirements for remote identification of UAS; (2) requirements for different classifications of UAS; and (3) the feasibility of the development and operation of a publicly accessible online database of unmanned aircraft and operators, and criteria for exclusion from the database.

To comply with the Congressional mandate, on May 4, 2017, the Administrator chartered the Unmanned Aircraft Systems (UAS) Identification (ID) and Tracking Aviation Rulemaking Committee (ARC) (UAS–ID ARC) to inform the FAA on technologies available for remote identification and tracking of UAS and to make recommendations for how remote identification and tracking could be implemented.[42] The FAA charged the UAS–ID ARC with the following three objectives:

- Identify, categorize, and recommend available and emerging technology for the remote identification and tracking of UAS.
- Identify the requirements for meeting the security and public safety needs of the law enforcement, homeland defense, and national security communities for the remote identification and tracking of UAS.
- Evaluate the feasibility and affordability of available technical solutions, and determine how well those technologies address the needs of the law enforcement and air traffic control communities. Develop evaluation criteria and characteristics for making decisions, and rate the available technical solutions provided.

The Administrator was also tasked with submitting a report to Congress regarding any standards developed and issuing regulations based on the standards developed. On June 30, 2017, the Administrator sent a letter to the Chairman of the Commerce, Science, and Transportation Committee detailing the FAA's considerations and efforts in supporting the development and implementation of Remote ID standards.

A. ARC Recommendations Final Report

The members of the UAS–ID ARC were organized into working groups. Working Group One (WG1) was tasked with identifying, categorizing, and recommending available and emerging technologies for the remote identification and tracking of UAS. WG1 identified and analyzed eight viable technology solutions, falling into two broad categories: (1) Direct broadcast solutions; and (2) network publishing solutions.[43] A detailed discussion of the eight viable technology solutions, as well as tables summarizing WG1's analysis of those solutions can be found in the ARC Recommendations Final Report (Recommendations Report), available in the docket for this rulemaking.

Working Group Two (WG2) was tasked with identifying the requirements for meeting the security and public safety needs of the law enforcement, homeland defense, and national security communities for the remote identification and tracking of UAS. WG2 identified two general categories of UAS ID and tracking needs: (1) Incident investigation; and (2) active monitoring of heightened awareness areas. To achieve the goals of both categories, WG2 determined that all UAS meeting certain threshold requirements would need to be tracked, whether passively or actively, from commencement to termination of each operation.[44] WG2 further concluded that information regarding the position of the aircraft, the location of the control station, and the identity of the remote pilot would help maintain a safe and secure environment for the general public and public safety officials.

The working groups presented their findings and conclusions to the full UAS–ID ARC for consideration in making its recommendations. The UAS–ID ARC submitted its Recommendations Report to the FAA on September 30, 2017. Although some decisions were not unanimous, the ARC reached general agreement on many of its recommendations.[45]

1. Applicability of Remote ID and Tracking Requirements

In its Recommendations Report, the ARC presented two options for an applicability threshold for the ID and tracking requirements and recommended the FAA give due consideration to both of those options.

Option 1: All UAS are required to comply with remote identification and tracking requirements except under any of the following circumstances:

- The unmanned aircraft is operated within visual line of sight of the remote pilot and is designed to not be capable of flying beyond 400 feet of the remote pilot.[46]
- The unmanned aircraft is operated in compliance with 14 CFR part 101, unless the unmanned aircraft:
  - Is equipped with advanced flight systems technologies that enable the aircraft to navigate from one point to another without continuous input and direction from the remote pilot.
  - Is equipped with a real-time downlinked remote sensor that provides the remote pilot the capability of navigating the aircraft beyond visual line of sight of the remote pilot.
- The UAS is operated under ATC and contains the equipment associated with such operations (including ADS–B, transponder, and communication with ATC).
- The UAS operation is exempt from ID and tracking requirements by the FAA (*e.g.,* for the purposes of law enforcement, security or defense, or under an FAA waiver).

Option 2: UAS with either of the following characteristics are required to comply with remote identification and tracking requirements:

- Ability of the aircraft to navigate between more than one point without direct and active control of the pilot.
- Range from control station greater than 400 feet and real-time remotely viewable sensor.

The ARC also recommended that, regardless of which option for applicability the FAA chooses, UAS operating under the following circumstances be exempt from the remote identification and tracking requirement:

- The UAS is operated under ATC and contains the equipment associated with such operations (including ADS–B, transponder, and communication with ATC).
- The UAS operation is exempt from ID and tracking requirements by the

[42] The UAS–ID ARC was composed of 74 members representing aviation community and industry member organizations, law enforcement agencies and public safety organizations, manufacturers, researchers, and standards bodies that are involved in the promotion and production of UAS and in addressing security issues surrounding the operation of UAS.

[43] The eight viable technology solutions WG1 identified are: (1) Automatic Dependent Surveillance Broadcast (ADS–B); (2) Low Power Direct RF; (3) Networked Cellular; (4) Satellite; (5) SW-based Flight Notification with Telemetry; (6) Unlicensed Integrated C2; (7) Physical Indicator; and (8) Visual Light Encoding.

[44] WG2 determined that UAS with either of the following characteristics should be required to comply with remote identification and tracking requirements: (1) Those that have the ability to navigate between more than one point without direct and active control of the pilot; or (2) those that have a range from control station greater than 400 feet and real-time remotely viewable sensor.

[45] Appendix D of the ARC's Recommendations Report contains dissenting opinions submitted by ARC members, as well as a chart showing a breakdown of how ARC members voted on the final report. The Recommendations Report is available in the docket for this rulemaking.

[46] The ARC noted that it is not intending to encompass drone racing at very low altitudes on a closed course that may be authorized by operation, by location, or some other mechanism.

FAA (*e.g.,* for the purposes of law enforcement, security or defense, or under an FAA waiver).

The ARC further recommended the FAA do the following regarding the applicability of remote identification and tracking requirements:

- Include a waiver mechanism in the remote identification and tracking rule.
- Apply the remote identification and tracking requirements to the remote pilot, not to the manufacturer of the UAS.
- Require manufacturers to label their products to indicate whether they are capable of meeting applicable remote identification and tracking requirements.
- Consider whether unmanned aircraft equipped with advanced flight system technologies that are strictly for safety purposes and that keep the aircraft within visual line of sight of the remote pilot, such as a ''return to home'' feature, should be exempt from remote identification and tracking requirements, provided the safety features cannot be readily altered or reprogrammed.

Some ARC members objected to both of the applicability options presented in the Recommendations Report, favoring instead a weight-based threshold for applicability, with remote identification and tracking requirements applying to any UAS or model aircraft weighing 250 grams or more. These members also argued that there should be no exemption from the remote identification and tracking requirements for unmanned aircraft operated in compliance with part 101 (*i.e.,* model aircraft).[47]

2. Method To Provide Remote ID and Tracking Information

The ARC recommended two methods for UAS to provide remote identification and tracking information: (1) Direct broadcast; and (2) network publishing to an FAA-approved internet-based database. With regard to direct broadcast capabilities, the ARC recommended the FAA adopt an industry standard for data transmission, which may need to be created, to ensure unmanned aircraft equipment and public safety receivers are interoperable, as public safety officials may not be able to equip with receivers for all possible direct broadcast technologies. With regard to network publishing, the ARC recommended that information held by Third Party Providers (TPP) or UAS Service Suppliers (USS) be governed by restrictive use conditions imposed on the TPP/USS related to the use and dissemination of any data and information collected.

3. Tiered Approach to Remote ID and Tracking Requirements

The ARC recommended the following tiered approach to direct broadcast and network publishing requirements:

- Tier 1—Direct broadcast (locally) or Network publish: UAS in this tier would be required to direct broadcast both ID and tracking information so that any compatible receiver nearby can receive and decode the ID and tracking data. If a network is available, network publishing to an FAA-approved internet-based database satisfies this requirement. A UAS would fall into Tier 1 if it does not qualify for an exemption from remote identification and tracking requirements (exempt UAS are referred to as Tier 0) and does not meet the conditions for Tier 2 or Tier 3. For example UAS conducting most part 107 operations would fit into Tier 1.
- Tier 2—Direct broadcast (locally) and Network publish: UAS in this tier would be required to broadcast (locally) ID and tracking data and network publish ID and tracking data to an FAA-approved internet-based database. An example of UAS that may fall into Tier 2 would be UAS that are conducting waivered operations that deviate from certain part 107 operating rules, and where the FAA determines that Tier 2 ID and tracking are required as a condition of the waiver.
- Tier 3—Flight under part 91 rules: UAS in this tier would have to adhere to the rules of manned aircraft as defined in 14 CFR part 91. This tier is intended for aircraft that are integrated into the manned aircraft airspace. An example of UAS that may fall into Tier 3 are those whose unmanned aircraft weighs above 55 pounds and operating BVLOS, in IFR conditions, or operating in controlled airspace.

4. Stages of Implementation of Remote ID and Tracking Rule

The ARC recommended the following three stages for implementing a remote identification and tracking rule:

- Pre-rule—Broaden UAS safety education efforts and continue the UAS detection pathway research with industry stakeholders.
- Before final rule is enacted—Work to scope standards needed to enable direct broadcast and network publishing technologies for implementing the remote identification and tracking requirement on new equipment and existing equipment; ensure that standards for ID and tracking technology move forward at a rapid pace; and work closely with industry stakeholders on developing the ideal architecture for the PII System.[48]
- After final rule enacted—Allow a reasonable grace period to carry out retrofit of UAS manufactured and sold within the United States before the final rule (with grace period ending) when retrofit options are inexpensive and easy to implement.[49]

5. Minimum Data Requirements for Remote ID and Tracking

The ARC recommended a set of minimum data requirements for remote identification and tracking of UAS. Under the ARC's recommendation, availability of the following types of data related to the unmanned aircraft or associated control station would be required: (1) Unique identifier of the unmanned aircraft; (2) tracking information for the UAS; and (3) identifying information of the UAS owner and remote pilot. Availability of the following types of data related to the unmanned aircraft or associated control station would be optional: (1) Mission type; (2) route data; and (3) operating status of the unmanned aircraft. The ARC also recommended that the specific data elements to be provided by the UAS operator should vary depending on the nature of the operation. Finally, the ARC recommended that some data elements be provided prior to flight (*e.g.,* via the internet), while other data elements be provided in real-time while the UAS is in flight.

6. ATC Interoperability

With respect to ATC interoperability with the remote identification and tracking system, the ARC recommended the following:

- The FAA should identify whether BVLOS operations would routinely occur without an IFR flight plan, and if so, under what operational conditions.
- Any proposal for using ADS–B frequencies in the solution for UAS ID and tracking would have to be analyzed for the impact on the performance of current and future Secondary Surveillance Radar (SSR), Airborne

[47] Section 336 of Public Law 112–95, the underlying authority for 14 CFR part 101 Subpart E- Special Rule for Model Aircraft, was repealed by section 349 of the FAA Reauthorization Act of 2018, Public Law 115–254.

[48] The ARC report defines ''PII System'' as follows: ''PII System includes processes and technology (direct broadcast or network publishing) that enables approved users to associate UAS ID with the FAA System of Records. This system would include the database where remote pilot/owner/operator PII [personally identifiable information] is housed for access by authorized users.''

[49] The FAA notes that the ARC only discussed establishing a grace period for implementation of remote identification. The ARC did not discuss or address grandfathering of existing UAS.

Collision Avoidance System (ACAS), and ADS–B.

- The UAS ID and tracking system should interoperate with the ATC automation such that target information from the ID and tracking ground system, including ID and position, can be passed to ATC automation.
- FAA automation should by default filter out UAS ID and tracking system targets from the ATC display that fall outside of adapted airspace deemed to be of interest to ATC.
- FAA automation and the UAS ID and tracking system should be able to display designated UAS targets of interest to ATC personnel.

7. Airports and Critical Infrastructure

The ARC recommended the FAA do the following related to airports and critical infrastructure:

- Incorporate implementation costs of critical infrastructure facilities into rulemaking analysis.
- Identify an approach and timeline to designating approved technologies for airports and critical infrastructure facilities, and address any legal barriers to implementing approved technologies.
- Provide guidance to airports on any impact or interference to safe airport operations including how UAS ID and tracking may impact definition of UAS Facility Maps, security procedures, and risk assessments of UAS operations.

8. Related Issues

Finally, the ARC identified related issues it determined could have an impact on the implementation of effective UAS ID and tracking solutions, and recommended the following for FAA's consideration:

- Access to data related to direct broadcast and network publishing—The FAA should implement three levels of access to the information that is either broadcast or captured and contained in the appropriate database: (1) Information available to the public (the unmanned aircraft unique identifier); (2) information available to designated public safety and airspace management officials (personally identifiable information (PII)); and (3) information available to the FAA and certain identified Federal, State, and local agencies (all relevant tracking data).
- PII—The United States government should be the sole keeper of any PII collected or submitted in connection with new UAS ID and tracking requirements.
- Governmental UAS Operations—The remote identification and tracking system should include reasonable accommodations to protect the operational security of certain governmental UAS operations.

B. FAA Response to ARC Report

The ARC was tasked with considering both identification and tracking of UAS; however, the ARC did not provide any specific recommendations related to tracking of UAS. The FAA has developed this proposed rule to require only the identification of UAS. Although the FAA is not proposing any requirements related to the use of remote identification information for tracking UAS, the FAA acknowledges that third parties could potentially track UAS operations in the airspace of the United States by developing systems that use information provided to Remote ID USS or through broadcasts. Similar third party applications exist today, such as FlightAware and Flightradar24, that track and display information about manned aircraft operations in the airspace of the United States.

Although there was general agreement that certain UAS operations should be excluded from a remote identification requirement, the ARC did not reach consensus on the applicability of such a requirement. The ARC's two recommended approaches would have provided for significant numbers of UAS without remote identification.[50]

The FAA believes that there is a need to identify as many UAS as possible because a comprehensive approach increases the usefulness of a remote identification system. Moreover, some of the ARC's applicability recommendation hinged on whether the UAS in question would have certain sensor capabilities. After consideration, the FAA determined that the sensor capabilities of a particular UAS should not be a factor in determining whether the aircraft should have remote identification. UAS without sensor capabilities can still be operated in a manner that may pose a threat to public safety, national security, and the safety and efficiency of the airspace of the United States and therefore the FAA determined that this recommendation would not meet the objective of this proposed rule. Accordingly, the FAA is proposing that the majority of UAS should have remote identification, regardless of the sensors installed on the unmanned aircraft. However, the FAA acknowledges that remote identification is not necessary for certain UAS operations conducted in an FAA-recognized identification area.

The FAA acknowledges the dissenting opinion within the ARC regarding using weight as the sole determinant of whether an unmanned aircraft should be required to have remote identification. While an exclusion to any remote identification requirement based on weight or operational performance could make sense from a law enforcement and security perspective, the same cannot be said from the perspective of the overall safety of the airspace of the United States. Because remote identification could be used in the near term to provide situational awareness, and because remote identification would ultimately be a foundational element of a UTM system, it is important for most UAS operated in the airspace of the United States to comply with the remote identification requirements.

The FAA does not believe that weight alone should be the determining factor

[50] The ARC recommended the following options:

Option 1:

Except for those members who strongly favor a weight-based threshold for applicability and those members who strongly oppose an exemption for model aircraft operated in compliance with 14 CFR part 101 . . ., the ARC recommends that all UAS be required to comply with remote ID and tracking requirements except under the following circumstances:

1. The unmanned aircraft is operated within visual line of sight of the remote pilot and is not designed to have the capability of flying beyond 400′ of the remote pilot.

2. The unmanned aircraft is operated in compliance with 14 CFR part 101, unless the unmanned aircraft:

a. Is equipped with advanced flight systems technologies that enable the aircraft to navigate from one point to another without continuous input and direction from the remote pilot.

b. Is equipped with a real-time downlinked remote sensor that provides the remote pilot the capability of navigating the aircraft beyond visual line of sight of the remote pilot.

3. The UAS is operated under ATC and contains the equipment associated with such operations (including ADS–B, transponder, and communication with ATC).

4. The UAS operation is exempt from ID and tracking requirements by the FAA (*e.g.,* for the purposes of law enforcement, security or defense, or under an FAA waiver).

Option 2:

Except for those members who strongly favor a weight-based threshold for applicability . . ., the ARC recommends UAS with either of the following characteristics must comply with remote ID and tracking requirements:

1. Ability of the aircraft to navigate between more than one point without direct and active control of the pilot.

2. Range from control station greater than 400′ and real-time remotely viewable sensor.

The ARC further recommends that UAS operating under the following circumstances be exempt from the remote ID and tracking requirement:

- The UAS is operated under ATC and contains the equipment associated with such operations (including ADS–B, transponder, and communication with ATC).
- The UAS operation is exempt from ID and tracking requirements by the FAA (*e.g.,* for the purposes of law enforcement, security or defense, or under an FAA waiver).

for whether a UAS is required to comply with remote identification. UAS may be used in a wide variety of types of operations that may present a range of safety and security risks, regardless of the weight of the unmanned aircraft. The FAA believes that the remote identification requirement should be tied to the unmanned aircraft registration requirement because the FAA, national security agencies, and law enforcement agencies have a need to correlate remote identification and registration data. If an unmanned aircraft is required to be registered, or its owner chooses to register the unmanned aircraft, then the UAS would have to comply with remote identification. Accordingly, under current regulations unmanned aircraft weighing less than 0.55 pounds would not be required to comply with the remote identification requirements unless they are registered under part 47 or part 48 (*e.g.,* to comply with the operating requirements of part 91 or part 107). Changes to the registration requirements in part 47 or part 48 (*e.g.,* to require unmanned aircraft weighting less than 0.55 pounds to register) would have a direct impact on which UAS would have to comply with remote identification.

The FAA does not agree with the recommendation that model aircraft, referred to throughout this proposal as limited recreational operations for consistency with 49 U.S.C. 44809, should be excluded from the remote identification requirements. Unmanned aircraft used in limited recreational operations required to register under part 47 or part 48 would be subject to the proposed remote identification requirement. The agency is, however, proposing a means for such aircraft to operate without remote identification equipment. Under the proposed rule, UAS would be permitted to operate without remote identification equipment if they are operated within visual line of sight and within an FAA-recognized identification area.

The FAA agrees with the ARC's recommendation for the methods of transmission for the remote identification message elements. The FAA agrees that requiring the broadcasting of messages directly from the unmanned aircraft and the transmission of messages over the internet is an appropriate approach because it provides a more complete picture of unmanned aircraft in the airspace of the United States. Moreover, this would support the development of UTM. Thus, the FAA proposes to require both the broadcast of the message elements and their transmission through the internet to a Remote ID USS for standard remote identification UAS.

Regarding the ARC's recommendation for a tiered approach for remote identification, the FAA agrees that some UAS, depending on their capabilities, may meet the intent of this proposed rule by only transmitting through the internet to a Remote ID USS. To accommodate these types of UAS, the FAA is proposing that a limited remote identification unmanned aircraft that is designed to operate no more than 400 feet from its control station be required to transmit information regarding the control station only. Standard remote identification UAS would be required to broadcast and transmit the remote identification message elements for both the unmanned aircraft and the control station.

The ARC identified a range of 400 feet as the maximum distance that an unmanned aircraft could be operated from its control station where a law enforcement officer could reasonably locate and identify the operator of the unmanned aircraft by visual means only. The FAA agrees with the ARC determination that 400 feet is a reasonable distance for visually associating an unmanned aircraft with the location of its control station, and has included a 400-foot range limitation in the requirements for limited remote identification UAS.

The FAA agrees with some of the ARC's recommendations related to the transmission of message elements. Specifically, the FAA agrees that a unique identifier should be broadcast or transmitted, as appropriate, and be part of the unmanned aircraft's Certificate of Aircraft Registration. The FAA also agrees that the location of the unmanned aircraft and the control station should be broadcast or transmitted, as appropriate. However, the FAA is not proposing for the identity of the owner of the UAS to be included in the message elements, because the message elements would generally be available to the public. The message elements that the FAA is proposing are the minimum necessary to achieve the FAA's safety and security goals while avoiding potential privacy concerns. UAS owner information would still be available to the FAA and law enforcement because the FAA would retain the ability to correlate the unmanned aircraft's unique identifier with the unmanned aircraft's registration information.

The ARC also recommended a number of message elements that could be optionally transmitted. The FAA concurs with the ARC's recommendation to include the emergency status of the UAS, which could include lost-link or downed aircraft, as part of the remote identification message elements, and therefore proposes to include it as a requirement of the proposed rule. This proposed rule does not preclude broadcasting or transmitting information, as appropriate in addition to the minimum required message elements, although any additional message elements would have to be incorporated as a part of an FAA-accepted means of compliance.

The FAA disagrees with the ARC's recommendation that the identifying information required to be transmitted would be based on the type of operation. The FAA believes that all of the message elements proposed should be broadcast or transmitted, as appropriate, by a UAS from takeoff to landing, regardless of the type of operation being conducted. By requiring the broadcast or transmission, as appropriate, of all message elements from takeoff to landing, the FAA is able to garner basic remote identification information that contributes to the development and operation of comprehensive UTM and ultimately enhances the safety and security of the airspace of the United States.

The FAA agrees with the ARC that the UAS operator should be responsible for ensuring that his or her UAS complies with the remote identification requirements. Ultimately, it would be the operator's responsibility to operate in compliance. That said, the FAA understands that responsibility for meeting UAS design and production requirements should not fall on UAS operators. Accordingly, the FAA is proposing requirements for UAS producers to ensure that UAS are designed and produced in a way that ensures reliable functionality of the remote identification equipment with minimal additional responsibilities for the UAS operator.

The FAA concurs with the ARC's recommendation that manufacturers label UAS to indicate that they comply with the requirements being proposed in this rule, and is proposing that all producers of standard remote identification UAS and limited remote identification UAS label their unmanned aircraft accordingly. The FAA believes that a labeling requirement would communicate to prospective operators, after-market purchasers, law enforcement, and other persons whether a UAS complies with

the remote identification requirements.[51]

VII. Terms Used in This Proposed Rule

The FAA is proposing to define a number of new terms to facilitate the implementation of remote identification of UAS.

In part 1, definitions and abbreviations, the FAA is proposing to add definitions of unmanned aircraft system, unmanned aircraft system service supplier, and visual line of sight to § 1.1.

The FAA is proposing that *unmanned aircraft system (UAS)* means an unmanned aircraft and its associated elements (including communication links and the components that control the unmanned aircraft) that are required for the safe and efficient operation of the unmanned aircraft in the airspace of the United States.

The FAA is proposing that *unmanned aircraft system service supplier* means a person qualified by the Administrator to provide aviation-related services to unmanned aircraft systems.

The FAA is proposing that *visual line of sight* means the ability of a person manipulating the flight controls of the unmanned aircraft or a visual observer (if one is used) to see the unmanned aircraft throughout the entire flight with vision that is unaided by any device other than corrective lenses.

The FAA recognizes that the term visual line of sight is already used in part 107. The term is specifically described in § 107.31(a). However, the FAA believes that providing a definition in § 1.1 would ensure that the term is used consistently throughout all FAA regulations. Therefore, the FAA is proposing to use the description of visual line of sight contained in § 107.31, without the part 107-specific regulatory requirements, as the basis for the definition of the term visual line of sight in § 1.1.[52] To account for the use of the term in proposed part 89 and the potential use of the term in other parts of 14 CFR, the FAA is proposing to include a slightly modified version of the description used in part 107. Part 107 remote pilots and visual observers would still be bound by the specific provisions of § 107.31 absent a waiver.

In § 1.2, abbreviations and symbols, the FAA is proposing to add the abbreviation *USS* to mean an Unmanned Aircraft System Service Supplier.

The FAA is proposing to add a new part 89, Remote Identification of Unmanned Aircraft Systems, to title 14, chapter I, subchapter F, Air Traffic and General Operating Rules. In part 89, § 89.1, the FAA is proposing to include the following definitions:

Amateur-built unmanned aircraft system means an unmanned aircraft system the major portion of which has been fabricated and assembled by a person who undertook the construction project solely for their own education or recreation.[53]

Broadcast means to send information from an unmanned aircraft using radio frequency spectrum.

Remote ID USS means a USS qualified by the Administrator to provide remote identification services.

VIII. Applicability of Remote Identification Requirements

The FAA is proposing to require a new set of technologies, systems, and guidelines for the remote identification of UAS. The proposal includes requirements that apply to operators of UAS, requirements for the development of means of compliance, and requirements that apply to designers and producers of UAS.

The FAA is proposing to add a new part 89, Remote Identification of Unmanned Aircraft Systems, to 14 CFR, chapter I, subchapter F, Air Traffic and General Operating Rules. The operating requirements in subpart B of part 89 would apply to persons operating unmanned aircraft registered or required to be registered under part 47 or part 48. The FAA is proposing to tie the remote identification requirements to the registration requirements because the remote identification data broadcast or transmitted from a UAS is meant to be correlated to the registration data of such UAS. To facilitate the correlation of data, the FAA proposes certain changes to the registration requirements in parts 47 and 48, which are discussed in section IX of this preamble. Specifically, the FAA proposes to revise part 48 to require the individual registration of unmanned aircraft.[54] The FAA also proposes to require that all registrations of unmanned aircraft with remote identification include the serial number assigned by the producer of the unmanned aircraft. The serial number would be used to provide a unique identity to each unmanned aircraft for remote identification purposes.

The operating requirements of the proposed rule would also apply to persons operating foreign civil unmanned aircraft in the United States and to persons operating UAS exclusively within FAA-recognized identification areas. The operating requirements of the proposed rule would not apply to aircraft of the Armed Forces of the United States because these aircraft are not required to be registered under part 47 or part 48.

The design and production requirements in subpart F of proposed part 89 would apply to persons responsible for the design and production of UAS produced for operation in the United States. The design and production requirements would not, however, apply to the following UAS, unless they are intentionally produced with remote identification (*i.e.,* a standard remote identification UAS or limited remote identification UAS): amateur-built UAS and UAS of the United States Government. Producers of UAS weighing less than 0.55 pounds (current weight threshold for requirement to register) may, but would not be required to, comply with the proposed remote identification design and production requirements.

The FAA anticipates that industry stakeholders would develop means of compliance (which may include consensus standards) that UAS designers and producers would use to comply with the requirements of this proposed rule. Any person or entity could submit a means of compliance for acceptance by the FAA if it meets the requirements in subpart D of proposed part 89.

IX. Changes to Registration Requirements

Under the proposed rule, persons operating unmanned aircraft registered or required to be registered under part 47 or part 48, would have to comply

[51] In addition to the ARC feedback, during the development of this NPRM, the FAA received two letters specific to remote identification of UAS, one from the Academy of Model Aeronautics and the other from the Small UAV Coalition. Both letters provided their respective organizations' views on the policies that the FAA should propose in this rule. Neither of these letters were considered in the development of this rule. Both letters have been placed in the docket for this rulemaking.

[52] In relevant part, 14 CFR 107.31(a) describes visual line of sight as with vision that is unaided by any device other than corrective lenses, the remote pilot in command, the visual observer (if one is used), and the person manipulating the flight control of the small unmanned aircraft system must be able to see the unmanned aircraft throughout the entire flight in order to: (1) Know the unmanned aircraft's location; (2) Determine the unmanned aircraft's attitude, altitude, and direction of flight; (3) Observe the airspace for other air traffic or hazards; and (4) Determine that the unmanned aircraft does not endanger the life or property of another.

[53] As currently proposed, amateur-built UAS would not include unmanned aircraft kits where the majority of parts of the UAS are provided to the operator as a part of the sold product.

[54] Currently, 14 CFR part 48 allows owners with UAS operated for limited recreational purposes to register multiple unmanned aircraft under a single registration number.

with the remote identification requirements of proposed part 89. The FAA is proposing to tie the remote identification requirements to the registration of unmanned aircraft because the FAA and law enforcement agencies need the ability to correlate remote identification information with registration data to obtain more complete information regarding the ownership of unmanned aircraft flying in the airspace of the United States. Aircraft registration requirements are the foundation for both identifying aircraft and for promoting accountability and the safe and efficient use of the airspace of the United States by both manned and unmanned aircraft. With limited exceptions, all aircraft are required to be registered under part 47 or part 48; therefore, nearly all UAS operating in the airspace of the United States would have to comply with the remote identification requirements, thereby enhancing the overall safety and efficiency of the airspace of the United States.

Parts 47 and 48 of title 14 of the Code of Federal Regulations implement the registration requirements codified in 49 U.S.C. 44101–44103. Additional statutory requirements address the registration of unmanned aircraft; specifically, 49 U.S.C. 44809(a)(8) requires unmanned aircraft used in limited recreational operations to be registered and marked in accordance with chapter 441 of Title 49 of the United States Code. Furthermore, under 49 U.S.C. 44809(f), the Administrator is not prohibited from promulgating rules relating to the registration and marking of unmanned aircraft including unmanned aircraft used in limited recreational operations.[55]

Under the current registration requirements, no person may operate an unmanned aircraft in the airspace of the United States unless it has been registered by its owner pursuant to part 47 or part 48, or unless the aircraft is excepted from registration. There are two exceptions to the registration requirements for unmanned aircraft: (1) Unmanned aircraft of the Armed Forces of the United States; and (2) most unmanned aircraft weighing 0.55 pounds or less on takeoff, including everything that is on board or otherwise attached to the aircraft. Small unmanned aircraft operating under 14 CFR part 91 and part 107 are required to register under part 47 or part 48 regardless of weight.

[55] Section 336 of Public Law 112–95, which prohibited the FAA from implementing new regulations on certain recreational UAS operations, was repealed by section 349 of the FAA Reauthorization Act of 2018, Public Law 115–254.

A. Registration Under Part 47

Registration under part 47 is required for:

(1) Unmanned aircraft weighing 55 pounds or more;

(2) small unmanned aircraft intended to be operated outside of the territorial airspace of the United States; and

(3) small unmanned aircraft registered through a trust or voting trust (*e.g.,* to meet U.S. citizenship requirements).

Registration under part 47 is available for:

(1) Any unmanned aircraft (including small unmanned aircraft) that needs—or desires—an N-number registration (*e.g.,* to operate outside the United States); or

(2) when public recording is needed for unmanned aircraft-related loans, leases, or ownership documents.

To register under part 47, the unmanned aircraft must not be registered under the laws of a foreign country, and must be:

(1) Owned by a citizen of the United States;

(2) owned by an individual citizen of a foreign country lawfully admitted for permanent residence in the United States;

(3) owned by a corporation not a citizen of the U.S. when the corporation is organized and doing business under U.S. Federal or State laws, and the aircraft is based and primarily used in the United States; or

(4) owned by the U.S. Government, or a State, or local governmental entity.

The registration process under part 47 is paper-based and commences with the filing of an Aircraft Registration Application (AC Form 8050–1) with the FAA Aircraft Registry. At a minimum, applicants must provide evidence of ownership (*e.g.,* a traditional bill of sale, a contract of conditional sale, a lease with purchase option, or an heir-at-law affidavit), provide a certification of eligibility for registration, and pay a registration fee. Additional documentation may be required, particularly for amateur-built aircraft and aircraft imported from foreign jurisdictions. Additional information required may include a builder certificate describing the type of aircraft and a comprehensive description of the aircraft (*e.g.,* make, model, serial number, engine manufacturer, type of engine, number of engines, maximum takeoff weight, and number of seats). Persons such as corporate registrants, trustees, and non-citizen corporations must file additional documentation evidencing their legal structures, authorities, and related data that supports registration. Aircraft previously recorded in foreign registries must file proof of deregistration. In the case of amateur-built aircraft, either the owner or builder must designate the aircraft model name and serial number.

Once an unmanned aircraft is registered, the FAA issues a Certificate of Aircraft Registration (AC Form 8050–3) to the aircraft owner. The FAA has clarified that, in the case of unmanned aircraft, the Certificate of Aircraft Registration may be maintained at the pilot's control station rather than on the unmanned aircraft and must be made available for inspection upon request.[56] The certificate expires three years after date of issuance.[57] A Certificate of Aircraft Registration may be renewed by submitting a renewal application and paying a renewal fee.

Unmanned aircraft registered under part 47 must comply with the identification and registration marking requirements in subparts A and C of 14 CFR part 45. Under part 45, the aircraft must display certain marks consisting of the Roman capital letter ''N'' (denoting U.S. registration) followed by the registration number of the aircraft. The N-number must be: (1) Painted on the aircraft or affixed to the aircraft by some other permanent means; (2) have no ornamentation; (3) contrast in color with the background; and (4) be legible.[58]

B. Registration Under Part 48

Part 48 provides a web-based aircraft registration process for small unmanned aircraft to facilitate compliance with the statutory requirement that all aircraft register prior to operation.[59] A small unmanned aircraft weighing less than 55 pounds on takeoff, including everything that is on board or otherwise attached to the aircraft, may be registered under either part 47 or part 48.

Owners of small unmanned aircraft used in civil operations (including commercial operations), limited recreational operations,[60] or public aircraft operations, among others, are

[56] See Memorandum to John Duncan, from Mark W. Bury, Assistant Chief Counsel for International Law, Legislation, and Regulations (August 8, 2014).

[57] Section 556 of the FAA Reauthorization Act of 2018 requires the Administrator to initiate a rulemaking to increase the duration of aircraft registrations for noncommercial general aviation aircraft to 7 years.

[58] See 14 CFR 45.21(c).

[59] See 80 FR 78593 (December 16, 2015).

[60] This proposal uses the term ''limited recreational operations'' when discussing registration requirements under part 48. Part 48 uses the term ''model aircraft'' to describe recreational UAS operations. The FAA considers that model aircraft under part 48 are consistent with the ''limited recreational operations'' described in 49 U.S.C. 44809, therefore ''limited recreational operations'' has been used throughout to ensure consistency of terminology with current statutory requirements.

eligible to register under part 48. Currently, unmanned aircraft may be registered in one of two ways: (1) Under an individual registration number issued to each aircraft; or (2) under a single registration number issued to an owner of multiple unmanned aircraft used exclusively for limited recreational operations.

If the owner of a small unmanned aircraft intends to use it at any point for a purpose other than exclusively for limited recreational operations as defined in 49 U.S.C. 44809, the owner must register that aircraft individually and obtain a unique registration number for the aircraft. The aircraft registration must include the: (1) Name of the applicant; (2) applicant's physical address; (3) applicant's email address; (4) aircraft manufacturer and model name; (5) aircraft serial number, if available; and (6) any other information required by the Administrator.

If the owner of multiple small unmanned aircraft intends to use the aircraft exclusively for limited recreational operations, part 48 currently allows the owner to register once and to obtain a single registration number that constitutes the registration number for all of the owner's small unmanned aircraft. This means that multiple aircraft may display the same registration number when the unmanned aircraft are used exclusively for limited recreational operations. Applicants for a single Certificate of Aircraft Registration for multiple unmanned aircraft must provide: (1) The applicant's name; (2) the applicant's physical address; (3) the applicant's email address; and (4) any other information required by the Administrator. This option does not require the applicant to provide the unmanned aircraft manufacturer, model, or serial number.

Once an unmanned aircraft is registered, the FAA issues a Certificate of Aircraft Registration, which contains a registration number composed of multiple alphanumeric characters. A part 48 registration number is not the traditional N-number issued under part 47.

Small unmanned aircraft registered under part 48 may not operate unless they display a unique identifier in a way that is readily accessible and visible upon inspection of the aircraft. The unique identifier must be either: (1) The registration number issued to an individual or the registration number issued to the aircraft by the Registry upon completion of the registration process; or (2) the small unmanned aircraft serial number, if authorized by the Administrator and provided with the application for Certificate of Aircraft Registration. Most commonly, the unique identifier displayed is the FAA registration number.

C. Issues With the Current Registration Requirements and Proposed Changes

The current registration requirements do not provide for aircraft-specific data of all aircraft, information fundamentally necessary for remote identification, due to the differing requirements of parts 47 and 48.

Part 47 requires the individual registration of aircraft and the submission of an aircraft's serial number as part of the application for a Certificate of Aircraft Registration. These requirements are consistent with the remote identification framework proposed in this NPRM because the FAA would be able to correlate the aircraft-specific registration data (*i.e.,* serial number) obtained under part 47 to the remote identification data which would have to be broadcast or transmitted by unmanned aircraft under the current proposal. This is not the case with the current registration requirements of part 48.

Currently, part 48 allows for registration of multiple unmanned aircraft used exclusively for limited recreational operations under a single Certificate of Aircraft Registration without requiring the applicant to submit the aircrafts' serial numbers.[61] This means that the FAA has no aircraft-specific data for aircraft operated under a single Certificate of Aircraft Registration. Second, part 48 requires the provision of an unmanned aircraft's serial number, only if available, and only if the aircraft is registered individually. This means that the FAA does not have a data set that includes the serial numbers of all unmanned aircraft registered under part 48 and cannot correlate the registration data to the remote identification data which would be broadcast or transmitted by unmanned aircraft under the proposed rule. Thus, the FAA believes that the current registration requirements of part 48 are not sufficient to support the remote identification framework proposed in this NPRM.

A change to the registration requirements of part 48 is therefore necessary to enable the FAA to gather all of the necessary data to support the unique identification of unmanned aircraft registered under part 48. The lack of aircraft-specific data for aircraft registered under part 48 inhibits the FAA and law enforcement agencies from correlating the remote identification data proposed in this rule with data stored in the Aircraft Registry. Thus, the FAA proposes to revise part 48 to require the individual registration of all small unmanned aircraft and the provision of additional aircraft-specific data. Owners of small unmanned aircraft would have to complete the registration application by providing aircraft-specific information in addition to basic contact information. This means that every small unmanned aircraft registered under part 48 would need to have its own Certificate of Aircraft Registration. To ease the financial burden on operators who previously registered multiple model aircraft under a single registration number, the FAA would explore ways to minimize the registration fee when multiple aircraft are registered at the same time.

Specifically, the proposed changes would include the removal of §§ 48.100(b) and 48.115, which currently allow small unmanned aircraft used exclusively as a model aircraft to be registered under a single Certificate of Aircraft Registration without unique identifying information. Sections 48.100(a) and 48.110, which require unique identifying information, would become the sole means for registration under part 48 and would be revised to reflect all of the requirements that apply to the individual registration of small unmanned aircraft under part 48. Conforming changes would be made throughout part 48 to reflect the removal of §§ 48.100(b) and 48.115 and the transition to a single form of registration under part 48.

The FAA believes the proposed revisions are necessary to implement the remote identification framework because individual aircraft registration under part 48 would allow the FAA to gather aircraft-specific data that is essential for remote identification. Furthermore, the proposed transition to an individual aircraft registration system under part 48 would harmonize these requirements with the individual aircraft registration requirements of part 47.

D. Proposed Changes to the Registration Requirements To Require a Serial Number and Telephone Number as Part of the Registration Process

As discussed in section XII.C.1 of this preamble, this proposed rule would require a unique identifier as part of the

[61] As of November 25, 2019, are currently 1,081,329 recreational flyers registered under part 48—but because these registrants do not currently register each individual UA the FAA does not have administrative data on the number or type of recreational UAs being flown. As a point of comparison, as of November 25, 2019, under part 48 there are also 417,663 UAs registered individually as non-model unmanned aircraft (largely part 107 operations).

message elements used to remotely identify UAS. A serial number is a unique number assigned to an aircraft—typically at the time of production—and does not change in case of a sale or transfer of ownership. The proposed revision of part 48 would require the provision of an unmanned aircraft's serial number at the time of registration. This proposed requirement is essential for the remote identification framework proposed in this NPRM. The serial number requirement would enable the FAA to correlate the data broadcast or transmitted by the UAS with the registration data in the Aircraft Registry to associate an unmanned aircraft with its registered owner. The requirement would also allow the FAA to distinguish one unmanned aircraft from another operating in the airspace of the United States and would facilitate the identification of non-registered unmanned aircraft flying in the airspace of the United States, which may warrant additional oversight or action by the FAA, national security agencies, or law enforcement agencies.

There has been little to no standardization regarding the issuance or use of serial numbers by UAS. The FAA believes that standardizing the issuance and use of serial numbers is necessary to successfully implement the remote identification requirements of the proposed rule. The standardization of the issuance and use of serial numbers would prevent a situation where two or more UAS are issued the same serial number. Thus, the FAA is proposing to add a new § 47.14 to require the owners of standard remote identification unmanned aircraft and limited remote identification unmanned aircraft registered under part 47 to list in the Certificate of Aircraft Registration the serial number issued by the manufacturer of the unmanned aircraft in accordance with the requirements of proposed part 89. According to the manufacturing requirements in proposed § 89.505, the serial number would have to comply with the ANSI/CTA–2063–A serial number standard.

The FAA is also proposing to revise § 48.100(a) to require a serial number for every small unmanned aircraft. Consistent with the proposed changes in part 47, § 48.100(a)(5) would require the owner of any standard remote identification unmanned aircraft or limited identification unmanned aircraft to list in the Certificate of Aircraft Registration the serial number issued by the manufacturer of the unmanned aircraft in accordance with the production requirements of part 89. Per the production requirements in proposed § 89.505, such serial number would have to comply with the ANSI/CTA–2063–A serial number standard.

Owners of amateur-built unmanned aircraft would have to comply with the serial number requirement in proposed § 48.100(a)(5) if the unmanned aircraft are designed and produced as standard remote identification unmanned aircraft or limited identification unmanned aircraft. The proposed revisions to § 48.100(a) would also require the owners of amateur-built unmanned aircraft to list in the Certificate of Aircraft Registration a manufacturer and model name of their choice.

Additionally, the FAA is proposing to update the registration information requirements to include one or more telephone number(s) for the applicant. Although registration data corresponds to the owner of the unmanned aircraft rather than the operator, the FAA believes that due to the nature and scope of most small UAS operations, it is reasonable to expect a significant number of unmanned aircraft owners to also be the operators of the aircraft or in close contact with the operators of the aircraft. Requiring owners of unmanned aircraft to provide their telephone number(s) as part of the registration process would assist FAA and law enforcement to disseminate safety and security-related information to the registrant in near real-time. This additional information would be retained by the FAA and only disclosed as needed to authorized law enforcement or Federal agencies.

E. Request for Comments Regarding Serial Number Requirements

The FAA acknowledges that some unmanned aircraft may not have serial numbers that comply with the ANSI/CTA–2063–A serial number standard. Some examples include unmanned aircraft manufactured prior to the compliance date of the final rule that follows this notice of proposed rulemaking (assuming the producer of the unmanned aircraft is unable to modify the aircraft or push an upgrade to assign an ANSI/CTA–2063–A compliant serial number), some amateur-built unmanned aircraft, and foreign-built unmanned aircraft with no serial numbers or with serial numbers that do not comply with ANSI/CTA–2063–A. Since these unmanned aircraft do not comply with the remote identification requirements for standard remote identification UAS or limited remote identification UAS, the proposed rule requires their operation be restricted to FAA-recognized identification areas. Accordingly, the FAA has not imposed a requirement for the owners of such unmanned aircraft to obtain an ANSI/CTA–2063–A compliant serial number and to list it in the Certificate of Aircraft Registration or the Certificate of Identification. The FAA welcomes detailed comments on whether and why it should require the owners of UAS without remote identification to have to obtain an ANSI/CTA–2063–A compliant serial number and to list it in the Certificate of Aircraft Registration or the Certificate of Identification and whether there would be any costs associated with obtaining a compliant serial number. The FAA also welcomes comments on whether the Agency should issue ANSI/CTA–2063–A compliant serial numbers to such aircraft when registered or re-registered by their owners.

F. Serial Number Marking

The FAA emphasizes that small unmanned aircraft owners are not required to affix the serial number to the exterior of the aircraft. However, nothing in the proposed regulation would preclude the owners from choosing to do so. The FAA envisions that producers may mark the exterior of unmanned aircraft with serial numbers that comply with the ANSI/CTA–2063–A serial number standard, and that such serial numbers could be used to meet the marking requirements of part 48, subpart C. This could alleviate the need to mark each UAS with the registration number. The FAA seeks specific comments on whether UAS producers should be required to affix the serial number to the exterior of all standard remote identification UAS and limited remote identification UAS. Please explain why or why not and provide data to support your response.

X. Operating Requirements for Remote Identification

A. Requirement To Broadcast or Transmit

Under the proposed rule, no person would be able to operate a UAS in the airspace of the United States unless the UAS has remote identification capability meeting the requirements of this proposed rule (*i.e.,* a standard remote identification UAS or limited remote identification UAS) or if the UAS has no remote identification equipment but is otherwise identified by operating exclusively within visual line of sight and within an FAA-recognized identification area.

The FAA is proposing to require all UAS with remote identification to broadcast or transmit the appropriate remote identification message elements from takeoff to landing. The agency is also proposing that no person would be

able to operate a UAS with remote identification unless the UAS is transmitting (for limited remote identification UAS) or transmitting and broadcasting (for standard remote identification UAS) the appropriate message elements. The remote identification message elements are described in greater detail in section XII.C of this preamble. Furthermore, the FAA proposes to prohibit the operation of UAS with remote identification if the remote identification equipment and functionality have been disabled without the authorization of the Administrator.

UAS would have to comply with the remote identification requirements in one of three ways, depending on the capabilities of the UAS. To help operators determine whether a particular UAS has remote identification, the FAA is proposing to require that all persons responsible for the production of standard remote identification UAS and limited remote identification UAS label the unmanned aircraft to indicate whether the UAS complies with the remote identification requirements of this proposed rule and whether the UAS is standard remote identification or limited remote identification. A person would therefore be able to determine what type of UAS they have and if it has remote identification capability simply by visual inspection of the unmanned aircraft.

1. Standard Remote Identification UAS

Standard remote identification UAS would be required to transmit certain message elements through the internet to a Remote ID USS (an FAA-qualified third party discussed in section XIV of this preamble) and to broadcast the same message elements directly from the unmanned aircraft using radio frequency spectrum in accordance with 47 CFR part 15, where operations may occur without an Federal Communications Commission (FCC) individual license. These message elements would include: The UAS Identification (either the unmanned aircraft's serial number or session ID); latitude, longitude, and barometric pressure altitude of both the control station and the unmanned aircraft; a time mark; and an emergency status code that would broadcast and transmit only when applicable.

A standard remote identification UAS would be required to broadcast and transmit the remote identification message elements from takeoff to landing. If the internet is available at takeoff, the standard remote identification UAS would have to connect to the internet and transmit the message elements through that internet connection to a Remote ID USS and would also be required to broadcast the message elements directly from the unmanned aircraft. If the internet is unavailable at takeoff, the standard remote identification UAS would only be required to broadcast the message elements directly from the unmanned aircraft. If the internet is available, but the UAS cannot connect to a Remote ID USS, the UAS would be designed such that it could not take off. This is discussed in more detail in section XII.D.6 of this preamble.

The FAA is proposing to define ''broadcast'' as sending information from an unmanned aircraft using radio frequency spectrum. Under the proposed rule, only standard remote identification UAS would be able to broadcast remote identification message elements. The reasons for prohibiting limited remote identification UAS from broadcasting message elements is explained in section XII.D.14 of this preamble.

A standard remote identification UAS that loses connection to the internet or that can no longer transmit to a Remote ID USS after takeoff would be able to continue its flight, as long as it continues broadcasting the message elements. If a standard remote identification UAS experiences an in-flight loss of broadcast capability, regardless of whether it is connected to a Remote ID USS, the operator would have to land the unmanned aircraft as soon as practicable. This is necessary because a loss of the broadcast capability is an indication of a remote identification equipment failure, whereas loss of connectivity to the internet or a Remote ID USS could be attributed to unavailability of a service outside the control of the UAS operator. In addition, a functioning broadcast capability is necessary in order for remote identification information to be available in areas that do not have wireless internet connectivity. For example, during a BVLOS operation, the unmanned aircraft could be operating over a rural area that does not have wireless internet connectivity, but, through the command and control link, the unmanned aircraft has connectivity with a control station that is in turn connected to the internet and transmitting to a Remote ID USS. If the unmanned aircraft is in a location that does not have wireless internet connectivity, then for any local third-party observers attempting to identify the unmanned aircraft the only accessible source of remote identification information would be the broadcast. To support compliance with this requirement, the FAA is proposing that standard remote identification UAS have a monitoring feature that would notify the person manipulating the flight controls of the UAS if the broadcast capability was lost.

The FAA expects that the proposed design and production requirements of this rule would facilitate a person's compliance with the proposed operating requirements (*e.g.,* transmission requirement). The FAA intends for compliance with the remote identification requirements to be simple and straightforward for individuals operating UAS produced in accordance with a current FAA-accepted means of compliance. For example, a standard remote identification UAS would automatically transmit and broadcast the message elements and its design would prevent it from taking off when the remote identification capability is not functioning. Under this rule, the remote identification capability would be considered not functioning when the equipment does not work or is unable to perform its intended function or when the remote identification message elements are not transmitted or broadcast in accordance with the requirements of the proposed rule. Under this proposed rule, all UAS with remote identification would be designed and produced such that the remote identification functionality is always enabled and cannot be disabled except as otherwise authorized by the Administrator. UAS with remote identification would be designed and produced to notify the person manipulating the flight controls of the UAS of any remote identification malfunctions, failures, or anomalies.

2. Limited Remote Identification UAS

Limited remote identification UAS are UAS that are designed and produced such that the aircraft is not capable of operating more than 400 feet from the control station and cannot broadcast the remote identification message elements identified in proposed § 89.305 or § 89.315. Under the proposed rule, persons operating limited remote identification UAS would be required to fly within visual line of sight at all times. Limited remote identification UAS would be required to connect to the internet and transmit the appropriate message elements through that internet connection to a Remote ID USS. Unlike standard remote identification UAS, if a limited remote identification UAS cannot connect to the internet or transmit through an internet connection to a Remote ID USS, the UAS would not be able to take off.

Again, unlike with standard remote identification UAS, if a limited remote identification UAS loses connectivity to the Remote ID USS in flight, the person manipulating the flight controls of the UAS would be required to land as soon as practicable. The limited remote identification UAS would not be able to continue its flight because it cannot broadcast remote identification message elements.

A limited remote identification UAS is not permitted to broadcast remote identification message elements using radio frequency spectrum because the broadcast function is only applicable to standard remote identification UAS. If remote identification broadcast capability is added to a limited remote identification UAS, it would not have been subject to the design and production requirements of this rule and could result in erroneous, non-compliant, or incorrectly formatted messages being broadcast, undermining the fundamental purposes of this rule. However, the proposal does not prohibit designers, producers, or operators from including a capability for limited remote identification UAS to broadcast information or data unrelated to remote identification, such as a camera feed or telemetry data.

The message elements for limited remote identification UAS would include: The UAS Identification (either the unmanned aircraft's serial number or session ID); latitude, longitude, and barometric pressure altitude of the control station; a time mark; and an emergency status code that would transmit only when applicable.

Table 4 provides a summary of the differences between standard remote identification UAS and limited remote identification UAS.

TABLE 4—SUMMARY OF DIFFERENCES BETWEEN STANDARD REMOTE IDENTIFICATION UAS AND LIMITED REMOTE IDENTIFICATION UAS

	Standard remote identification UAS	Limited remote identification UAS
Message elements		
UAS Identification (serial number or session ID)	YES	YES.
Unmanned aircraft:.		
Latitude and longitude, barometric pressure altitude:	YES	NO.
Control station:.		
Latitude and longitude, barometric pressure altitude:	YES	YES.
A time mark identifying the Coordinated Universal Time (UTC) time of applicability of a position source output.	YES	YES.
An indication of the emergency status of the UAS	YES	YES.
Connectivity prior to takeoff		
Internet and Remote ID USS	YES	YES.
Broadcast	YES	NO.
If, at takeoff, the UAS cannot connect to the internet	Broadcast	Do not take off.
If, at takeoff, the UAS is connected to the internet, but is not transmitting to a Remote ID USS.	Do not take off	Do not take off.
In-flight loss of remote identification		
If, during flight, the UAS loses the connection to the internet or stops transmitting to the Remote ID USS.	Broadcast	Land as soon as practicable.
If, during flight, the UAS loses its ability to broadcast the message elements.	Land as soon as practicable	N/A.
Range limitation		
Range limitation from control station	None; operation would have to comply with all other operating requirements.	Limited to operations within 400 feet of control station.
Broadcasting from the unmanned aircraft at any point		
Broadcast limitation	Standard remote identification unmanned aircraft must broadcast remote identification message elements.	Limited remote identification unmanned aircraft cannot broadcast remote identification message elements.

3. UAS Without Remote Identification

Under the proposed rule, the vast majority of UAS would be required to remotely identify. The FAA understands, however, that not all UAS would be able to meet this requirement. For example, some UAS manufacturers may be able to bring UAS produced before the compliance date of this rule into compliance, but others might not. In addition, certain amateur-built UAS might not be equipped with remote identification equipment. The FAA is proposing operating rules in § 89.120 to allow these aircraft to continue to operate without remote identification equipment. A UAS that would not qualify as either a standard remote identification UAS or a limited remote identification UAS would only be allowed to operate under two circumstances. The first circumstance is where the UAS operates within visual line of sight and within the boundaries of an FAA-recognized identification area. An FAA-recognized identification area is a defined geographic area where UAS without remote identification can operate. In the proposed § 89.120(a), the

phrase ''operated within an FAA-recognized identification area'' means that both the unmanned aircraft and the person manipulating the flight controls of the UAS would be required to be located within the FAA-recognized identification area from takeoff to landing. FAA-recognized identification areas are described in section XV of this preamble. Note that this operating exception from remotely identifying only applies to those UAS that do not have remote identification; anyone operating a standard or limited remote identification UAS would continue to be bound by the operating rules applicable to their UAS, even if he or she is located inside an FAA-recognized identification area during the flight.

The second circumstance in which a UAS that is not a standard remote identification UAS or limited remote identification UAS could be operated without remote identification is where the person operating the UAS has been authorized by the Administrator to operate the UAS for the purpose of aeronautical research or to show compliance with regulations. In this context, the FAA would consider aeronautical research to be limited to the research and testing of the unmanned aircraft, the control systems, equipment that is part of the unmanned aircraft (such as sensors), and flight profiles, or development of specific functions and capabilities for the UAS. Under this provision, producers and other persons authorized by the Administrator, would have the ability to operate UAS prototypes without remote identification exclusively for researching and testing the UAS design, equipment, or capabilities. This provision does not extend to any other type of research using a UAS.

Additionally, a person authorized by the Administrator would be permitted to conduct flight tests and other operations to show compliance with an FAA-accepted means of compliance for remote identification, or airworthiness regulations, including but not limited to flights to show compliance for issuance of type certificates and supplemental type certificates, flights to substantiate major design changes, and flights to show compliance with the function and reliability requirements of the regulations.

B. Prohibition From Using ADS–B To Satisfy Remote Identification Requirements

The FAA proposes to prohibit the use of ADS–B Out to meet remote identification requirements in this rule. The FAA determined that both the ADS–B message elements and the infrastructure required to receive the ADS–B message elements are incompatible with the current need for remote identification at lower altitudes. ADS–B does not provide information regarding the location of a UAS control station. Thus, it would not advance the FAA's need to associate a control station with the actual unmanned aircraft it controls. Further, because ADS–B receivers do not provide sufficient low altitude coverage, ADS–B Out would not align well with the FAA's vision for the development of UTM. Finally, the FAA determined that the use of ADS–B Out by UAS would generate undue signal saturation and would create an overall safety hazard for manned aircraft due to the potentially high numbers of UAS which may be operating in the airspace at any given time. For these reasons, the FAA is proposing in § 89.125 to prohibit ADS–B Out equipment from being used to comply with the remote identification requirements of part 89.

C. Internet Availability and Transmission to a Remote ID USS

The FAA is proposing to require standard remote identification UAS and limited remote identification UAS to connect automatically to the internet, when available, and transmit remote identification message elements through that internet connection to a Remote ID USS. The FAA is also proposing a related performance requirement for standard remote identification UAS and limited remote identification UAS to continuously monitor the connectivity to the internet and the transmission of remote identification message elements to a Remote ID USS and notify the person manipulating the flight controls of the UAS if that connection is lost or the UAS is no longer transmitting to the Remote ID USS. Because of this proposed performance requirement for the UAS, the person manipulating the flight controls of the UAS would be aware at all times of whether the UAS was connected to the internet and transmitting to a Remote ID USS.

The FAA believes an internet-based solution is appropriate, when the internet is available, because the internet is the largest, most multifaceted, and prevalent platform for data transmission. Under the proposed rule, the internet would be considered available if cellular or other forms of wireless internet connectivity such as Wi-Fi are available in an operational area with sufficient signal strength to maintain a connection between the UAS and the internet. UAS with remote identification would automatically connect to the internet when it is available, similar to how wireless devices, such as smart phones, connect automatically to the internet when there is sufficient signal strength and coverage.

If the internet is available but the operator's Remote ID USS is not working, the operator would be required to either connect to another Remote ID USS or the UAS would be restricted from taking off. In the unlikely event that all Remote ID USS become unavailable at the same time but the internet remains available, no standard or limited remote identification UAS would be able to take off. The FAA assumes this situation would be extremely unlikely. The FAA seeks public comment on whether there are ways to address this extremely unlikely situation within the framework of the rule as proposed.

After connecting to the internet, a standard remote identification UAS or limited remote identification UAS must transmit the remote identification message elements to a Remote ID USS. The FAA anticipates that there will be some Remote ID USS available to the general public and that others will be private. Under the proposed rule, a Remote ID USS would be considered available as long as that Remote ID USS provides remote identification services to the general public at the time the standard remote identification UAS or limited remote identification UAS is being operated. A private or restricted access Remote ID USS would be considered available only to UAS operators who receive remote identification services from that Remote ID USS. For example, if Company ABC sets up a private Remote ID USS to provide remote identification services exclusively to its fleet of UAS, then the private Remote ID USS would only be available to the UAS operators of Company ABC. In comparison, if Company XYZ sets up a Remote ID USS that can be accessed by the general public for remote identification services, then Company XYZ's Remote ID USS would be considered available to all operators of UAS flying in the airspace of the United States, irrespective of whether that access requires a monetary cost. The FAA is not proposing to establish specific requirements regarding Remote ID USS business models, (*e.g.,* charging fees, requiring user agreements, and requiring information from Remote ID USS users). The FAA believes that operators will choose a Remote ID USS that best meets their operational needs. The FAA further discusses some of its assumptions related to Remote ID USS business models in the accompanying

Regulatory Impact Analysis, where it assumes (while acknowledging significant uncertainty) the average publicly available Remote ID USS will charge $2.50 as a monthly subscription ($30 annually) cost to users of its service.

D. In-Flight Loss of Connectivity With a Remote ID USS or Loss of Functionality

The FAA foresees situations where the person manipulating the flight controls of a UAS would need to receive an indication that the connection to a Remote ID USS has been lost mid-flight. Under this proposal, standard remote identification UAS would be produced with the capability to both connect to the internet and, through that connection, transmit to a Remote ID USS and to broadcast. The broadcast capability provides continuous remote identification information and continues to provide remote identification when connectivity to the internet is lost or the unmanned aircraft is no longer transmitting to a Remote ID USS. If the connection to the internet or to a Remote ID USS is lost after takeoff, the person manipulating the flight controls would be allowed to continue operating the UAS as long as it is still broadcasting the remote identification message elements. If, however, a standard remote identification UAS loses its ability to broadcast the message elements, the person manipulating the flight controls of the UAS would be required to land the unmanned aircraft as soon as practicable. This is necessary because a loss of the broadcast capability is an indication of a remote identification equipment failure.

Because limited remote identification UAS cannot broadcast remote identification message elements, if the UAS loses connection to the internet or to a Remote ID USS, then the person manipulating the flight controls would have to land the unmanned aircraft as soon as practicable. The FAA considers this to be the safest course of action given that these operations would be conducted within visual line of sight and no more than 400 feet from the person manipulating the flight controls of the UAS.

Should the UAS remote identification equipment experience a loss of functionality or malfunction in flight, the FAA proposes in §§ 89.110(b) and 89.115(b) to require the person manipulating the flight controls of the UAS to land as soon as practicable. The FAA does not define the phrase ''land as soon as practicable'' and expects that the person manipulating the flight controls of the UAS will take steps to land in a safe manner. For instance, if the aircraft is still within visual line of sight, the safest option may be to keep the aircraft within sight to avoid other aircraft and return to the departure point. For a standard remote identification UAS operating BVLOS, the safest way to land may be to continue to the intended destination.

E. Valid Declaration of Compliance

The FAA is proposing to require persons responsible for the production of UAS with remote identification to declare that the UAS meet the minimum performance requirements of the proposed rule using an FAA-accepted means of compliance by submitting a declaration of compliance for acceptance by the FAA. A declaration of compliance is a document submitted to the FAA by the person responsible for the production of UAS with remote identification. It includes information required by the FAA to determine whether the person and the UAS comply with the remote identification requirements of the rule. The FAA is proposing in §§ 89.110(c)(1) and 89.115(c)(1) to prohibit a person from operating a UAS with remote identification unless its serial number is identified on an FAA-accepted declaration of compliance. The FAA would provide a list of all FAA-accepted declarations of compliance on its website to notify the public when its acceptance of a declaration of compliance is valid. The website would also identify declarations of compliance that have been rescinded. Section XIII.E.3 of this preamble discusses the rescission of a declaration of compliance.

F. Foreign Registered Civil Unmanned Aircraft Operated in the United States

In § 89.101(b), the FAA is proposing to apply the operational requirements of part 89 to persons operating foreign civil unmanned aircraft in the United States. These persons would have to comply with the remote identification requirements in § 89.105, which means that these persons would only be able to operate foreign civil unmanned aircraft in the United States that qualify as standard remote identification UAS, limited remote identification UAS, or that have no remote identification equipment but are operated within an FAA-recognized identification area.

The FAA must be able to correlate the remote identification message elements transmitted or broadcast by foreign civil unmanned aircraft operated in the United States against information that helps FAA and law enforcement identify a person responsible for the foreign civil unmanned aircraft. Where unmanned aircraft are registered in a foreign jurisdiction, the FAA may not have access to information regarding the unmanned aircraft or its registered owner. Thus, the FAA is proposing in § 89.130(a) to allow a person to operate foreign-registered civil unmanned aircraft in the United States only if the person submits a notice of identification to the Administrator. The notice would include the following information to allow the FAA to associate an unmanned aircraft to a responsible person:

(1) The name of the operator and, for an operator other than an individual, the name of the authorized representative providing the notice.

(2) The physical address of the operator and, for an operator other than an individual, the physical address for the authorized representative. If the operator or authorized representative does not receive mail at a physical address, a mailing address must also be provided.

(3) The physical address of the operator in the United States (*e.g.,* hotel name and address).

(4) One or more telephone number(s) where the operator can be reached while in the United States.

(5) The email address of the operator or, for an operator other than an individual, the email address of the authorized representative.

(6) The aircraft manufacturer and model name.

(7) The serial number of the aircraft.

(8) The country of registration of the aircraft.

(9) The registration number of the aircraft.

Once a person submits a notice of identification, the FAA would issue a confirmation of identification. Under § 89.130(c), a person operating a foreign-registered unmanned aircraft in the United States would have to maintain the confirmation of identification at the UAS' control station and would have to produce it when requested by the FAA or a law enforcement officer.

As specified in proposed § 89.130(b)(2), the filing of the notice of identification and the issuance of a confirmation of identification would not have the effect of U.S. aircraft registration.

The issuance of a confirmation of identification would not exempt any person from having to obtain the appropriate safety authority issued by the FAA or economic authority issued by the Department of Transportation [62] prior to conducting unmanned aircraft

[62] *https://www.faa.gov/uas/resources/foreign_operators/.*

operations in the airspace of the United States, if required for their particular operations.

Lastly, under proposed § 89.130(d), the holder of a confirmation of identification would have to ensure that the information provided under proposed § 89.130(a) remains accurate and is current prior to operating a foreign registered civil unmanned aircraft system in the United States.

G. Example Operating Scenarios

The FAA is providing these notional scenarios to provide examples of how the FAA envisions the proposed rule would apply to certain common situations.

1. Subscribing to a USS

Kim decides to give her daughter Emily a UAS for her birthday. Emily, excited to finally have her own UAS, eagerly unwraps the package so she can begin taking aerial selfies. Under FAA rules, Emily's drone must be registered and therefore comes with remote identification. The UAS will not take off unless it is connected to a Remote ID USS. In order to comply with the remote identification requirement, Kim researches FAA-qualified Remote ID USS on the FAA's website and decides to subscribe to Alpha USS, Inc. Emily's UAS was designed to pair with her smartphone and connect to the Remote ID USS through her smartphone's internet connection. After Emily's UAS connects to Alpha USS, she is able to start using her drone to take selfies.

2. Operating a Standard Remote Identification UAS

Patty has a photography business and has decided to purchase a UAS to take aerial photos for weddings and other events. She researched different types of UAS and their capabilities and determined that she needs a UAS that can operate more than 400 feet from its control station. Patty decides to buy a standard remote identification UAS. Because the UAS has standard remote identification, it is designed to: (1) Connect to the internet and transmit the remote identification message elements through that internet connection to a Remote ID USS; and (2) broadcast the same message elements directly from the unmanned aircraft.

Patty sees that the UAS she wants to buy has a label that says it is a standard remote identification UAS. Regardless, Patty checked the FAA's website to confirm that the UAS she is buying has a valid FAA-accepted declaration of compliance. Because the UAS was listed on the FAA website, the UAS meets the requirements of part 89. Patty intends to operate her UAS for business purposes, so the operations are subject to the operating rules in 14 CFR part 107, which require her to register the unmanned aircraft with the FAA. Patty goes online to the FAADroneZone[63] website, applies for, and is issued a Certificate of Aircraft Registration under part 48. As part of the application process, Patty submits her unmanned aircraft's serial number. Because Patty is required to register her unmanned aircraft under part 48, she is subject to the remote identification operating requirements in part 89.

Patty then subscribes online to Alpha, Inc., an FAA-qualified Remote ID USS. Her UAS is designed to connect to the internet by automatically pairing with her personal smart phone when the phone is running an application provided by Alpha USS. Each time Patty uses her UAS, it automatically transmits the standard remote identification UAS' remote identification message elements through that internet connection to Alpha USS. Patty chooses to use her unmanned aircraft's serial number for the UAS Identification message element, but in the future, she may instead choose to use a session ID assigned by Alpha USS.

Sometimes, Patty's UAS loses its internet connection while she is operating in rural areas; she can continue the operation as long as the unmanned aircraft is still broadcasting the remote identification message elements. During one operation, Patty's UAS indicated that, due to a malfunction, the unmanned aircraft was no longer broadcasting the message elements, at which point she landed the unmanned aircraft as soon as practicable.

During a different operation, Patty's UAS attempts to connect to Alpha USS at the time of takeoff, but Alpha's remote identification service is unavailable because Alpha's server is down. Patty's UAS can still connect to the internet through her smart phone and she discovers that an alternate FAA-qualified Remote ID USS, Bravo, Inc., is available. Patty's UAS connects to Bravo, Inc. and is able to fly her UAS. Patty's subscription with Alpha USS provides for a ''roaming'' feature that allows her to connect to other available USS free of charge so she can have uninterrupted service. If her subscription did not provide this roaming feature, Patty would have had to pay any associated fees directly to Bravo. This is because if any Remote ID USS is available, even if it is not the one she contracted with, her UAS is designed to connect to it through the internet. As long as she can connect to the internet, it is incumbent on Patty to connect to a USS. Only when the UAS cannot connect to the internet would the unmanned aircraft be able to take off while only broadcasting.

On another occasion, Patty is unable to connect to Alpha, Inc. at the time of takeoff due to a disruption in Alpha's service, but Bravo is also experiencing problems. There are no other publicly available Remote ID USS. Because Patty's UAS is designed not to take off when it has access to the internet but is not connected to a Remote ID USS, her unmanned aircraft would not take off. Her service would be interrupted until Alpha, Bravo, or another publicly available USS became available.[64]

3. Operating a Limited Remote Identification UAS

Charlie purchases a used UAS that looks like a spaceship. The UAS weighs more than 0.55 pounds and he intends to operate it outside his house for recreational purposes, such as filming his daughter's soccer games and entertaining his sons who love science fiction movies. The person who sold Charlie the UAS assures him it is remote identification compliant. Because the company responsible for production of the UAS was required to label the unmanned aircraft to indicate that it is remote identification compliant, Charlie is able to confirm the seller's assurance by reading the label affixed to the aircraft. Charlie's UAS is a ''limited remote identification UAS,'' which means it is designed and produced to operate no more than 400 feet from its control station and cannot broadcast remote identification message elements. Under part 89, he is only allowed to operate his limited remote identification unmanned aircraft within visual line of sight. Prior to his purchase, Charlie visits the FAA's website and confirms that his UAS has an FAA-accepted declaration of compliance. After the previous UAS owner de-registers the unmanned aircraft as required by § 48.105(b)(2), Charlie goes online to the FAADroneZone website, applies for, and is issued a Certificate of Aircraft Registration under part 48. During the registration process, he provides the UAS manufacturer name, the model name, and the aircraft's manufacturer-issued serial number.

Because Charlie is required to register his unmanned aircraft, he is also subject

[63] *https://faadronezone.faa.gov.*

[64] Practically speaking, the FAA anticipates that there will be many more than two publicly available USS and this scenario under which all USS would be simultaneously unavailable should not occur except in the rarest of circumstances.

to the remote identification operating rules in part 89. This means that before Charlie can start to use the UAS, he must subscribe to a USS. He subscribes to Bravo, Inc., an FAA-qualified Remote ID USS and opts to use the unmanned aircraft's serial number for the UAS Identification message element. Charlie's UAS is designed to pair with his smartphone to transmit the remote identification message elements through an internet connection to a USS. Because Charlie's UAS cannot broadcast remote identification message elements, it does not function unless his smartphone is connected to the internet and transmitting through that internet connection to Bravo USS. If Charlie's UAS loses its connection to either the internet or is unable to transmit to Bravo USS in the middle of an operation, he would be required to land the aircraft as soon as practicable. Charlie may take off again as soon as his UAS reestablishes its connection to the internet and can transmit to a Remote ID USS.

4. Operating a UAS Without Remote Identification

Linus wants to fly a UAS without remote identification that he assembled at home from parts he bought at a hobby shop a few years ago. He uses his unmanned aircraft exclusively as a model aircraft. Since he registered his unmanned aircraft in 2018, before the effective date of the remote identification rule, he was not required to provide any specific information about the aircraft, such as the serial number. Linus's aircraft registration expires in 2021, and he will renew the registration of his unmanned aircraft on the FAADroneZone website. At that time, he would have to submit the unmanned aircraft's manufacturer and model name as part of the registration process. Because Linus built his own UAS, he plans to use his own name as the manufacturer and use a model number of his choosing.

Because his UAS does not have any remote identification capabilities, Linus knows he may only operate it within an FAA-recognized identification area. Linus is a member of the Arizona Amateur Modelers (AAM) organization, which has an FAA-recognized identification area near his home. He found information about AAM's FAA-recognized identification area at the FAA website and has agreed to AAM's terms and conditions for operating within the FAA-recognized identification area. While operating there, Linus makes sure that both he and the unmanned aircraft physically stay within the boundaries of the FAA-recognized identification area. Linus operates the unmanned aircraft within visual line of sight and in accordance with any applicable operational rules and site-specific safety guidelines.

5. Flying in an FAA-Recognized Identification Area

Scenario 1: Linus owns another UAS which is a standard remote identification UAS and wants to operate it at AAM's FAA-recognized identification area. Since his second UAS is a standard remote identification UAS, even when operating within the boundaries of the FAA-recognized identification area, he is still required to ensure that the standard remote identification UAS transmits the applicable remote identification message elements through an internet connection to a Remote ID USS and broadcasts directly from the unmanned aircraft. The remote identification requirements for Linus are no different inside or outside of the FAA-recognized identification area when he is operating a UAS with remote identification.

Scenario 2: Linus owns a third UAS—this one a limited remote identification UAS—which was given to him as a birthday present. He decided he would try out his new limited remote identification UAS after he finished posting on his blog. While working on his computer, there was a massive power outage that took out all communications in the city. Since Linus lost connection to the internet in both his computer and mobile phone, he decided he would go fly his limited remote identification UAS at the nearby FAA-recognized identification area until the internet came back and he could finish working on his blog. When Linus arrived at the FAA-recognized identification area, he took out the limited remote identification UAS from its box, turned it on, and attempted to fly. The limited remote identification UAS did not lift off. Linus realized that he was going to have to go back home to get his standard remote identification UAS or his UAS with no remote identification capabilities. Even though he was at an FAA-recognized identification area, he would not be able to fly his limited remote identification UAS because the limited remote identification UAS cannot broadcast remote identification message elements and was produced to meet requirements that prevent it from taking off when it cannot connect to the internet and transmit to a Remote ID USS. Linus will be able to operate his limited remote identification UAS at the FAA-recognized identification area or elsewhere when the connection to the internet is reestablished and his limited remote identification UAS is able to transmit to a Remote ID USS.

Scenario 3: Sam is cleaning out his closet and finds a UAS that he bought a number of years ago. The UAS was purchased before the remote identification rule went into effect and the unmanned aircraft weighs 1 pound. He remembers registering the unmanned aircraft, but knows it does not have remote identification. Sam is aware that some older UAS manufactured without remote identification could receive a software update that makes them remote identification compliant. He checks the UAS manufacturer's website, but unfortunately his model of UAS is not eligible for an update. Because Sam's unmanned aircraft is required to be registered and does not have remote identification, Sam can only operate it at an FAA-recognized identification area.

XI. Law Enforcement Access to Remote Identification and Registration Information

In addition to aiding the FAA in its civil enforcement of FAA regulations, the FAA anticipates that with the implementation of the proposed remote identification requirements, law enforcement and national security agencies would find the remote identification information useful for criminal enforcement, public safety, and security purposes. There are over 18,000 law enforcement and security agencies across the United States, many of which would seek access to remote identification information to respond to emerging threats or as part of an investigation.

The FAA envisions it would facilitate near real-time access to the remote identification message elements (paired with certain registration data, when necessary) for accredited and verified law enforcement and Federal security partners. The information could be used to identify and possibly contact the person manipulating the flight controls of a UAS in response to potentially unsafe or nefarious UAS activities. Potential scenarios include local law enforcement or Federal agencies seeking information in response to nuisance calls from private citizens or large crowd event managers; UAS at emergency scenes (*e.g.,* fires, motor vehicle accident scenes); critical infrastructure protection; UAS around airports; and manned aircraft encounters with UAS. Law enforcement agencies would be able to access remote identification information in near real-time and also access remote identification information maintained by Remote ID USS.

Remote identification would assist in providing law enforcement and security agencies with important information about the UAS in real time, including the location of the control station and therefore the location of the person manipulating the flight controls of the UAS. This information would better enable law enforcement to immediately find the location of the person manipulating the flight controls of a UAS and help with preliminary threat discrimination. In addition, when correlated with registration information, remote identification of UAS also would enable law enforcement officers to determine some information about who the UAS' owner is before engaging the person manipulating the flight controls of a UAS directly. Once located, a law enforcement officer can speak with the person manipulating the flight controls of a UAS to gain potential insight into his or her intentions and allow the officer to either educate the person manipulating the flight controls of a UAS or begin an investigation. Although remote identification of UAS may not deter nefarious actors, it would allow the swift interdiction of the clueless and careless persons manipulating the flight controls of UAS and shift law enforcement and security partners' UAS protection efforts to the truly nefarious actors. This information would also aid in any subsequent criminal or civil enforcement action.

Remote identification information, when correlated with UAS registry information, would inform law enforcement officers about two essential factors: Who registered the UAS, and where the person manipulating the flight controls of a UAS is currently located. This is particularly relevant to a law enforcement officer's decision on whether use of force would be appropriate. Law enforcement officials have made clear that it can be very difficult to make a decision about the potential intent of a person manipulating the flight controls of a UAS with the limited information available from visually observing a UAS. Remote identification information would enable better threat discrimination, an immediate and appropriate law enforcement response, and a more effective follow-on investigation.

As part of this NPRM, the FAA has conducted a Privacy Impact Assessment. The PIA found the NPRM requirements that affect privacy include, among others, the registration of the UAS with the FAA, the transmission of data from the UAS to Remote ID USS, and the broadcast of data from standard remote identification UAS to any person capable of receiving broadcasts. As noted elsewhere in this NPRM, the FAA anticipates that the message elements related to any standard remote identification UAS or limited remote identification UAS are publicly available information and may be accessed by any person able to receive a broadcast or who has access to a Remote ID USS. Currently, the FAA restricts access to information contained in its small unmanned aircraft registration system; the FAA is not proposing to change the restrictions regarding that information.

The PIA discusses the information proposed to be collected and the uses of that information. The PIA points to several mitigation strategies including: limiting collection to only relevant and necessary personally identifiable information (PII), limiting the use of PII to the specific purpose for which it was collected, using security measures to protect PII collected, notifying individuals of collection practices prior to collection, and the voluntary nature of all PII submitted. Additionally, the FAA would enter into contractual agreements with the Remote ID USS including directions for the use, protection, and storage of the data. Section XIV discusses the data security requirements the FAA intends to impose upon FAA-qualified Remote ID USS. Although the message elements themselves would be publicly accessible information, the ability to cross-reference that information with registry data would not be publicly available and would be limited to the FAA and law enforcement for security purposes. A copy of the draft PIA is posted in the docket for this rulemaking.[65]

The following paragraphs provide notional scenarios regarding how the FAA envisions the proposed rule would apply to law enforcement agents.

Lucy is a sheriff's deputy in Boone County, Montana, and is assigned to provide a law enforcement presence at an outdoor concert. At one point during the event, Lucy observes an unmanned aircraft circling above the crowd. She opens an application (app) for law enforcement[66] on her smartphone, which identifies the UAS and indicates that the UAS operator is located 90 feet away from where she is standing. She approaches a man holding a UAS controller who appears to be operating the UAS. The UAS operator tells her he is filming the crowd for the purposes of creating and selling a video of the event. Lucy's app informs her that the unmanned aircraft is not registered. Through the conversation, Lucy learns that the person manipulating the flight controls of the UAS is unaware of the rules for operating unmanned aircraft over people. She also discovers that the person manipulating the flight controls of the UAS does not hold an FAA remote pilot certificate. Based on the information available to Lucy, she requests that the person manipulating the flight controls of the UAS land the UAS in a manner that ensures the safety of the concert audience. After the unmanned aircraft lands, she collects the pilot's information, takes appropriate local law enforcement action, and forwards the information to the FAA for appropriate action.

In another scenario, Officer Schroeder, a law enforcement officer working at a national security facility, sees a UAS operating near a protected area of the facility that is not transmitting any remote identification information. He knows this because he has an internet-connected tablet computer with an application developed for law enforcement that displays remote identification information for UAS operating nearby. Because the UAS is not transmitting any remote identification information, he is unable to access information that could identify the UAS and indicate the location of the person manipulating the flight controls of the UAS. He visually scans an area on the ground below where the UAS is operating but does not see anyone that could be the person manipulating the flight controls of the UAS. After completing his risk assessment, Officer Schroeder determines the UAS is a potential threat and takes action in accordance with his agency's procedures.

On a different occasion, Officer Schroeder is alerted to the presence of a UAS near the same protected area of the facility because the UAS is transmitting remote identification information in accordance with FAA regulatory requirements. Officer Schroeder is able to identify the UAS and sees the location of the person manipulating the flight controls of the UAS on a tablet computer. The serial number being transmitted by the UAS is used to determine that the registered owner is Schultz Inspection Services. Officer Schroeder checks the facility's log of authorized UAS activities for the day and determines that Schultz

[65] Upon finalization, PIAs are posted on the Department of Transportation's Privacy Program page, available at *https://www.transportation.gov/individuals/privacy/privacy-impact-assessments#Federal%20Aviation%20Administration%20(FAA).*

[66] The FAA anticipates that in the future, third parties may develop mobile phone applications for law enforcement use.

Inspection Services is conducting an authorized inspection.

XII. Means of Compliance

A. Introduction

Performance-based regulations describe outcomes, goals, or results without establishing a specific means or process for regulated entities to follow. Under certain FAA performance-based rules, a person may use a means of compliance to meet these performance requirements.

The FAA recognizes that UAS technology is continually evolving, making it necessary to harmonize new regulatory action with technological growth. Setting performance requirements is one way to promote that harmonization. Developing a regulatory framework with performance-based requirements rather than prescriptive text provides a flexible regulation that allows a person to develop means of compliance—which may include consensus standards—that adjust to the fast pace of technological change, innovation, design, and development while still meeting the regulatory requirements. The FAA believes that the use of an FAA-accepted consensus standard as a means of compliance would provide stakeholders this flexibility to comply with the remote identification requirement.

The FAA recognizes that consensus standards are one way, but not the sole means, to show compliance with the performance requirements of the proposed part 89. The FAA emphasizes that, although a means of compliance developed by a consensus standards body (*e.g.,* ASTM International (ASTM), Society of Automotive Engineers (SAE), Consumer Technology Association (CTA), etc.) may be available, any individual or organization would also be able to submit its own means of compliance to the Administrator for consideration and potential acceptance.

The FAA encourages consensus standards bodies to develop means of compliance and submit them to the FAA for acceptance. These bodies generally incorporate openness, balance, due process, appeals process, and peer review. The FAA has an extensive history of working with consensus standards bodies such as ASTM International, SAE, and Institute of Electrical and Electronics Engineers (IEEE). Section 12(d) of the National Technology Transfer and Advancement Act of 1995 (NTAA)[67] directs Federal agencies to use consensus standards in lieu of government-unique standards except where inconsistent with law or otherwise impractical. The FAA intends to rely increasingly on consensus standards as FAA-accepted means of compliance for UAS performance-based regulations for remote identification, consistent with FAA precedent for general aviation aircraft and other initiatives taken with respect to UAS.

The proposed approach aligns with the direction of the Office of Management and Budget (OMB) Circular A–119, which favors the use of performance-based regulations and voluntary consensus standards. OMB Circular A–119 states that, for cases in which no suitable voluntary consensus standards exist, an agency may consider using other types of standards. In addition, an agency may develop its own standards or use other government-unique standards, solicit interest from qualified standards development organizations for development of a standard, or develop a standard using the process principles outlined in Section 2e of the Circular.[68] OMB Circular A–119 cautions regulators to avoid standards with biases in favor of a few large manufacturers that create an unfair competitive advantage.

B. Applicability

The FAA is proposing that—with limited exceptions—all UAS produced for operation in the United States would be required to be designed and produced to meet the performance requirements of proposed part 89 in accordance with an FAA-accepted means of compliance for remote identification. The FAA is also proposing that persons operating a UAS within the airspace of the United States (other than within FAA-recognized identification areas) would be prohibited from doing so unless the UAS meets the requirements of the rule.

Subpart D of the proposed rule prescribes the minimum remote identification message element set and minimum performance requirements for standard remote identification UAS and limited remote identification UAS. Specifically, § 89.305 and § 89.315 establish the proposed minimum message elements which would have to be broadcast or transmitted, as appropriate, by standard remote identification UAS and limited remote identification UAS. The minimum remote identification message element requirements are discussed in greater detail in section XII.C of this preamble. Sections 89.310 and 89.320 propose the minimum performance requirements for standard remote identification UAS and limited remote identification UAS. These requirements are discussed in section XII.D of this preamble.

Subpart E of the proposed rule would prescribe the requirements for the submission (§ 89.405) and acceptance (§ 89.410) of means of compliance used in the design and production of standard remote identification UAS or limited remote identification UAS to ensure such UAS meet the minimum performance requirements of subpart D. The process for submission and acceptance of a means of compliance is discussed in section XII.F of this preamble.

C. Remote Identification Message Elements

The FAA is proposing the minimum message elements necessary for the remote identification of UAS. These message elements contain the data required to meet the objectives of the proposed rule. Although the message elements are designed specifically to meet remote identification requirements, the FAA anticipates the proposed message elements would also support future UTM services.

Under proposed § 89.315, the message elements for limited remote identification UAS would include: (1) The UAS Identification; (2) an indication of the control station's latitude and longitude; (3) an indication of the control station's barometric pressure altitude; (4) a time mark; and (5) an indication of the emergency status of the UAS.

Under proposed § 89.305, the message elements for standard remote identification UAS would include the same message elements required for limited remote identification UAS plus (1) an indication of the unmanned aircraft's latitude and longitude, and (2) an indication of the unmanned aircraft's barometric pressure altitude.

In accordance with § 89.120, unless authorized by the Administrator to operate UAS for the purpose of aeronautical research or showing compliance with regulations, a person operating a UAS that does not meet the requirements for standard remote identification UAS under § 89.110 or for limited remote identification UAS under § 89.115 would only be allowed to operate within FAA-recognized identification areas.

1. UAS Identification

The UAS Identification message element establishes the unique identity of UAS operating in the airspace of the United States. This message element would consist of one of the following:

[67] Public Law 104–113; 15 U.S.C. 3701 *et seq.*

[68] OMB Circular A–119, Section 5d.

- A serial number assigned to the unmanned aircraft by the person responsible for the production of the standard or limited remote identification unmanned aircraft system; or
- A session identification number (session ID) assigned by a Remote ID USS.

The FAA considered but is not proposing to use the unmanned aircraft registration number instead of a serial number as the UAS Identification. A serial number is a unique identifier issued by the UAS producer to identify and differentiate individual aircraft. The serial number is preferable as a unique identifier in a remote identification message because it would be encoded into the unmanned aircraft system during production whereas a registration number is provided to the owner of the unmanned aircraft and may change for that aircraft if the unmanned aircraft is resold. In addition, a registration number is assigned by the FAA only after a UAS owner applies for one, whereas a serial number would be assigned prior to the UAS being purchased and would provide a means for the UAS to send out a remote identification message, even if it is not registered. The FAA anticipates a UAS would be designed to broadcast and transmit, as appropriate, its serial number regardless of whether the unmanned aircraft has been registered or not.

i. Session Identification

The FAA is proposing an option for UAS operators to be able to use a session ID assigned by a Remote ID USS as the UAS Identification, instead of the unmanned aircraft serial number. This would provide a layer of operational privacy. The association between a given session ID and the unmanned aircraft serial number would not be available to the public through the broadcast message. This association would be available to the issuing Remote ID USS, the FAA, and other authorized entities, such as law enforcement. The FAA recognizes there could be concerns with the transmission of the serial number from UAS conducting routine or repetitive operations. For example, some businesses operating UAS may be concerned with the collection and analysis of flight information by their competitors in a manner that reveals sensitive business practices, such as the flight profile of an individual UAS over time. Allowing a UAS to broadcast and transmit to a Remote ID USS, as appropriate, a session ID instead of a serial number would provide operational privacy to these operators without adversely impacting the safety and security needs of the FAA, national security agencies, and law enforcement. Where a session ID has been issued, the FAA and authorized entities would have the means to correlate the session ID to the UAS serial number and would consequently be able to correlate the UAS serial number to its registration data.

ii. Correspondence Between Serial Number and Session ID

The FAA is proposing in § 89.310(j)(1) to require standard remote identification UAS to use the same remote identification message elements, including the same UAS Identification, when transmitting to a Remote ID USS and broadcasting directly from the unmanned aircraft. The FAA considers that the UAS Identification should be required to be identical because a lack of consistency regarding this message element could create confusion as to who is flying in the airspace of the United States. If the broadcast message and the transmission to the Remote ID USS contain different UAS Identifications, it may potentially appear as if there are two different aircraft in the airspace instead of one in a particular location.

2. An Indication of the Control Station's Latitude and Longitude

As proposed in § 89.305(b) for standard remote identification UAS and § 89.315(b) for limited remote identification UAS, the FAA would require a UAS to transmit the latitude and longitude of its control station through an internet connection to a Remote ID USS. In addition, standard remote identification UAS would have to broadcast this information. This message element would be derived from a position source, such as a GPS receiver. The FAA notes that it is not proposing a specific type of position source used to determine this information to allow the greatest flexibility to designers and producers of UAS. The FAA would require that the person manipulating the flight controls of the UAS is co-located with the control station; therefore, knowing the control station location would also provide the location of the person manipulating the flight controls. This message element would be used by the FAA and authorized entities to locate the UAS operator when necessary for the safety, security, or efficiency of aircraft operations in the airspace of the United States.

3. An Indication of the Control Station's Barometric Pressure Altitude

As proposed in § 89.305(c) for standard remote identification UAS and § 89.315(c) for limited remote identification UAS, the FAA would require an indication of the control station's barometric pressure altitude, referenced to standard sea level pressure of 29.92 inches of mercury or 1013.2 hectopascals. This information would be used to establish a standard altitude reference for UAS operating in the airspace of the United States and provide information that could be used to approximate the control station's height above ground level. This information is necessary for instances where the person manipulating the flight controls of the UAS is not at ground level, such as a person operating a UAS from the roof of a building.

The FAA considered and rejected a requirement to indicate the control station's geometric altitude, which is a measure of altitude provided by GPS that is not affected by atmospheric pressure. Barometric pressure altitude is a more precise measurement than geometric altitude and is the standard altitude reference for aviation. While systems such as ADS–B require an indication of both barometric pressure altitude and geometric altitude, those requirements are necessary to ensure the safe separation of aircraft in controlled airspace. The FAA concluded that a single altitude reference for UAS with remote identification equipment is sufficient for identification and thus is proposing to use only barometric pressure altitude. The FAA requests comments regarding whether both barometric pressure altitude and geometric altitude of the control station should be part of the remote identification message elements.

4. An Indication of the Unmanned Aircraft's Latitude and Longitude

As proposed in § 89.305(d) for standard remote identification UAS, this message element would provide the position of the unmanned aircraft using its latitude and longitude and would be derived from a position source, such as a GPS receiver. This message element would be used to associate a specific unmanned aircraft with its associated control station position. It would also be used to provide situational awareness to other aircraft, both manned and unmanned, operating nearby. Manned aircraft, especially those operating at low altitudes where UAS operations are anticipated to be the most prevalent, such as helicopters and agricultural aircraft, could carry the necessary

equipment to display the location of UAS operating nearby. Facility operators could use latitude and longitude information to know about the location of UAS operating near an airport, airfield, or heliport. The FAA notes that this proposed requirement would not apply to limited remote identification UAS, which would be required to transmit message elements regarding the location of the control station only through an internet connection to a remote ID USS.

5. An Indication of the Unmanned Aircraft's Barometric Pressure Altitude

As proposed in § 89.305(e) for standard remote identification UAS, this message element would indicate the unmanned aircraft's barometric pressure altitude referenced to standard sea level pressure of 29.92 inches of mercury or 1013.2 hectopascals. This information would be used to establish a standard altitude reference for UAS operating in the airspace of the United States. It would also be used to provide situational awareness to other aircraft, both manned and unmanned, operating nearby. The FAA notes that this proposed requirement would not apply to limited remote identification UAS, which would be required to transmit through an internet connection to a Remote ID USS message elements regarding the location of the control station only. The FAA considered and rejected a requirement to indicate the unmanned aircraft's geometric altitude, concluding that a single altitude reference—barometric pressure altitude—is sufficient (see discussion in XII.C.3 of this preamble). The FAA requests comments regarding whether both barometric pressure altitude and geometric altitude of the unmanned aircraft should be part of the remote identification message elements.

6. Time Mark

This message element would provide a time mark identifying the Coordinated Universal Time (UTC) time of applicability of a position source output. A position source output is the latitude and longitude coordinates of the unmanned aircraft or control station, as applicable. The time of applicability is therefore a record of the UTC time when the UAS was at a particular set of coordinates. As proposed in § 89.305(f) for standard remote identification UAS, the time mark would apply to the position source output for both the control station and the unmanned aircraft. For limited remote identification UAS, the same requirement is proposed in § 89.315(d), but the time mark would only be applicable to the control station position source output. While the FAA is not proposing a particular format for the time mark, the FAA anticipates that a means of compliance that specifies a GPS position source would also specify a GPS time mark.

As an unmanned aircraft or control station position changes, the position source, such as a GPS receiver, provides continuous outputs that indicate the new position of the unmanned aircraft or control station. The time mark message element would be used to indicate the time a particular unmanned aircraft or control station location was measured, therefore providing information that can be used to correlate the time and location of unmanned aircraft operating in the airspace of the United States.

7. An Indication of the Emergency Status of the UAS

As proposed in § 89.305(g) for standard remote identification UAS and § 89.315(e) for limited remote identification UAS, this message element would specify a code that indicates the emergency status, which could include lost-link, downed aircraft, or other abnormal status of the UAS. The FAA anticipates that a standard for remote identification would specify the different emergency codes applicable to unmanned aircraft affected by this rule. This message element could be initiated manually by the person manipulating the flight controls of the UAS or automatically by the UAS, depending on the nature of the emergency and the UAS capabilities. This message element would alert others that the UAS is experiencing an emergency condition and would indicate the type of emergency. The requirement would be useful for a multitude of reasons. For example, security personnel could use an emergency status to differentiate a nefarious actor from a malfunctioning unmanned aircraft. Other users of the airspace of the United States or Remote ID USS could use the information to make informed decisions about how best to keep nearby aircraft out of the way of an unmanned aircraft experiencing an emergency. Thus, the emergency status requirement would contribute to a safer and more efficient airspace of the United States.

D. Minimum Performance Requirements

The proposed rule would require standard remote identification UAS to meet the minimum performance requirements established in § 89.310 by using an FAA-accepted means of compliance. These requirements relate to the control station location, automatic connection to a Remote ID USS, time mark, self-testing and monitoring, tamper resistance, connectivity, error correction, interference considerations, message transmission, and message elements performance requirements.

The proposed rule would require limited remote identification UAS to meet the minimum performance requirements established in § 89.320 by using an FAA-accepted means of compliance. The performance requirements for limited remote identification UAS cover the topics addressed in the requirements for standard remote identification UAS not related to broadcast functionality, and include criteria for range limitation.

1. Control Station Location

As proposed in § 89.310(a) for standard remote identification UAS and § 89.320(a) for limited remote identification UAS, the FAA would require all UAS with remote identification to generate and encode a control station location that corresponds to the location of the person manipulating the flight controls of the UAS. The rationale for this requirement is to assist the FAA and authorized persons using this information to locate the person manipulating the flight controls of the UAS. The FAA envisions that in some situations, the control station might be a distributed system where some elements, such as a remotely sited uplink antenna, might not be located in a close enough proximity to the person manipulating the flight controls of the UAS. Thus, the FAA intends for an FAA-accepted means of compliance to outline a process for UAS designers and producers to determine which part or element of the control station should be incorporated into the remote identification message due to its close proximity to the person manipulating the flight controls of the UAS.

2. Automatic Remote ID USS Connection

As proposed in § 89.310(b) for standard remote identification UAS and § 89.320(b) for limited remote identification UAS, the FAA is proposing that from takeoff to landing, the UAS would be required to automatically maintain a connection to the internet when available and would be required to transmit the message elements to a Remote ID USS through that connection. The FAA envisions that UAS would connect to an internet-based Remote ID USS upon initialization. This process would be similar to the way cell phones automatically connect to cellular networks without user input

when the cell phones are turned on and when they are within range of a cellular network. Standard remote identification UAS would also be required to broadcast message elements.

The FAA welcomes comments on whether the connection should be required from takeoff to landing or whether it should be required from start up to shut down.

3. Time Mark

As proposed in §§ 89.310(c) for standard remote identification UAS and § 89.320(c) for limited remote identification UAS, the FAA is proposing that all UAS with remote identification would be required to generate and transmit through an internet connection to a Remote ID USS messages with the time mark message element; standard remote identification UAS would broadcast the message element as well. The time mark message element would have to be synchronized to the time when all other message elements are generated. The purpose of this requirement is to ensure that position and other data contained in remote identification messages would have a usable time reference for the purposes of reconstructing unmanned aircraft flight profiles.

4. Self-Testing and Monitoring

The FAA is proposing in § 89.310(d) for standard remote identification UAS and § 89.320(d) for limited remote identification UAS, to require UAS with remote identification to automatically test the remote identification functionality when the UAS is powered on and to notify the person manipulating the flight controls of the UAS of the result of the test. Further, the FAA is proposing to prohibit these UAS from taking off if the remote identification equipment is not fully functional. Since a person would only be allowed to operate a standard remote identification UAS or a limited remote identification UAS if its remote identification equipment is functional (§ 89.110(c)(2) and § 89.115(c)(2)), the FAA envisions that UAS designers and producers would build a notification system to alert potential operators of any remote identification equipment-related malfunction. This notification requirement would help operators comply with the operating requirements of proposed part 89.

The FAA is also proposing to require UAS to continuously self-monitor the remote identification functionality throughout the flight and to provide notification of malfunction or failure to the person manipulating the flight controls of the UAS. With this capability, the person manipulating the flight controls of the UAS can make informed decisions about what actions to take to minimize risk to other users of the airspace and people and property on the ground. This requirement is necessary because, as proposed in § 89.110(b), a standard remote identification UAS would be required to land as soon as practicable if it loses broadcast capability in-flight. Similarly, a limited remote identification UAS would be required to land as soon as practicable if it can no longer transmit the message elements through an internet connection to a Remote ID USS, as proposed in § 89.115(b).

5. Tamper Resistance

The FAA is proposing in § 89.310(e) for standard remote identification UAS and in § 89.320(e) for limited remote identification UAS to require that UAS with remote identification be designed and produced in a way that reduces the ability of a person to tamper with the remote identification functionality. The FAA envisions the UAS would have tamper-resistant design features to hinder the ability to make unauthorized changes to the remote identification equipment or messages.

6. Connectivity

For standard remote identification UAS, the FAA is proposing in § 89.310(f)(1) and § 89.310(f)(2) that if the internet is available at takeoff, the unmanned aircraft would be required to be designed and produced so that it would not be able to take off unless it is connected to the internet and transmitting the message elements in proposed § 89.305 through that internet connection to a Remote ID USS.

In addition, the FAA is proposing to require that the message elements be broadcast directly from the unmanned aircraft. If the internet is unavailable at takeoff, the standard remote identification UAS would not be able to take off unless it is broadcasting the message elements. Further, in § 89.310(f)(3), the FAA is proposing to require a standard remote identification UAS to continuously monitor its connection to the internet and the transmission of remote identification message elements to a Remote ID USS. If either is lost, the UAS would have to notify the person manipulating the flight controls of the UAS so he or she may take appropriate action, as needed.

For limited remote identification UAS, the FAA is proposing in § 89.320(f)(1) that if the internet is available at takeoff, the limited remote identification UAS would be required to be designed and produced in such a way that it would not be able to take off until it establishes a connection to the internet and transmits the message elements in proposed § 89.315 through that internet connection to a Remote ID USS. If the internet is unavailable at takeoff, the limited remote identification UAS would not be able to take off because, unlike a standard remote identification UAS, a limited remote identification UAS would not be able to broadcast the remote identification message elements in § 89.305 or § 89.315. Further, under proposed § 89.320(f)(2), a limited remote identification UAS would be required to continuously monitor the connection to the internet and the transmission of remote identification message elements to a Remote ID USS. If connection to the internet is lost or the UAS stops transmitting to a Remote ID USS, the UAS would be required to notify the person manipulating the flight controls of the UAS so that the person may land the limited remote identification UAS as soon as practicable.

7. Error Correction

As proposed in § 89.310(g) for standard remote identification UAS and § 89.320(g) for limited remote identification UAS, the FAA is proposing to require all UAS with remote identification equipment to incorporate error correction in the transmission and broadcast of the message elements, as appropriate. Error correction would allow remote identification broadcast receivers, such as smart phones, and Remote ID USS to detect potential errors that may exist in the message, and take the appropriate action. The FAA is not proposing any specific algorithms or technologies that would be required to be incorporated into an FAA-accepted means of compliance. Instead, the error correction capabilities incorporated into a proposed means of compliance would be reviewed and evaluated as a part of the acceptance process.

8. Interference Considerations

As proposed in § 89.310(h) for standard remote identification UAS and in § 89.320(h) for limited remote identification UAS, and consistent with FCC regulations, the FAA would prohibit the remote identification equipment from causing harmful interference to other systems or equipment installed on the unmanned aircraft or control station. For example, the remote identification equipment could not cause harmful interference to the UAS command and control datalink and could not otherwise be in violation of FCC regulations. In addition, the

remote identification equipment would not meet the requirements of this rule if its operation would be adversely affected by interference from other systems or equipment installed on the unmanned aircraft or control station, such as the UAS command and control datalink or a camera feed from the unmanned aircraft to a display at the control station.

A specific means of compliance may include requirements to use specific radio frequency emitters and receivers. The FAA envisions that a proposed means of compliance could include an analysis of frequency congestion and interference considerations. For example, a proposed means of compliance could require analysis and mitigation of interference from equipment on the ground as well as other similarly equipped unmanned aircraft in the air. Additionally, the means of compliance could also consider the impact those equipped aircraft could have on manned aircraft or equipment on the ground that use the same frequency bands (*e.g.,* personal electronic devices). The FAA does not propose a particular method by which interference considerations are identified or mitigated by designers or producers. Instead, the FAA would consider proposed methods for dealing with interference considerations and would verify that they are appropriate for the types of equipment and operations applicable to those means of compliance and do not run counter to any applicable regulations, including FCC regulations.

9. Message Transmission

The FAA is proposing in § 89.310(i)(1) that standard remote identification UAS be capable of transmitting the message elements in proposed § 89.305 through an internet connection to a Remote ID USS. Additionally, the FAA is proposing in § 89.310(i)(2) to require that standard remote identification UAS be capable of broadcasting the message elements in proposed § 89.305 using a non-proprietary broadcast specification and radio frequency spectrum in accordance with 47 CFR part 15 that is compatible with personal wireless devices. The FAA envisions that remote identification broadcast equipment would broadcast using spectrum similar to that used by Wi-Fi and Bluetooth devices. The FAA is not, however, proposing a specific frequency band. Rather, the FAA envisions industry stakeholders would identify the appropriate spectrum to use for this capability and would propose solutions through the means of compliance acceptance process. This requirement would ensure that the public has the capability, using existing commonly available and 47 CFR part 15 compliant devices, such as cellular phones, smart devices, tablet computers, or laptop computers, to receive these broadcast messages.

The FAA has considered the conditions of operation, the general technical requirements, and the performance limitations associated with the use of part 15 devices and has determined that these conditions, requirements, and limitations would be acceptable and compatible with the proposed use and expected performance of the broadcast capability of standard remote identification UAS. The FAA acknowledges that, by rule, part 15 devices, including those used for the remote identification broadcast, may not cause harmful interference and must accept any interference received.

To meet the proposed requirement of compatibility with personal wireless devices, a means of compliance may take into consideration whether the remote identification capability would be compatible with current and older models of personal wireless devices still in common usage. The FAA intends the proposed requirement to ensure that the broadcast message from standard remote identification UAS would be accessible by most personal wireless devices in use.

Additionally, for standard remote identification UAS, § 89.310(i)(2) proposes that the broadcast device use radio frequency spectrum in accordance with 47 CFR part 15 that is compatible with personal wireless devices and must be designed to maximize the range at which the broadcast can be received, while complying with the 47 CFR part 15 regulatory requirements in effect at the time that the Declaration of Compliance is submitted for FAA acceptance, and must be integrated into the unmanned aircraft or control station without modification to its authorized radio frequency parameters. This proposed requirement would ensure that producers use a means of compliance that specifies a broadcast technology or broadcast technology characteristics that maximize the broadcast range while still meeting the other minimum performance requirements under this proposed rule. Maximizing the broadcast range would ensure that remote identification information would be available to the largest number of potential receiving devices within the limits permitted by law. Maximized range would also optimize future operational capabilities, such as detect-and-avoid and aircraft-to-aircraft communications where range is a factor.

For limited remote identification UAS, the FAA is proposing in § 89.320(i) that the UAS be capable of transmitting the message elements in proposed § 89.315 through an internet connection to a Remote ID USS. Under the proposed rule, limited remote identification UAS would be prohibited from broadcasting the remote identification message elements.

For both standard and limited remote identification UAS, at this time the FAA has not proposed any requirements regarding how the UAS connects to the internet to transmit the message elements or whether that transmission is from the control station or the unmanned aircraft. The FAA understands, however, that there are concerns about the impact that connecting to the internet directly from the unmanned aircraft (as opposed to the control station) could have on networks that use radio frequency spectrum, including interference, network stability, or other effects. The FAA seeks comments on these potential effects, recognizing that issues of interference or other impacts to communications networks are independently reviewed by the FCC. The FAA requests that comments indicate any drawbacks or impacts to users or license holders of either licensed or unlicensed spectrum. Additionally, the FAA seeks feedback regarding whether any existing UAS are capable of connecting to the internet from the unmanned aircraft, and if so, what methods are used for those connections.

10. Interoperability

To achieve interoperability among standard remote identification UAS that may be produced using different means of compliance, the FAA is also proposing in § 89.310(i)(2) that for standard remote identification UAS, a means of compliance would be required to include the requirement that the message elements be broadcast using a non-proprietary specification for remote identification. For the broadcast to be interoperable with personal wireless devices, the message elements for standard remote identification UAS would have to be broadcast using a message format available to the public. A known message format is necessary for the receiving personal wireless devices to decode the messages and make the message elements available for use by software applications on the receiving devices. For example, where the UAS remote identification broadcast message format is known to the public,

an entity would be able to develop a mobile phone application that allows the user to view unmanned aircraft operating nearby on a map display.

11. Message Elements Performance Requirements

As proposed in § 89.310(j) for standard remote identification UAS and § 89.320(j) for limited remote identification UAS, the FAA would require that all UAS with remote identification meet certain minimum requirements regarding the transmission of the message elements including the minimum performance requirements related to positional accuracy, barometric pressure, message latency, and message transmission rate. The FAA invites comments on whether the parameters for the message elements performance requirements proposed in § 89.310(j) and § 89.320(j) are appropriate and requests commenters submit specifics, supported by data, to sustain their position.

i. Transmission and Broadcast of Identical Message Elements

Under § 89.310(j)(1), the FAA is proposing that standard remote identification UAS transmit and broadcast identical message elements.

ii. Positional Accuracy

The FAA is proposing positional accuracy requirements that are compatible with commercial off the shelf position sources, such as GPS receivers integrated into many existing UAS, smart phones, or other smart devices. For an unmanned aircraft, the position source is considered to be equipment onboard the aircraft that computes a geodetic position (latitude and longitude). The position source can be a separate sensor or can be integrated into other systems. While the FAA anticipates that most unmanned aircraft would use a GPS receiver as the position source, other equipment could be used as long as it is capable of producing the required message elements and meets the proposed accuracy requirement. For a control station, the position source is considered to be equipment that is either integrated into the control station or separate from but in close proximity to the control station. For example, a commercially available smart phone with a GPS receiver could be an acceptable control station position source if it meets the proposed accuracy requirement.

As proposed in § 89.310(j)(2) for standard remote identification UAS, the reported position of the unmanned aircraft and control station would have to be accurate to within 100 feet of the true position, with 95 percent probability. For limited remote identification UAS, the same requirement is proposed in § 89.320(j)(1) except that it would only apply to the control station since the FAA is not proposing an unmanned aircraft location message element requirement for limited remote identification UAS. The proposed 100-foot accuracy requirement is based on the 30-meter (98.4 feet) accuracy requirement for commercial off the shelf GPS position sources allowed for Traffic Awareness Beacon System (TABS) equipment in TSO–C199.[69]

Based on information the FAA has reviewed from UAS producers and smart device technology developers, the FAA believes this accuracy requirement is achievable by the majority of GPS-enabled UAS and smart devices in use today, and indications are that future GPS-based technology will have improved accuracy compared to current systems. The FAA expects that future UAS will take advantage of technological advancements in position source accuracy to provide even greater accuracies as technologies evolve.

iii. Barometric Pressure Altitude Accuracy

The FAA is proposing an unmanned aircraft and control station barometric pressure altitude accuracy requirement that it believes is compatible with barometers integrated into many existing UAS, smart phones, and smart devices.

As proposed in § 89.310(j)(3) for standard remote identification UAS, the reported barometric pressure altitude for the unmanned aircraft and the control station would be required to be accurate to within 20 feet of the true barometric pressure altitude for pressure altitudes ranging from 0 to 10,000 feet. For limited remote identification UAS, the same requirement is proposed in § 89.320(j)(2) for the control station only, as there is no unmanned aircraft pressure altitude message element requirement for limited remote identification UAS. Based on information the FAA has reviewed from producers of UAS, the FAA believes this requirement is achievable by many UAS and smart devices in use today that are equipped with a barometer. In addition, there are indications that UAS and smart device barometer technology is continually improving in terms of accuracy, and the FAA expects the trend of improving performance and accuracy of these systems to continue. The FAA seeks comment from UAS designers and producers and other interested individuals on whether the proposed barometric pressure altitude accuracy requirement is consistent with current and anticipated future UAS performance capabilities.

iv. Remote Identification Message Latency

The FAA is proposing a remote identification system latency requirement that it believes is compatible with existing commercial off the shelf UAS systems, including position sources, and both transmit and broadcast technologies. The proposed latency requirement would apply to both the transmitted message set and the broadcast message set and is the time between when a position is measured by the unmanned aircraft or control station position source and when it is transmitted and broadcast by the remote identification equipment. The latency requirement does not apply to any systems external to the UAS, such as broadcast receivers or information display devices. Based on information the FAA has reviewed from manufacturers of commercial off the shelf position sources, broadcast equipment, and transmission equipment, the FAA believes a latency of no more than one second is achievable by existing systems. The FAA therefore proposes that this is the appropriate latency requirement for the remote identification message set in § 89.310(j)(4) for standard remote identification UAS and in § 89.320(j)(3) for limited remote identification UAS.

v. Remote Identification Message Transmission Rate

The FAA is proposing a transmission rate for the remote identification message elements that it believes is compatible with existing commercial off the shelf UAS systems, including both internet connectivity and broadcast technologies. The proposed transmission rate would apply to both the message elements transmitted to a Remote ID USS and broadcast, and is the minimum rate at which the remote identification message would be either broadcast or transmitted to a Remote ID USS by the remote identification equipment. The FAA believes a transmission rate of at least 1 message per second (1 hertz) is achievable by existing systems and is proposing this as the minimum transmission rate for the remote identification message elements in § 89.310(j)(5) for standard remote

[69] *See http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgTSO.nsf/0/1600df588a6f53ae86257d710070d105/$FILE/TSO-C199.pdf.* Accessed July 31, 2019.

identification UAS and § 89.320(j)(4) for limited remote identification UAS.

12. Cybersecurity

As proposed in § 89.310(k) for standard remote identification UAS and § 89.320(k) for limited remote identification UAS, the FAA is proposing to require all UAS with remote identification equipment to incorporate cybersecurity protections for the transmission and broadcast of the message elements, as appropriate. Cybersecurity protections are necessary to defend against cyber threats that could adversely affect the authenticity or integrity of the remote identification information being transmitted by the UAS to a Remote ID USS or being broadcast from the unmanned aircraft. The FAA is not proposing any specific cybersecurity protection methods that would be required to be incorporated into an FAA-accepted means of compliance. Instead, the cybersecurity protection methods incorporated into a proposed means of compliance would be reviewed and evaluated as a part of the acceptance process.

13. Range Limitation

The FAA is proposing in § 89.320(l) to require that a limited remote identification UAS be designed to operate no more than 400 feet from its control station. The FAA is proposing this as a performance-based requirement so that persons submitting means of compliance can innovate and develop their own means to meet the requirement. The FAA envisions that this requirement can be met through a range of solutions, such as geo-fencing or command and control link power limitations.

The FAA is not proposing to impose any range limitation on standard remote identification UAS.

14. Broadcast Limitation

The FAA is proposing in § 89.320(m) to prohibit limited remote identification unmanned aircraft from broadcasting remote identification message elements identified in § 89.305 or § 89.315. A limited remote identification unmanned aircraft cannot broadcast remote identification message elements using radio frequency spectrum because the broadcast function is only applicable to standard remote identification UAS. Remote identification broadcast capability on a limited remote identification UAS would not have been designed or produced to meet the proposed requirements in this rule and could result in erroneous, non-compliant, or incorrectly formatted messages being broadcast, undermining the principal purposes of this proposed rule. An unmanned aircraft that is equipped to broadcast any of the remote identification message elements identified in § 89.305 or § 89.315 would have to comply with the remote identification requirements for standard remote identification UAS.

E. Other Performance Requirements Considered

The FAA considered imposing additional performance requirements as part of an acceptable means of compliance; however, the FAA believes that the current proposal reflects the minimum requirements necessary to achieve the intent of the proposed rule. Regardless, the FAA acknowledges that imposing additional requirements could add value to the remote identification of UAS and further integration into the National Airspace System. The FAA welcomes comments on whether the final rule should incorporate additional performance requirements, including but not limited to any of the ones addressed in this section.

The FAA emphasizes that nothing in the proposed rule would preclude a person or entity from developing and submitting a means of compliance that covers the topics discussed in this section or any other topics that span beyond the minimum performance requirements of the proposed rule. Although the FAA is proposing to require specific minimum performance requirements on certain message elements such as location and altitude, the FAA envisions that technology may progress such that improved performance may become achievable and revised minimum performance requirements may be appropriate at some point in the future. For this reason, the FAA would be willing to consider means of compliance that incorporate performance requirements that are more stringent and that exceed the minimum performance requirements of the proposed rule. The FAA would not accept any means of compliance that fails to meet any of the minimum performance requirements of the proposed rule but would consider accepting means of compliance that exceed the minimum performance requirements.

Once a means of compliance is accepted by the FAA, it establishes the actual required performance and functionality for UAS with remote identification that are designed and produced using that particular means of compliance. A person responsible for the design and production of UAS using a particular means of compliance would be required to adhere to that means of compliance in its totality, even if certain elements exceed the minimum performance requirements. Developers of means of compliance should consider the implications of specifying performance or functionality that exceeds the minimum regulatory requirements.

The FAA considered several potential requirements that it ultimately decided were not necessary to include in the proposed minimum performance requirements. The FAA considered but chose not to propose the following:

- Other message elements such as certain UAS operator contact information or other aircraft or control station information such as velocity, direction, route, or altitude above ground level;
- Equipment interface requirements such as the appropriate connections between GPS receivers, altimeters, and the remote identification message compiler, the communication protocol between the aircraft and the control station through which remote identification message data is exchanged, or protocols and interfaces between UAS, internet providers, and Remote ID USS;
- Flight data recording features to store remote identification information within the UAS;
- Requirements for connection indications such as a separate indication of whether the UAS is connected to the internet and its connection to a specific Remote ID USS, an indication of the transmission latency, or a notification of the specific Remote ID USS to which the UAS is connected; or
- Transmission or broadcast requirements during a command and control lost-link event.

Although the FAA is not proposing these features in the minimum performance requirements, the FAA requests comments on whether and why any should be required.

F. Submission and FAA Acceptance of Means of Compliance

Any person or entity would be able to submit a proposed means of compliance to the FAA for review and potential acceptance. To submit a means of compliance for acceptance by the FAA, a person or entity would be required to indicate how the means of compliance meets the minimum performance requirements in §§ 89.305 through 89.320, as applicable, by submitting any information, analysis, or test results necessary for the FAA to determine acceptability. Specifically, under § 89.405(b), the person or entity would be required to submit all of the following information to the FAA: (1)

The name of the person or entity submitting the means of compliance, the name of the main point of contact for communications with the FAA, the physical address, email address, and other contact information; (2) a detailed description of the means of compliance; (3) an explanation of how the means of compliance addresses all of the minimum performance requirements established in §§ 89.305 through 89.320, as applicable, so that any standard remote identification UAS or limited remote identification UAS designed and produced using that means of compliance meets the remote identification performance requirements of proposed part 89; and (4) any substantiating material the person or entity wishes the FAA to consider as part of the application.

In § 89.405(c), the FAA is proposing to require the means of compliance to include testing and validation procedures for the person responsible for production of the standard remote identification UAS or limited remote identification UAS to demonstrate through analysis, ground test, or flight tests, as appropriate, how the UAS with remote identification would perform its intended functions and how it meets the minimum performance requirements established in §§ 89.305 through 89.320, as applicable. The FAA makes no finding on radio transmitter technical compliance with 47 CFR regulations but expects technically compliant transmitters to be integrated into the UAS without modification to their authorized radio frequency parameters.

The FAA would indicate acceptance of a means of compliance by notifying the submitter and publishing a notice in the **Federal Register** identifying the means of compliance as accepted. The FAA would also notify the public that it has accepted the means of compliance by including it on a list of accepted means of compliance at *https://www.faa.gov.* The FAA would not disclose commercially valuable information in this document. It would only provide general information stating that FAA has accepted the means of compliance.

G. Rescission of a Means of Compliance

Pursuant to proposed § 89.415, a means of compliance is subject to ongoing review by the Administrator. The Administrator would be able to rescind acceptance of a means of compliance when the Administrator finds that a means of compliance does not meet any or all of the requirements of the proposed rule. The FAA would publish a notice of rescission in the **Federal Register**. If discussions with the person or entity that submitted the means of compliance are unable to resolve any noncompliance issues, the FAA would notify the person or entity who submitted the FAA-accepted means of compliance of its decision to rescind its acceptance of the means of compliance by sending a letter of rescission to the email address on file for such person or entity. The FAA would also provide notice of the rescission to any person responsible for the production of standard remote identification UAS or limited remote identification UAS who submitted an FAA-accepted declaration of compliance as discussed in section XIII.E of this preamble that uses the means of compliance that is no longer accepted as a basis for compliance with the proposed requirements of this rule. Lastly, the FAA would also choose to publish at *https://www.faa.gov* a list of rescinded means of compliance.

The main consequence of the rescission of the FAA's acceptance of a means of compliance is that the FAA's acceptance of any declaration of compliance that relies on the no longer accepted means of compliance may be rescinded. Therefore, any UAS with remote identification produced and listed under a declaration of compliance that relies on a no longer accepted means of compliance would fail to comply with the proposed requirements of this rule and would be restricted to flying within FAA-recognized identification areas. The rescission of the FAA's acceptance of a declaration of compliance, as a result of the rescission of the FAA's acceptance of a means of compliance, would follow the rescission and reconsideration provisions of proposed § 89.530. In such case, prior to rescinding the FAA's acceptance of a declaration of compliance, the FAA proposes to notify the submitters of the affected FAA-accepted declaration(s) of compliance that their declaration(s) of compliance may be rescinded by sending a letter to the email address on file for such person or entity. Where the proposed rescission is due to the rescission of the FAA's acceptance of a means of compliance, the FAA may allow the submitter of the FAA-accepted declaration of compliance to amend the declaration of compliance to include another FAA-accepted means of compliance, as long as the UAS produced and listed under the declaration of compliance comply with the newly-listed means of compliance. The FAA proposes not to rescind its acceptance of a declaration of compliance that is promptly amended to list another FAA-accepted means of compliance. Failure to amend the declaration of compliance would result in the rescission of FAA acceptance of the declaration of compliance in accordance with the provisions of § 89.530.

The FAA does not expect the rescission of its acceptance of a means of compliance to occur frequently. However, the FAA does contemplate potential scenarios when FAA-acceptance of a means of compliance might be rescinded. For example, the FAA could rescind its acceptance of a means of compliance if it is based on a technology standard that becomes obsolete, particularly if the old technology would interfere with the newer technologies used on UAS at that given time. The FAA believes that due to the rapid changes in technology, new means of compliance would likely be submitted for FAA acceptance whenever a significant technological change warrants a change in the design and production of UAS with remote identification. The FAA believes that due to the typical lifecycle of UAS, very few UAS built in accordance with older means of compliance would be in operation by the time the FAA's acceptance of a means of compliance is rescinded due to a major shift in technology. By that time, the FAA expects most UAS would be designed and produced in accordance with the latest means of compliance available. Older, operational UAS built in accordance with means of compliance that are no longer accepted would still be eligible to operate within FAA-recognized identification areas.

H. Record Retention Requirements

In § 89.420, the FAA is proposing for persons or entities who submit FAA-accepted means of compliance under part 89 to retain certain information for as long as the means of compliance is accepted plus an additional 24 calendar months. The information would be required to be made available to the FAA upon request. Specifically, the person or entity would be required to retain all documentation and substantiating data submitted for the acceptance of the means of compliance; records of all test procedures, methodologies, and other procedures, if applicable; and any other information necessary to justify and substantiate how the means of compliance enables compliance with the remote identification requirements of part 89.

This requirement is being proposed so that, in the event of an FAA investigation or analysis, the Administrator may obtain data necessary to re-assess the acceptability

of the means of compliance. The additional 24 calendar months is being proposed because the FAA envisions that, if a means of compliance is found to no longer be acceptable, UAS produced using that means of compliance might still be on the market or in the possession of operators. The additional time would ensure that the data is still readily available while any FAA actions are being taken such as possible rescissions of FAA acceptance of declarations of compliance. If the FAA requests the data and the submitter did not retain the data in accordance with this requirement, then the Administrator may choose to rescind acceptance of the means of compliance.

XIII. Design and Production Requirements

A. Applicability and Summary of Requirements

Subpart F of the proposed rule prescribes requirements for the design and production of UAS operated in the United States. It also proposes certain procedural requirements for the submission of declarations of compliance for FAA acceptance and certain rules governing persons who have submitted FAA-accepted declarations of compliance.

According to proposed § 89.501(c), the requirements of subpart F would not apply to the following UAS, unless they are intentionally designed or produced as standard remote identification UAS or limited remote identification UAS:

- Amateur-built UAS.
- UAS of the United States Government.[70]
- UAS where the unmanned aircraft weighs less than 0.55 pounds including the weight of anything attached to or carried by the aircraft.
- UAS designed or produced exclusively for the purpose of aeronautical research or to show compliance with regulations.

The FAA is proposing that persons responsible for the production of standard remote identification UAS or limited remote identification UAS would be required to do the following:

- Under § 89.505, ensure each UAS produced has a serial number that complies with the ANSI/CTA–2063–A serial number standard.
- Under § 89.510(a)(1), ensure that the UAS are designed and produced to meet the minimum performance requirements for standard remote identification UAS or limited remote identification UAS by using an FAA-accepted means of compliance.
- Under § 89.510(b), comply with certain inspection, audit, and notification requirements.
- Under § 89.515, label each unmanned aircraft to indicate that the unmanned aircraft system is remote identification compliant and indicate whether it is a standard remote identification UAS or a limited remote identification UAS.
- Under § 89.520, submit a declaration of compliance for acceptance by the FAA declaring that the UAS complies with the design and production requirements of the proposed rule.

The FAA anticipates that most UAS produced will be consumer or professional grade, fully-assembled UAS from a commercial manufacturer. Under those circumstances, the manufacturer is subject to all of the design and production requirements of subpart F. There are certain circumstances, however, where the responsibility for the production requirements may be less obvious.

- *UAS Kits.* The FAA anticipates that some UAS producers will wish to sell kits that would allow a person to assemble a fully functional UAS. If the kit contains all the parts and instructions necessary to build a UAS, the producer of the kit, not the person assembling the UAS from the kit, is considered the manufacturer of the UAS and is subject to all of the design and production requirements of proposed subpart F. For purposes of the proposed rule, the FAA does not consider any package containing less than 100% of the parts and instructions necessary to assemble a complete, functional UAS to be a UAS kit.
- *Amateur-built UAS.* As discussed later in this section, the FAA considers a UAS to be amateur built when the person building it fabricates and assembles more than 50 percent of the UAS. Under these circumstances, the person building the UAS would be the producer and may, but is not required to, comply with the design and production requirements of proposed subpart F.
- *UAS assembled completely from pre-fabricated parts.* The FAA anticipates that some model aircraft enthusiasts may assemble UAS entirely from pre-fabricated parts and that commercial vendors may wish to sell UAS parts, including packages that contain more than 50 but less than 100 percent of the parts necessary to build a UAS. The resulting UAS would not qualify as amateur-built because the person building it would be fabricating and assembling 50 percent or less of the UAS. The UAS would not qualify as built from a kit because it did not include 100 percent of the necessary parts. Under these circumstances, the person assembling the UAS would be considered the producer and would be required to comply with the design and production requirements of proposed subpart F.

In § 89.1 of this proposed rule, the FAA proposes defining an amateur-built unmanned aircraft system as a UAS, the major portion of which has been fabricated and assembled by a person who undertook the construction project solely for his or her own education or recreation. The FAA would consider a UAS to be amateur built if the person building it fabricates and assembles at least 50 percent of the UAS.

The FAA is proposing, in § 89.501(c)(1) to exclude amateur-built UAS from the requirements of subpart F. Specifically, amateur-built UAS would not be required to meet the performance requirements for a standard remote identification UAS or limited remote identification UAS. However, irrespective of the applicability of subpart F, all UAS operated in the airspace of the United States would be subject to the operating requirements of the proposed rule. Accordingly, an amateur-built UAS that is fabricated and assembled without remote identification would be restricted to operating within an FAA-recognized identification area in accordance with §§ 89.105(c) and 89.120. The FAA has chosen to exclude this category from the design and production requirements of this rule because builders of amateur-built UAS may not have the necessary technical knowledge, ability, or financial resources to design and produce a UAS that meets the minimum performance requirements proposed in this rule. Requiring amateur-built UAS to comply with the performance requirements proposed in this rule would place an undue burden on the builders of these UAS. The FAA expects that amateur-built UAS will represent a very small portion of the total number of UAS operating in the airspace of the United States.

Nothing in this proposal would prevent a person from building a UAS

[70] Although this exception applies to UAS produced for the use of the United States Government, U.S. government entities would still be bound by the operating provisions of part 89, subpart B. Only the aircraft of the national defense forces of the United States are excepted from the aircraft registration requirements and not required to comply with subpart B. All other United States government entities who wish to use UAS without remote identification at a location other than an FAA-recognized identification area would be required to seek authorization from the Administrator to deviate from the operating provisions of subpart B.

with remote identification for educational or recreational purposes. However, a person doing so would be subject to all of the requirements of subpart F, even if the UAS would otherwise be considered an amateur-built UAS. For example, an individual may wish to design and produce their own standard remote identification UAS for educational or other purposes, procuring parts and components from multiple vendors. Under the proposed § 89.501(c), this person would be required to meet the requirements of subpart F including using a means of compliance that meets the requirements of proposed § 89.310.

The FAA is not proposing any restrictions on the sale, transfer of ownership, or lending of amateur-built UAS with or without remote identification to someone other than the person who originally built the UAS. For example, a person could lend his or her amateur-built UAS to another person on a temporary basis or sell it after he or she no longer intends to use it for personal operation. However, the new operators of such UAS would be required to comply with the applicable operating rules at all times, including the limitation to fly within an FAA-recognized identification area if the amateur-built UAS does not have remote identification.

The FAA anticipates that some UAS producers will wish to sell complete kits including all parts and instructions that would allow a person to assemble a fully functional UAS with remote identification. If the kit contains all the parts and instructions necessary to build a standard remote identification UAS or limited remote identification UAS, and the fully assembled UAS would meet the requirements of an FAA-accepted means of compliance, then the producer of the kit, not the person assembling the UAS from the kit, is considered the producer of the UAS and is subject to all of the design and production requirements of subpart F. A requirement for the owner to assemble some or all of the parts of a UAS fabricated by a particular company prior to flight would not turn that owner into a producer for purposes of subpart F when all the parts and instructions for assembly have been included for sale.

The FAA requests comments about whether persons should be allowed to produce kits for sale that contain 100 percent of the parts and the instructions for assembly necessary to build a fully functioning UAS without remote identification capability. Once assembled, such UAS without remote identification would be required to either have the unmanned aircraft weigh less than 0.55 pounds or operate only within an FAA-recognized identification area.

UAS that are designed and produced for the purpose of aeronautical research or showing compliance with regulations would not be required to meet the production requirements of the rule. The FAA intends this exception to allow for testing of prototype UAS not intended for sale without the requirement that the producer meet all of the production requirements of the proposed rule. Any person operating a UAS under this exception would still need to receive authorization from the Administrator to operate the UAS in accordance with § 89.120.

B. Requirement To Issue Serial Numbers

The FAA is proposing in § 89.505 to require the person responsible for the production of standard remote identification UAS or limited remote identification UAS to issue a serial number to each unmanned aircraft that complies with the ANSI/CTA–2063–A serial number standard. The FAA is proposing to adopt ANSI/CTA–2063–A as the serial number standard to be used by producers of UAS, and seeks comments on this approach. The FAA believes the standard is appropriate because it enables the issuance of unique serial numbers to UAS and promotes worldwide standardization of UAS remote identification requirements: The European Commission recently issued rules adopting this standard.[71]

The FAA seeks specific comment regarding whether this standard can be effectively used as a serial number standard for unmanned aircraft other than small unmanned aircraft.

1. American National Standards Institute/Consumer Technology Association Standard 2063–A

For the serial number, the FAA is proposing the use of American National Standards Institute/Consumer Technology Association standard 2063–A (ANSI/CTA–2063–A)—Small Unmanned Aerial Systems Serial Numbers (September 2019) for the format of the serial number. ANSI/CTA–2063–A outlines the elements and characteristics of a serial number to be used by small UAS.[72] The FAA is proposing the use of ANSI/CTA–2063–A as it has been specifically developed to provide a format for small UAS serial numbers. It is the only widely available standard for these serial numbers. Use of ANSI/CTA–2063–A would provide a single accepted format for serial numbers, helping to ensure consistency in transmission of this message element. The FAA seeks feedback from UAS manufacturers who are assigning serial numbers in accordance with ANSI/CTA–2063–A, including the type and number of UAS that the serial numbers are being assigned to.

2. Incorporation by Reference

The FAA is proposing to incorporate ANSI/CTA–2063–A by reference. The Office of the Federal Register has regulations concerning incorporation by reference. These regulations require that, for a final rule, agencies must discuss in the preamble to the rule the way in which materials that the agency incorporates by reference are reasonably available to interested persons, and how interested persons can obtain the materials. Additionally, the preamble to the rule must summarize the material.

Interested persons can view ANSI/CTA–2063–A at *https://www.cta.tech* by creating a free account and searching under ''Research and Standards''. At the time of publication of this notice of proposed rulemaking, the ANSI/CTA–2063–A standard is available for viewing and download free of charge. ANSI/CTA–2063–A is summarized in the immediately preceding section, 1. American National Standards Institute/Consumer Technology Association Standard 2063–A.

C. Requirement To Label UAS

The FAA proposes in § 89.515 that persons responsible for the production of standard remote identification UAS and limited remote identification UAS label each UAS with an indication of its remote identification capability and whether it is a standard remote identification UAS or a limited remote identification UAS. The FAA envisions such labels would be useful to UAS operators, FAA inspectors, investigators, and law enforcement agencies by communicating the capabilities and restrictions of a particular unmanned aircraft with respect to remote identification. The label would be affixed to the unmanned aircraft and would provide a simple and efficient way to determine the UAS capabilities. The FAA is not proposing a prescriptive labeling requirement that specifies exactly how a producer would label an aircraft, what size font to use, where the label would have to be located, and so on. Due to the variety of UAS models that exist, such a prescriptive

[71] Commission Delegated Regulation (EU) 2019/945 of 12 March 2019 on unmanned aircraft systems and on third-country operators of unmanned aircraft systems.

[72] ANSI/CTA–2063–A—Small Unmanned Aerial Systems Serial Numbers (September, 2019) available at *https://www.cta.tech.*

requirement would be unnecessarily limiting for UAS producers. Instead, a producer could label the aircraft by any means as long as the label is in English, legible, prominent, and permanently affixed to the unmanned aircraft.

D. Requirement for a UAS To Be Designed and Produced Using an FAA-Accepted Means of Compliance

According to proposed § 89.510(a)(1) and (3), no person would be allowed to produce a standard remote identification UAS or a limited remote identification UAS unless the person obtains FAA acceptance of the declaration of compliance. The declaration of compliance would establish that the UAS meets the minimum performance requirements for standard remote identification UAS or limited remote identification UAS because it was produced in accordance with an FAA-accepted means of compliance (see § 89.405) that meets the minimum performance requirements for standard remote identification UAS or limited remote identification UAS. Further, § 89.510(a)(2) would require persons responsible for the production of UAS to meet all requirements of subpart F.

E. Requirement To Submit a Declaration of Compliance

The FAA is proposing in § 89.520 that a person responsible for the production of standard remote identification UAS and limited remote identification UAS be required to submit a declaration of compliance for acceptance by the FAA. The declaration of compliance would affirm that the UAS meets the minimum performance requirements for remote identification by meeting all aspects of an FAA-accepted means of compliance (*e.g.,* a consensus standard) for UAS with remote identification equipment. The FAA would rely on the declaration of compliance to show that the UAS complied with the applicable remote identification requirements at the time the UAS was produced.

The FAA would not consider a declaration of compliance under this proposed rule to be an airworthiness certification. UAS that are certified under the 14 CFR part 21 Airworthiness Certification processes may have other identification requirements in addition to those being proposed in this rule.

1. Information Required for a Declaration of Compliance

Proposed § 89.520(b) lists the information that would be required to be included in a declaration of compliance submitted by a person responsible for the design or production of a standard remote identification UAS or limited remote identification UAS. This information would make clear to the FAA if the producer has demonstrated compliance with the remote identification equipage requirements.

The following information would be required in the declaration of compliance:

(1) The name, physical address, telephone number, and email address of the person responsible for production of the UAS.

(2) The UAS make and model name.

(3) The UAS serial number, or the range of serial numbers for which the person responsible for production is declaring compliance.

(4) The means of compliance used in the design and production of the UAS and whether the UAS is a standard remote identification UAS or a limited remote identification UAS.

(5) Whether the declaration of compliance is an initial declaration or an amended declaration, and if the declaration of compliance is an amended declaration, the reason for the amendment.

(6) A declaration that the person responsible for the production of the unmanned aircraft system can demonstrate that the UAS was designed and produced to meet the minimum performance requirements of § 89.310 or § 89.320 by using an FAA-accepted means of compliance.

(7) A declaration that the producer complies with the inspection, audit, and notification requirements of § 89.510(b).

(8) A declaration that the producer will perform independent audits on a recurring basis to demonstrate compliance with the requirements of subpart F of proposed part 89 and will provide the results of those audits to the FAA upon request.

(9) A declaration that the producer will maintain product support and notification procedures to notify the public and the FAA of any defect or condition that causes the UAS to no longer meet the requirements of subpart F, within 15 calendar days of the date the person becomes aware of the defect or condition.

The FAA invites comments on whether the previously discussed 15 calendar day notice period is appropriate for the public to gain awareness of any defect or condition that causes the UAS to no longer meet the requirements of subpart F.

2. Acceptance of a Declaration of Compliance

As proposed in § 89.525, after a person submits a declaration of compliance to the FAA, the Administrator would evaluate the declaration of compliance submitted and may request additional information (*e.g.,* test results) or documentation, as needed, to supplement the declaration of compliance. The FAA would evaluate the declaration of compliance to ensure completeness and compliance with the requirements of § 89.520(b). After the FAA has finished its evaluation, the FAA would notify the submitter whether the declaration of compliance has been accepted or not accepted. The FAA would also notify the submitter if it determines the submitter has not provided sufficient evidence to demonstrate compliance. The FAA would also provide a list of accepted declarations of compliance at *https://www.faa.gov.*

3. Rescission of FAA Acceptance of a Declaration of Compliance

Pursuant to proposed § 89.530, a declaration of compliance would be subject to ongoing review by the Administrator. The FAA would notify a person responsible for the production of standard remote identification UAS or limited remote identification UAS if a non-compliance issue has been identified prior to initiating a proceeding to rescind its acceptance of a declaration of compliance. If the Administrator determines that it is in the public interest, prior to rescinding acceptance of a declaration of compliance, the Administrator could provide a reasonable period of time for the person holding the declaration of compliance to remediate the noncompliance. A failure to remediate the noncompliance would result in the rescission of FAA's acceptance of the declaration of compliance.

As part of the rescission process, the FAA would notify the person who submitted the declaration of compliance of its decision to rescind its acceptance by sending a letter of rescission to the email address on file for such person or entity. The FAA would also send a notice of rescission to the registered owners of unmanned aircraft listed under a declaration of compliance that is no longer accepted by the FAA. Additionally, the FAA would publish a notice of rescission in the **Federal Register** to provide notice of the rescission to all interested or affected parties, which include: (a) The person holding the FAA-accepted declaration of compliance and (b) the owners and operators of unmanned aircraft listed in the no longer accepted declaration of compliance. Lastly, the FAA would publish at *https://www.faa.gov* a list of

declarations of compliance that are no longer accepted.

The FAA could rescind its acceptance of a declaration of compliance under circumstances including, but not limited to:

(1) A standard remote identification UAS or a limited remote identification UAS listed under an accepted declaration of compliance does not meet the minimum performance requirements of § 89.310 for standard remote identification UAS or of § 89.320 for limited remote identification UAS.

(2) A previously FAA-accepted declaration of compliance does not meet the requirements of subpart F of proposed part 89.

(3) The FAA rescinds its acceptance of a means of compliance listed in a declaration of compliance.

4. Petition To Reconsider the Rescission of FAA Acceptance of a Declaration of Compliance

The FAA proposes in § 89.530(b) to allow a person who submitted a declaration of compliance that is no longer accepted or any person adversely affected by the rescission of the Administrator's acceptance of that declaration of compliance to petition for a reconsideration of the decision to rescind its acceptance by submitting a request to the FAA. For purposes of the reconsideration, those adversely affected by the rescission of the Administrator's acceptance of a declaration of compliance includes the owners and operators of unmanned aircraft listed in the no longer accepted declaration of compliance.

A request for reconsideration would be required to be submitted to the FAA within 60 calendar days of publication in the **Federal Register** of a notice of rescission. A petition to reconsider the rescission of the Administrator's acceptance of a declaration of compliance would be required to show that the petitioner is an interested party and has been adversely affected by the decision of the FAA.

The petition for reconsideration would be required to demonstrate at least one of the following:

- The petitioner has a significant additional fact not previously presented to the FAA.
- The Administrator made a material error of fact in the decision to rescind its acceptance of the declaration of compliance.
- The Administrator did not correctly interpret a law, regulation, or precedent.

If the FAA chooses to reinstate its acceptance of a declaration of compliance, it would indicate so by notifying the petitioner, and the person who submitted the FAA-accepted declaration of compliance (if different). The FAA would also publish at *https://www.faa.gov* a list of declarations of compliance that have been reinstated.

5. Record Retention

The FAA is proposing in § 89.535 to require any person who submits a declaration of compliance to retain all of the following information for as long as the UAS listed on that declaration of compliance are produced plus an additional 24 calendar months:

- The means of compliance, all documentation, and substantiating data related to the means of compliance used.
- Records of all test results.
- Any other information necessary to demonstrate compliance with the means of compliance so that the UAS meets the remote identification requirements and the design and production requirements of this part.

The person submitting the declaration of compliance would be required to make the information available for inspection by the Administrator.

F. Accountability

After obtaining FAA acceptance of their declaration of compliance, the FAA expects persons responsible for the production of UAS to monitor all UAS produced under that declaration of compliance to ensure they comply with the remote identification requirements of the proposed rule. The FAA expects persons responsible for the production of UAS with remote identification to take remedial action whenever they become aware of a lack of compliance with the proposed design and production regulations.

If the FAA suspects, or becomes aware of, a lack of compliance with any of the requirements of the proposed rule, the person responsible for the production of the standard remote identification UAS or limited remote identification UAS would be required to allow the Administrator to inspect any associated facilities, technical data, or any UAS produced, and to witness any tests necessary to determine compliance with part 89. In addition to any inspection that may be required by the Administrator from time to time, the person responsible for the production of UAS with remote identification would be responsible for performing independent audits on a recurring basis to ensure that the standard remote identification UAS or limited remote identification UAS continue to comply with the remote identification requirements of proposed part 89. The FAA is not proposing a specific timeframe for the independent audits. It expects that the person responsible for the production of the UAS would apply industry best practices to determine when and how often independent audits are needed. However, the FAA believes these audits would have to occur on a regular basis and as many times as necessary to ensure continuous compliance with the technical requirements of the proposed rule. Additionally, all audit reports would have to be retained and would have to be provided to the FAA upon request. The FAA requests comments regarding appropriate time intervals for conducting independent audits, including any time intervals specified in industry standards related to independent audits of aviation systems.

As part of the independent audits, a person responsible for the production of UAS would be responsible for maintaining a product support and notification system and procedures to notify the public and the FAA of any defect or condition that may cause a standard remote identification UAS or limited remote identification UAS to no longer comply with the remote identification requirements of proposed part 89. To satisfy these obligations, persons responsible for the production of UAS would have to monitor their manufacturing processes, UAS operational usage to the extent the manufacturer has access to such information, and collection of accident and incident data. The FAA expects that as part of the monitoring process, producers would collect, analyze, and provide to the FAA any information that is furnished by the owners and operators of the UAS with remote identification. If the FAA identifies a safety issue that warrants review of a producer's data, records, or facilities, the producers would have to grant the FAA access to such data, records, or facilities, and would have to provide all data and reports from the independent audits and investigations.

XIV. Remote Identification UAS Service Suppliers

The operating rules in subpart B of part 89 would require persons operating a standard remote identification UAS or limited remote identification UAS to transmit the remote identification message elements through an internet connection to an FAA-qualified Remote ID USS. The FAA intends to provide oversight of the Remote ID USS through contractual agreements and is therefore not proposing specific rules related to how the Remote ID USS offer services. This section provides background information so that persons operating

standard remote identification UAS or limited remote identification UAS may understand what the FAA expects a Remote ID USS would be and how it would be required to provide services to be FAA-qualified.

A. UAS Service Suppliers (USS)

As the FAA looks to innovative solutions to develop UAS traffic management (UTM), the FAA is partnering with third parties referred to as UAS Service Suppliers (USS). This proposal defines a USS as any person (*e.g.,* governmental or non-governmental entity) that is qualified by the Administrator to provide aviation related services to UAS. The FAA anticipates that some USS may choose to offer a suite of different services, while others may choose to specialize in one service.

The FAA already has leveraged the USS concept successfully in the implementation of the Low Altitude Authorization and Notification Capability (LAANC).[73] In qualifying a USS to be a LAANC service provider, the FAA uses its acquisition authority to enter into a Memorandum of Agreement (MOA) with the USS. All prospective USS go through an onboarding process to become qualified and agree to abide by a set of documented terms and conditions regarding the technical administration of the service and how it is administered to the public.[74] See 49 U.S.C. 106(l) and (m). The LAANC USS are fully responsible for the development and operation of the software applications; the FAA does not provide payment for the development or operation of LAANC USS products or services. Congress affirmed the USS model for future UTM-related services in the FAA Reauthorization Act of 2018. Section 376 of Public Law 115–254 recommended that the FAA use the LAANC model of private sector participation in implementing future expanded UTM services. The FAA is proposing to use a similar strategy for remote identification.

B. Remote ID USS

A Remote ID USS would be a person or entity qualified by the FAA to provide remote identification services to UAS. A Remote ID USS would perform four primary functions: (1) Collect and store the remote identification message elements; (2) provide identification services on behalf of the UAS operator and act as the UAS operator's access point to identification services; (3) provide the FAA access to the remote identification information collected and stored upon request through a data connection that may be on-demand or a continuous connection depending on safety and security needs; and (4) inform the FAA when its services are active and inactive.

Although a USS may be qualified as both a Remote ID USS and a LAANC USS, the services provided and the terms for providing each service would be independent from one another. Although the FAA anticipates that most Remote ID USS would offer their services to the general public, a Remote ID USS, such as an operator of multiple routine unmanned aircraft flights, may choose to provide remote identification services only for its own fleet. Additionally, the FAA expects that the majority of Remote ID USS would likely come from private industry; however, the FAA anticipates other Federal agencies may consider creating a Remote ID USS to manage their own flights. Although some Remote ID USS may choose to offer their services for free, Remote ID USS may have a variety of business models and may choose to require a subscription, payment, or personal information to access that Remote ID USS.

The FAA does not propose to require a Remote ID USS be universally compatible with all UAS. That said, the FAA anticipates that some UAS manufacturers will also be Remote ID USS. In those cases, the Remote ID USS may choose to only connect to UAS made by the same manufacturer. This model is similar to how mobile telephone networks sell devices that can only be used on their networks. The FAA requests comment on whether manufacturers should be permitted to produce UAS that are only compatible with a particular Remote ID USS.

Persons operating UAS with remote identification would be required to interact with a Remote ID USS. The FAA envisions that a UAS operator would connect to the Remote ID USS through the internet using a variety of different technologies, such as cellular phone applications, web-based interfaces, or other tools. The FAA expects some Remote ID USS may provide UAS operators with a session ID that would be used in place of the unmanned aircraft serial number to satisfy the UAS Identification message element requirement. Such Remote ID USS would be responsible for generating (and maintaining) the session IDs.

To ensure safety in the airspace of the United States, the FAA may require access to the remote identification message elements transmitted by UAS with remote identification to Remote ID USS. This request may take the form of an individual query or a continuous connection to the Remote ID USS. In addition, the FAA anticipates providing that information, to other airspace users, authorized Federal Government partners, and law enforcement entities as discussed in section XI of this preamble. Upon request, a Remote ID USS would be required to provide the FAA: (1) The near real-time remote identification message elements that meet the minimum message element performance requirements discussed in sections XII.C and XII.D.11 of this preamble; and (2) stored remote identification data.

Under proposed § 89.135, the Administrator would contractually require that Remote ID USS retain the remote identification message elements for no more or less than six months from the date of receiving the message elements. For enforcement actions against certificate holders under 49 U.S.C. 44709, the Administrator has six months to notify the respondent that the FAA will be pursuing enforcement action against him or her pursuant to 49 CFR 821.33. The FAA believes that a six-month retention period is the minimum amount of time the FAA needs to access the remote identification message elements from the Remote ID USS. Additionally, the FAA believes that six months represents a balance between security and law enforcement purposes on the one hand and privacy interests on the other. The FAA requests comments on whether six months should be the period for retention of the remote identification message elements by Remote ID USS.

One critical element of implementing remote identification would be the establishment of a cooperative data exchange mechanism between the FAA and Remote ID USS. On December 20, 2018, the FAA issued a Request for Information (RFI), seeking industry participation in developing remote identification information technology applications and informing the Remote ID USS technical terms and conditions.[75] Working with an industry group selected through the RFI, the FAA intends to establish the technological

[73] LAANC automates significant portions of the application and approval process for airspace authorizations through an electronic data exchange with third party USS.

[74] The terms and conditions the LAANC USS agree to be bound by are available at: *https://www.faa.gov/uas/programs_partnerships/uas_data_exchange/industry/media/uss_operating_rules.pdf.*

[75] The FAA UAS Remote Identification Request for Information (RFI), issued December 20, 2018 and amended January 31, 2019 is available at *https://faaco.faa.gov/index.cfm/announcement/view/32514.*

interfaces between Remote ID USS and the FAA, and demonstrate and evaluate a prototype remote identification capability. The FAA anticipates that Remote ID USS will be available to the public by the effective date of the final rule.

C. Data Privacy and Information Security

The remote identification message elements that operators would be required to transmit to a Remote ID USS under this rule would be considered publicly accessible information. However, the FAA recognizes the need for privacy of other information that may be voluntarily provided to a Remote ID USS by an operator, particularly where an operator would use the Remote ID USS for other value-added services. The FAA would not have access to information collected by Remote ID USS other than the remote identification information required by this rule.

The MOA signed by Remote ID USS would require it to agree to privacy protections of any data that the Remote ID USS would not have received but for its qualification as a Remote ID USS. This data would include personally identifiable information received from operators. The FAA expects that the MOA would require user permission for any data sharing or additional information gathered by the Remote ID USS. Prospective Remote ID USS would also be reviewed for consistency with national security and cybersecurity requirements and export administration regulations.

The remote identification message elements transmitted by a standard remote identification UAS or limited remote identification UAS to a Remote ID USS may be available to the general public. Remote ID USS would be required to provide to the public, for no cost, the UAS Identification message element, either the UAS serial number or session ID. At this time, the FAA does not intend to make registration data held under 14 CFR part 48 available to Remote ID USS or the general public. The FAA would provide registration data associated with a particular serial number or session ID only to law enforcement or the Federal Government. The FAA welcomes comments on whether it should provide some fields in the registration database to some or all Remote ID USS for use by law enforcement or the Federal Government.

For standard remote identification UAS, in addition to transmitting the message elements to the Remote ID USS, the unmanned aircraft would broadcast the message elements using radio frequency spectrum in accordance with 47 CFR part 15 that is compatible with personal wireless devices. This means that any of the message elements that are broadcast directly from the unmanned aircraft could be received by commonly available consumer cellular phone, tablet, or other wireless device capable of receiving that broadcast. Therefore, any message element that is broadcast would be publicly available.

All FAA information systems are bound by the security standards found in FAA Order 1370.121, FAA Information Security and Privacy Program & Policy. This order defines the minimum standards for data encryption, privacy protection, and cybersecurity controls. To address the security of information maintained by third party systems (*e.g.,* USS information systems), the FAA would adopt National Institute of Standards and Technology (NIST) standards to ensure compliance with their requirements and guidelines where appropriate and would include them in the technical parameters required by the MOA. The Remote ID USS and UAS producers would be responsible for ensuring that UAS remote identification data and connections would be protected against cyber-attacks.

XV. FAA-Recognized Identification Areas

The FAA is proposing a means for UAS that do not meet the requirements of standard remote identification UAS under § 89.110 or limited remote identification UAS under § 89.115 to comply with the intent of this rule. In § 89.120, the FAA is proposing to allow UAS to operate without remote identification equipment if they do so within visual line of sight and within certain defined geographic areas approved by the FAA, called FAA-recognized identification areas. For UAS not equipped with Remote ID, the way to identify and comply with the intent of the remote identification rule is to operate within the FAA-recognized identification areas. The intent is to minimize the regulatory burden for operators of UAS that do not have remote identification equipment, while still meeting the intent of the rule. This proposal would not preclude UAS with remote identification from operating in or transiting the airspace over FAA-recognized identification areas; it would simply limit UAS with no remote identification equipment from operating anywhere else.

UAS with remote identification equipment that operate in or transit the airspace over FAA-recognized identification areas would be required to comply with the applicable remote identification requirements in § 89.105(a) for standard remote identification UAS or § 89.105(b) for limited remote identification UAS. Some UAS manufacturers may offer an option to modify a UAS originally manufactured without remote identification to become compliant with the requirements for a standard remote identification UAS or limited remote identification UAS. For example, a UAS manufacturer may offer a software update that would turn the UAS into a standard or limited remote identification UAS. A UAS that is modified to have remote identification capability must remotely identify throughout its operation, regardless of where it is operated. This means that the operator of a modified UAS would have to follow the requirements for remotely identifying everywhere, even when flying at FAA-recognized identification areas, including transmitting to a Remote ID USS. Operators of modified UAS would be required to subscribe to a Remote ID USS to operate anywhere where internet connectivity is available, including within an FAA-recognized identification area. The FAA seeks comments on this requirement.

The FAA recognizes that UAS flying sites exist today without a significant impact on aviation safety. As proposed in § 89.205, only a community based organization (CBO) recognized by the Administrator would be eligible to apply for the establishment of a flying site as an FAA-recognized identification area to enable operations of UAS without remote identification within those areas. For clarification purposes, the concept of FAA-recognized identification areas proposed in this rule is different and independent from the fixed-site concept in 49 U.S.C. 44809(c)(1) and a fixed site would not automatically be approved as an FAA-recognized identification area.

The FAA would maintain a list of FAA-recognized identification areas at *https://www.faa.gov.* The location of FAA-recognized identification areas would be made available to the public to: (1) Advise UAS operators of where operations of UAS without remote identification are permitted; (2) advise both manned and unmanned aircraft operators of where operations of UAS without remote identification are taking place; and (3) inform security and law enforcement agencies of where operations of UAS without remote identification are taking place. Operators of UAS with remote identification would be able to avoid these locations if they prefer to operate

in areas where there are no UAS without remote identification. Law enforcement and security personnel would be able to identify if a suspect UAS has remote identification and, if not, determine if it is legally operating within an FAA-recognized identification area.

The FAA is proposing to accept applications for FAA-recognized identification areas within 12 calendar months of the effective date of a final rule. At the end of that 12-month period, no new applications for FAA-recognized identification areas would be accepted. After that date, the number of FAA-recognized identification areas could therefore only remain the same or decrease. Over time, the FAA anticipates that most UAS without remote identification will reach the end of their useful lives or be phased out. As these numbers dwindle, and as compliance with remote identification requirements becomes cheaper and easier, the number of UAS that need to operate only at FAA-recognized identification areas would likely drop significantly.

Operating within FAA-recognized identification areas would not provide relief from other applicable Federal, State, or local laws, ordinances, or regulations, nor would they provide any authorization to operate. Operators would remain obligated to comply with all relevant requirements. The FAA is not proposing any additional or specific operating rules for operations within the bounds of FAA-recognized identification areas.

A. Eligibility

The FAA proposes in § 89.205 to only allow a CBO recognized by the Administrator to apply for the establishment of an FAA-recognized identification area. For purposes of this rule, a CBO shall have the meaning ascribed to the term in 49 U.S.C. 44809.[76]

Persons requesting the establishment of an FAA-recognized identification area would do so using an online process. The FAA is currently working on Advisory Circular (AC) 91–57C, Unmanned Aircraft Systems—Recreational Operating Standards, which, among other things, provides the process by which the FAA will recognize an organization as a Community Based Organization (CBO). The matters addressed in AC 91–57C directly relate to areas beyond remote identification of unmanned aircraft systems (*e.g.,* limited recreational operations of unmanned aircraft) so the FAA intends to publish AC 91–57C in an independent docket for public comment and expects to finalize it prior to the publication of the final rule that follows this notice of proposed rulemaking. One person would be permitted to request multiple sites be established, provided that person could demonstrate that he or she has the authority to request establishment on behalf of each site.

B. Process To Request an FAA-Recognized Identification Area

Under the proposed § 89.210, a request to establish an FAA-recognized identification area would have to be submitted within 12 calendar months from the effective date of a final rule and would have to include certain specified information, including at a minimum:

- The name of the CBO requesting the FAA-recognized identification area.
- A declaration that the person making the request has the authority to act on behalf of the CBO.
- The name and contact information of the primary point of contact for communications with the FAA.
- The physical address of the proposed FAA-recognized identification area.
- The latitude and longitude coordinates delineating the geographic boundaries of the proposed FAA-recognized identification area.
- If applicable, a copy of any existing letter of agreement regarding the flying site.[77]

The process to request establishment of an FAA-recognized identification area would include an FAA review of each application to verify safety, security, and eligibility criteria are met. The FAA could require additional information or documentation, as needed, to supplement the request for establishment of an FAA-recognized identification area. Under § 89.215, the Administrator may take into consideration the following matters when reviewing a request for establishment of an FAA-recognized identification area:

- The effects on existing or contemplated airspace capacity.
- The effect on critical infrastructure, existing or proposed manmade objects, natural objects, or the existing use of the land, within or close to the FAA-recognized identification area.
- The safe and efficient use of airspace by other aircraft.
- The safety and security of persons or property on the ground.

The FAA would maintain a list of FAA-recognized identification areas at *https://www.faa.gov.*

The FAA solicits comment on whether the proposed 12 month deadline for applying for an FAA-recognized identification area should be extended. The responses should include specific reasons for why or why not the time period should be extended.

C. Amendment

Under § 89.220, any change to the information submitted in a request for establishment of an FAA-recognized identification area would have to be submitted to the FAA within 10 calendar days of the change. Such changes would include, but not be limited to, a change to the point of contact for the FAA-recognized identification area, or a change to the CBO's affiliation with the FAA-recognized identification area. A request to change the geographic boundaries of the FAA-recognized identification area may be submitted to the FAA for review and approval. Any change to the information submitted to the Administrator would be reviewed under § 89.215 and could result in the termination of the FAA-recognized identification area pursuant to § 89.230. The FAA may terminate an FAA-recognized identification area for cause or upon a finding that the FAA-recognized identification area may pose a risk to aviation safety, public safety, or national security, a finding that the FAA-recognized identification area is no longer associated with a community based organization recognized by the Administrator, or a finding that the person who submitted a request for establishment of an FAA-recognized identification area provided false or

[76] 49 U.S.C. 44809 defines a ''community based organization'' as a membership-based association entity that—(1) is described in section 501(c)(3) of the Internal Revenue Code of 1986; (2) is exempt from tax under section 501(a) of the Internal Revenue Code of 1986; (3) the mission of which is demonstrably the furtherance of model aviation; (4) provides a comprehensive set of safety guidelines for all aspects of model aviation addressing the assembly and operation of model aircraft and that emphasize safe aeromodelling operations within the national airspace system and the protection and safety of individuals and property on the ground, and may provide a comprehensive set of safety rules and programming for the operation of unmanned aircraft that have the advanced flight capabilities enabling active, sustained, and controlled navigation of the aircraft beyond visual line of sight of the operator; (5) provides programming and support for any local charter organizations, affiliates, or clubs; and (6) provides assistance and support in the development and operation of locally designated model aircraft flying sites.

[77] Facility guidance for development of letters of agreement is outlined in FAA JO 7210.3, Chapter 4, Section 3. Letters of agreement are formally developed between the ATC facility and the CBO. They establish items such as the CBO operating areas (horizontal/vertical dimensions), coordination procedures, hours of operation, and emergency procedures (*e.g.,* lost link).

misleading information during the submission, amendment, or renewal process.

D. Duration of an FAA-Recognized Identification Area

Under proposed § 89.225, the term of an FAA-recognized identification area would be 48 calendar months after the date the FAA approves the request for establishment of an FAA-recognized identification area.

A person wishing to renew the establishment of an FAA-recognized identification area would have to submit a request for renewal no later than 120 days before the expiration date. If a request for renewal is submitted after that time but prior to the expiration date, the Administrator could choose not to consider the request. Requests for renewal submitted after the expiration date of the designation would not be considered by the Administrator.

E. Expiration and Termination

Unless renewed, an FAA-recognized identification area would be automatically cancelled as of the day immediately after its expiration date.

Under proposed § 89.230(b)(1), if a CBO wanted to terminate an FAA-recognized identification area prior to the expiration date, it would do so by submitting a request for termination to the Administrator. Once the CBO has terminated an FAA-recognized identification area, the CBO may not reapply to have that flying site reestablished as an FAA-recognized identification area and that site would no longer be eligible to be an FAA-recognized identification area. The FAA seeks comment on this approach.

Under proposed § 89.230(b)(2), the FAA would be able to terminate an FAA-recognized identification area for any reason, including but not limited to a finding that the designation could pose a risk to aviation safety, public safety, or national security or that the person who submitted a request for establishment of an FAA-recognized identification area provided false or misleading information during the submission, amendment, or renewal process. Once an FAA-recognized identification area is terminated by the FAA, a CBO may not reapply to have the associated flying site reestablished as an FAA-recognized identification area.

F. Petition To Reconsider the FAA's Decision To Terminate and FAA-Recognized Identification Area

Under § 89.230(c), a person whose FAA-recognized identification area has been terminated by the FAA would be able to petition for reconsideration by submitting a request for reconsideration within 30 calendar days of the date of issuance of the termination.

XVI. Use of ADS–B Out and Transponders

Section 91.225 requires aircraft to be equipped with ADS–B Out by the year 2020 when operating in certain parts of the airspace of the United States, including Class A, Class B, Class C, and Class E airspace above 10,000 feet mean sea level. Additionally, any aircraft equipped with ADS–B Out must have that equipment on and operating at all times, regardless of airspace. UAS operated under part 107 are not required to meet the part 91 ADS–B Out equipage requirement but are currently not prohibited from doing so.

A recent study showed that the existing ADS–B frequencies cannot support the projected number of UAS operations, which is likely to vastly exceed estimates for future manned aircraft operations (*e.g.,* unmanned aircraft counts could be 5–10 times that of manned aircraft in the same airspace volume).[78] This study's projections led the FAA to reevaluate current regulations and policies regarding ADS–B Out for UAS. The FAA is concerned that the potential proliferation of ADS–B Out transmitters on UAS may negatively affect the safe operation of manned aircraft in the airspace of the United States.

The current ADS–B system (which uses two radio frequencies: 978 megahertz (MHz) and 1090 MHz) does not have capacity for significant growth. The 1090 MHz frequency is also used by the Air Traffic Control Radio Beacon System (ATCRBS), Traffic Alert and Collision Avoidance System (TCAS), and Department of Defense IFF (Identification, Friend or Foe) systems. These systems are already experiencing interference and other issues in high density areas such as the Northeast corridor and the Los Angeles area. The 1090 MHz frequency is significantly more congested than the 978 MHz frequency. The study also looked at the ability of the 978 MHz frequency to support small UAS operations using reduced power 978 MHz ADS–B Out avionics.[79] This study concluded that, based on the projected number of small unmanned aircraft to be in operation going forward, 978 MHz could become unusable for manned aircraft in some areas and blind some FAA ADS–B ground stations, interfering with the ability of the FAA to provide ATC separation services. Thus, the FAA concluded that the widespread use of ADS–B Out for unmanned aircraft, on either 978 or 1090 MHz, would interfere with the safe operation of manned aircraft in the airspace of the United States.

The FAA is proposing changes to 14 CFR part 91. Under the proposed changes, UAS operating under part 91 would no longer be mandated to equip with ADS–B Out. However, there are certain UAS operations for which ADS–B Out would be necessary due to existing airspace equipage requirements or operational necessities. The FAA proposes to require UAS to operate ADS–B Out in transmit mode when the person operating UAS is engaged in two-way radio communication with air traffic control and the operation is conducted under a flight plan. Additionally, the FAA is proposing to allow the Administrator to authorize the use of ADS–B Out when appropriate. The FAA envisions that certain unmanned aircraft receiving ATC services, such as large UAS operating at high altitudes, would need to be equipped with ADS–B Out because they will routinely be inhabiting the same airspace as manned aircraft and will need to be participating in the same air traffic control systems.

To implement these changes in the specific operating rules, the FAA is proposing to amend § 91.215 to prohibit persons from operating an unmanned aircraft under part 91 with a transponder on, unless the operation is conducted under a flight plan and the person operating the unmanned aircraft system maintains two-way radio communication with air traffic control or unless otherwise authorized by the Administrator.

The FAA is proposing changes to 14 CFR part 107 to generally prohibit unmanned aircraft from operating with ADS–B Out. The FAA envisions that remote identification would provide a similar safety function for unmanned aircraft and provide similar situational awareness to various stakeholders. The prohibition would allow ADS–B to continue to enable the safety of airspace for manned aircraft going forward. However, the proposal does not prohibit the use of ADS–B In, if the ADS–B In equipment is manufactured and installed in accordance with FAA requirements and guidance.[80]

[78] Guterres, Michael; Jones, Stanley; Orrell, Greg and Strain, Robert. ''ADS–B Surveillance System Performance With Small UAS at Low Altitudes'', AIAA Information Systems-AIAA Infotech @ Aerospace, AIAA SciTech Forum, (AIAA 2017–1154). *https://doi.org/10.2514/6.2017-1154.*

[79] Id.

[80] See Advisory Circulars 20–172B and 90–114A.

The FAA is proposing to add §§ 107.52 and 107.53 in part 107, to prohibit persons from operating a small unmanned aircraft with a transponder on or with ADS–B Out equipment in transmit mode, unless otherwise authorized by the Administrator. These changes are in addition to the proposed § 89.125 prohibition against using ADS–B Out equipment to comply with the remote identification requirements of part 89.

XVII. Proposed Effective and Compliance Dates

The sooner the remote identification of UAS is required, the sooner law enforcement, security partners, public safety personnel, and the FAA would be able to locate unsafe and careless operators, bring an end to the unsafe activity, and educate or conduct enforcement actions as needed. Until the remote identification of UAS can be implemented, most allegedly unauthorized UAS sightings remain unverified; incidents remain unsolved; and operator intention remains unknown, leaving it unclear if the operator is being careless or is engaged in nefarious activity. Without the remote identification of UAS, security and law enforcement agencies are left with few options to stop the unauthorized activity and address the safety or security risk potentially posed by the errant or malicious UAS operation.

The FAA believes expedited implementation and effectivity of this NPRM would protect the interests of operators of manned aircraft, compliant UAS operators, and the security agencies charged with protecting lives and property on the ground. Additionally, due to the essential role of remote identification of UAS in contributing to the safety and efficiency of the airspace, and its role as a critical tool in a robust UAS protection security regime, the FAA believes the remote identification of UAS must be implemented as quickly as possible. In addition, UAS remote identification is a foundational building block of UTM and a key stepping stone to the future ability to conduct routine BVLOS operations.

The FAA proposes a number of requirements for operators and producers of UAS with remote identification. This rule also includes proposed requirements for applying for FAA-recognized identification areas. As with most new regulations, the FAA recognizes that some elements of this proposal would take time to fully implement. The FAA also recognizes it would need to quickly implement requirements that address ongoing safety and security needs. Therefore, the FAA proposes that a final rule finalizing remote identification requirements would become effective on the first day of the calendar month following 60 days from the date of publication of the final rule that follows this proposal.

The FAA finds that CBOs can begin to identify flying sites that they may wish to apply to have established as FAA-recognized identification areas immediately. This proposal allows time for CBOs to evaluate their needs and organize their applications for establishment of their flying sites as FAA-recognized identification areas. For that reason, the proposal includes a 12 calendar month period after the effective date of the rule to make that application. Applications made before the effective date of the rule, or after the 12-month period, would not be considered.

Persons responsible for the production of UAS would not be able to submit declarations of compliance until the FAA accepts at least one means of compliance. Once a means of compliance is accepted by the FAA, persons responsible for the production of UAS would need time to design, develop, and test UAS using that means of compliance. For that reason, the proposal includes a 24-month period before compliance with the production requirements proposed in this rule is required. During this 24-month period, UAS without remote identification can continue to be produced, sold, and operated in the United States. It also provides time for the development and deployment of Remote ID USS to support the requirements of the proposed rule. Prior to the 24-month compliance date, this proposal allows for the production and operation of both UAS with and without remote identification.

Requirements that prohibit operation of UAS without remote identification would begin 36 months after the effective date of the rule. This 36-month period runs concurrently with the 24-month period provided for the development of means of compliance, and for the design, production, and sale of UAS with remote identification. Once UAS with remote identification are widely available, this proposal would allow an additional one- year period of time for UAS owners and operators to purchase and transition to operations of UAS with remote identification.

The FAA is seeking comments about whether certain UAS operations currently conducted under waiver, such as operations over people or nighttime operations, should be required to comply with remote identification prior to being authorized under a waiver or regulation. For example, should the FAA require UAS to comply with remote identification as a condition precedent to granting a nighttime waiver or authorizing operations over people?

The following are the FAA's proposed compliance dates:

TABLE 5—PROPOSED COMPLIANCE DATES

Requirement	Compliance date
Any non-excepted unmanned aircraft weighing more than 0.55 pounds must have an FAA-accepted declaration of compliance (89.510).	First day of the month following 24 months after the effective date.
Serial number added to unmanned aircraft registration.	
Requirement to remotely identify (89.105)	First day of the month following 36 months after the effective date.
The serial number of any UA required to be registered must be listed on an FAA-accepted declaration of compliance or the UA can only be flown within an FAA-recognized identification area (89.110(c)(1) and 89.115(c)(1)).	First day of the month following 36 months after the effective date.
Submit an application for establishment of an FAA-recognized identification area (89.210).	First day of the month following 12 months after the effective date.

The FAA believes that early compliance may benefit both industry and UAS operators and encourages regulated parties to implement remote identification of UAS sooner than the compliance dates established in this proposed rule. The FAA invites comments providing specific proposals and ideas on how to build an early

compliance framework into the regulation. The agency is interested in comments related to how an early compliance framework would work and how it would fit into the overarching remote identification framework proposed by the FAA.

The FAA would also consider providing incentives that the FAA can reasonably provide to parties that adopt remote identification as early as possible. The FAA invites comments on possible incentives for early compliance.

XVIII. Proposed Guidance Documents

The FAA is proposing several guidance documents to supplement the requirements proposed in this rule. Copies of the draft guidance documents are included in the docket for this rulemaking. The FAA invites comments regarding these draft advisory materials.

The FAA is proposing a new advisory circular, *Means of Compliance Process for Remote* Identification *of Unmanned Aircraft Systems.* This advisory circular provides guidance on the means of compliance process described in part 89. This AC outlines the required information for submitting a means of compliance.

The FAA is proposing a new Advisory Circular, *Declaration of Compliance Process for Remote Identification of Unmanned Aircraft Systems.* This advisory circular provides guidance on the declaration of compliance process described in part 89. This AC outlines the required information for submitting a declaration of compliance.

The FAA is proposing to revise AC 107–2, Small Unmanned Aircraft Systems, to describe the requirements of remote identification. The draft AC also describes where the various small UAS would be permitted to operate.

As noted, the FAA would update the Airman Certification Standards and remote pilot test questions to reflect the new regulatory requirements regarding remote identification.

The FAA is proposing a new Advisory Circular for FAA-recognized identification areas. This advisory circular provides guidance to persons requesting the establishment of an FAA-recognized identification area under § 89.210. This AC also provides guidance for persons responsible for FAA-recognized identification areas, as well as persons operating UAS at FAA-recognized identification areas under § 89.120.

XIX. Regulatory Notices and Analyses

Changes to Federal regulations must undergo several economic analyses. First, Executive Order 12866 and Executive Order 13563 direct that each Federal agency shall propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs. Second, the Regulatory Flexibility Act of 1980 (Pub. L. 96–354) requires agencies to analyze the economic impact of regulatory changes on small entities. Third, the Trade Agreements Act of 1979 (Pub. L. 96–39) prohibits agencies from setting standards that create unnecessary obstacles to the foreign commerce of the United States. In developing U.S. standards, this Trade Act requires agencies to consider international standards and, where appropriate, that they be the basis of U.S. standards. Fourth, the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4) requires agencies to prepare a written assessment of the costs, benefits, and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by State, local, or tribal governments, in the aggregate, or by the private sector, of $100 million or more annually (adjusted for inflation with base year of 1995). The FAA has provided a more detailed Preliminary Regulatory Impact Analysis of this proposed rule in the docket of this rulemaking. This portion of the preamble summarizes this analysis.

In conducting these analyses, the FAA has determined that this proposed rule: (1) Has benefits that justify its costs; (2) is not an economically ''significant regulatory action'' as defined in section 3(f) of Executive Order 12866; (3) will have a significant economic impact on a substantial number of small entities; (4) will not create unnecessary obstacles to the foreign commerce of the United States; and (5) will not impose an unfunded mandate on state, local, or tribal governments, or on the private sector by exceeding the threshold identified above.

A. Regulatory Evaluation

1. Key Assumptions and Data Sources

The FAA's analysis of the proposed rule is based on findings from the Unmanned Aircraft Systems Identification and Tracking Aviation Rulemaking Committee (UAS–ID ARC), as well as data and information from the FAA and industry stakeholders. The analysis for the regulatory evaluation is based on the following assumptions and data sources:

A. Retrofits

An important assumption used in this analysis involves the availability of retrofits. Based on information from UAS producers,[81] part of the existing fleet of UAS could be retrofit to comply with remote identification requirements with relative ease and minimal cost (*e.g.,* by a software update or ''push'' through the internet) and this could be achieved within the first year after the effective date of the final rule given the availability of FAA-accepted means of compliance.[82] This would enable early compliance with remote identification for persons operating a portion of the existing UAS fleet and those UAS purchased during the proposal's 24-month period before compliance with production requirements.

Based on industry information and market research, the FAA estimates at least 93% of the current part 107 fleet and at least 20% of the current recreational fleet would be eligible for retrofits, thus minimizing the costs for operators and producers.[83] This is based on industry information suggesting that small UAS at a certain level of design specification and operational capability would likely have system and connectivity capabilities that could be retrofit through a software update.

The FAA reviewed UAS registered to part 107 operators and found 93% of the existing part 107 UAS fleet may have technical capabilities to be retrofit based on information received by industry (*i.e.,* could support software updates through internet).[84] The FAA identified

[81] The FAA received information from industry on the potential to retrofit during Executive Order 12866 meetings from September through December, 2019. Information from these meetings will be available in the docket of this rulemaking. Under Executive Order 12866, OIRA meets on regulatory actions with any interested party to discuss issues on a rule under review. Under OIRA procedures, the OIRA Administrator or his/her designee meets with outside parties during a review and the subject, date, and participants of the meeting are publicly disclosed on Reginfo.gov along with any written materials received from outside parties on rules under review (*https://reginfo.gov/public/do/eo/neweomeeting*).

[82] Producers of UAS with Remote ID, including those that retrofit, would be required to meet proposed performance standards using an FAA-accepted means of compliance for remote identification.

[83] Assuming retrofits can be made under an FAA-accepted means of compliance, some producers would not need to delay compliance. Retrofits may indicate producers need less modification of existing UAS models to comply with the proposal. In addition, the availability of retrofits would minimize impacts for some operators of UAS purchased without remote identification equipment who would otherwise need to upgrade or buy a new UAS equipped for Remote ID, especially those operated under part 107 for commercial purposes that would not receive any commercial value or benefit from operating at an FAA-recognized identification area.

[84] This is 93% of the part 107 ''consumer'' grade aircraft could be retrofit. Additionally, the FAA assumes the entire fleet of part 107 ''professional'' grade UAS could be retrofit.

the top-10 registered aircraft by producer and researched registered model specifications online. The FAA found each of the registered models within this group had internet and Wi-Fi connectivity, ability to transmit data, receive software uploads, and had radio frequency transceivers, among other technology such as advanced microprocessors. Figure 1 provides the breakdown of manufacturers of registered part 107 UAS that could retrofit representing 93% of part 107 registered UAS fleet.

FIGURE 1—PART 107 UNMANNED AIRCRAFT REGISTRATIONS BY MANUFACTURER

Producer/manufacturer	UAS registrations—part 107	Percent share of total	Cumulative percent share
DJI	252,678	78.1	78.1
Intel	13,147	4.1	82.2
Yuneec	9,725	3.0	85.2
Parrot	7,928	2.5	87.7
GoPro	5,980	1.8	89.5
3dr	4,687	1.4	91.0
Holy Stone	2,580	0.8	91.8
Autel	2,677	0.8	92.6
Hubsan	1,278	0.4	93.0
Kespry	1,143	0.4	93.3

Source: FAA, part 107 UAS Registrations, October 2019 point-in-time count.

The FAA has limited information on the manufacturers and types of UAS in the recreation fleet because part 48 registration currently allows limited recreational flyers to register multiple small unmanned aircraft under a single Certificate of Aircraft Registration. However, published market information finds 36% of the North America fleet is manufactured by one producer (DJI) [85] that provided information to the FAA suggesting they could retrofit. The FAA estimates that about 20% of the recreational fleet is comprised of aircraft manufactured by DJI that could be retrofit. This estimate was developed by multiplying the combined part 107 and recreational unmanned aircraft fleet by 36%, and then subtracting DJI aircraft registered under part 107.[86]

Therefore, the FAA assumes UAS purchased in year 1 that are retrofit would allow the aircraft to ''continue flying'' under the limited or standard remote identification requirements after the compliance date of the final rule. UAS sold in year 1 that could not be retrofit would likely not meet the limited or standard remote identification requirements after year 3. Persons that own unmanned aircraft in this group of ''legacy'' UAS without remote identification equipment would have potential ''loss of use'' associated impacts since this proposal does not include grandfathering.[87] The retrofit assumptions above were used in this analysis to estimate the effects of retrofits on the costs of the proposal and its compliance period.

The FAA requests comments on the capability of retrofits to meet the proposed remote identification requirements. Specifically, the FAA requests information and data from producers of affected UAS in response to the following questions that can be used to inform this analysis. Please provide references and sources for information and data.

- As a producer of UAS affected by this proposal, would you be able to retrofit your current UAS models to comply with the proposed rule given the availability of FAA-accepted means of compliance?
- Do you have information that would assist in the early development of means of compliance that would be available for retrofits for the following scenarios a) before the effective date of the final rule, which is 60 days after the publication date of the final rule, and b) within one year after effective date of the final rule?
- Would it be possible to retrofit by a software or firmware update through an internet download?
- How would a retrofit solution meet the proposed tamper resistance and labelling requirements? Would a software push be able to meet requirements for tamper resistance or would it require hardware? How would you meet labelling requirements under a retrofit scenario (*e.g.,* would you mail the label)?
- Would retrofits meet the limited or standard remote identification requirements?
- What are the costs of retrofits to the producer and the owner/operator?
- In lieu of a software push through the internet, what other methods could producers use to facilitate retrofits (*e.g.,* mail-in programs or physical retrofit drop-off locations)?
- If retrofits are not an option for certain makes and models, would you offer operators ''buy-back'' or ''trade-in'' incentives to replace UAS without remote identification equipment? If so, please describe the incentive and the process.
- The FAA also solicits comments on the capability of producers of UAS weighing greater than 55 pounds to retrofit aircraft to be compliant with remote identification requirements.

B. Period of Analysis & Valuation of Impacts

- The analysis uses 2019 constant dollars. Year 1 of the period of analysis, which would correlate with the effective date of the final rule, is used as the base year.
- The FAA uses a ten-year time period of analysis to capture the effects

[85] Source: 2017 Skylogic Research, a firm tracking the drone industry found 36% of the units sold in North America in the $500 to $1000 range are manufactured by DJI (*https://www.vox.com/2017/4/14/14690576/drone-market-share-growth-charts-dji-forecast*). For purposes of this analysis, the 36 percent is used as a proxy for the share of DJI units in the U.S. fleet.

[86] The FAA made the following calculations to estimate the portion of the modeler fleet that are DJI: (i) Multiplied the year 1 combined UAS sales forecast developed for the proposed rule by 36 percent to estimate the number of DJI units sold for recreational and part 107 purposes during year 1; (ii) Multiplied the year 1 part 107 sales forecast by 71% to estimate portion of part 107 sales that were DJI; and, (iii) Subtracted ''b'' from ''a'' to estimate year 1 recreational sales of DJI units. Based on these calculations, DJI recreational units sold in year 1 accounted for about 20% of the recreational units sold in year 1.

[87] Persons operating UAS without remote identification equipment would always be required to operate within visual line of sight and within an FAA-recognized identification area. Persons operating UAS without remote identification equipment would need to travel and incur costs of operating within an FAA-recognized identification area.

of the proposed compliance period and recurring effects of the proposed rule.[88]

• The analysis includes the proposed two-year phase-in period for compliance by persons responsible for the production of UAS from the effective date of the rule. Operators have one additional year beyond this compliance date to comply with the provisions of the final rule.

• The FAA uses a three percent and seven percent discount rate to quantify present value costs and cost savings as prescribed by OMB in Circular A–4.[89]

C. Affected UAS Fleet/Characteristics

• The analysis of costs and cost savings of this proposed rule are based on the fleet forecast for small unmanned aircraft as published in the FAA Aerospace Forecast 2019–2039.[90] The forecast includes base, low, and high scenarios. The analysis provides a range of net impacts from low to high based on these forecast scenarios. The FAA considers the primary estimate of net impacts of the proposed rule to be the base scenario.

• Based on the FAA fleet forecast for small unmanned aircraft, the FAA estimates the average number of aircraft owned by each part 107 operator to be 2.4 and the average number owned by each recreational flyer to be 1.4 aircraft. The FAA assumes the average lifespan for unmanned aircraft operated by these two groups is three years based on FAA research related to the its annual aerospace forecast, UAS registration information, information from recreational and model unmanned aircraft owners, and a review of literature.[91]

• The FAA assumes members of a nationwide community based organization own, on average, two aircraft,[92] which may have an average lifespan that exceeds ten years. As a result, members of a nationwide community-based organization may not incur the same pattern of maintenance and replacement costs as other recreational flyers.[93]

D. Producers (Manufacturers)

• Based on the FAA part 48 unmanned aircraft registry, the FAA estimates that 83 percent of small unmanned aircraft sold in the United States are produced by foreign entities.

• Each UAS producer will incur an estimated one-time cost of $313 for the purchase of a remote identification standard from a consensus standards body.[94]

• The FAA estimates that potentially as many as 157 U.S. and 324 foreign producers would submit a declaration of compliance for 313 U.S. and 787 foreign models of UAS for FAA acceptance by year 1 or 2 of the analysis period depending on their ability to retrofit.[95] During each of the remaining years of the analysis period, the FAA assumes an additional nine new producers would submit a declaration of compliance annually for one model of unmanned aircraft each, and nine new models will be produced by preexisting producers, for a total of eighteen new models of UAS annually.[96]

• The FAA assumes that five percent of the declarations of compliance submitted by persons responsible for the production of standard remote identification UAS and limited remote identification UAS to the FAA would not be accepted. The declaration of compliance would then be rewritten and resubmitted to the FAA for acceptance, and the FAA would accept the resubmission.

• Producers will maintain product support and notification procedures to notify the public and the FAA of any defect or condition that causes the UAS to no longer meet the requirements of proposed part 89.

E. Remote ID USS

• The FAA estimates that ten entities will request to become Remote ID USS and nine of the entities will be approved by the FAA by the end of year 1 in the analysis period. For each of the nine remaining years of the analysis period, the FAA assumes one additional entity will request to become a Remote ID USS annually which will then be approved by the FAA.[97]

• Each Remote ID USS applicant will be required to submit an application package to the FAA requesting to become an FAA-qualified Remote ID USS. The FAA determines that each application package submitted will not exceed 40 pages[98] and will take the applicant 25 hours per page to complete at a fully burdened wage of $92.72 per hour (a fully burdened wage includes pay and benefits).[99]

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[88] The FAA typically uses a five-year time period for Regulatory Impact Analysis of UAS rulemakings to align with historical and current FAA UAS Forecasts (see *https://www.faa.gov/data_research/aviation/aerospace_forecasts/media/Unmanned_Aircraft_Systems.pdf*). In addition, the FAA acknowledges uncertainty in estimating incremental impacts of this proposed rule beyond five years due to rapid changes in UAS technology and innovation.

[89] OMB Circular A–4, *Regulatory Analysis* (2003), *https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/circulars/A4/a-4.pdf.*

[90] FAA Aerospace Forecast Fiscal Years 2019–2039 at 30–33, *available at http://www.faa.gov/data_research/aviation/aerospace_forecasts/media/FY2019–39_FAA_Aerospace_Forecast.pdf*

[91] A review of articles and papers further supports an average three-year lifespan for a small UAS. The review found life expectancy is influenced by many factors, such as flight conditions, frequency of use, and quality of maintenance. Lifespan is also affected by rapid advances in technology, which can result in ''planned obsolescence'' of older UAS models due to manufacturers advancing new capabilities that drive consumer satisfaction and demand at additional costs. UAS lifespan is expected to last similar to other consumer electronics within the same price range. In the United States, smart phones are replaced after 32 months, on average, while laptops have an average lifespan of 2–4 years (see the 2018 NPD Mobile Connectivity Report; *https://www.npd.com/wps/portal/npd/us/news/press-releases/2018/the-average-upgrade-cycle-of-a-smartphone-in-the-u-s--is-32-months---according-to-npd-connected-intelligence/*). Other information published by the European Union Aviation Safety Agency (''EASA''; *https://www.easa.europa.eu/sites/default/files/dfu/GTF%20-%20Report_Issue2.pdf#page=93&zoom=100,0,13.* p.47), the Civil Aviation Authority of Israel (*https://en.globes.co.il/en/article-proposals-drawn-up-for-regulating-drones-in-israel-1001270656*), and academia (see for example, *http://eng.fau.edu/research/fmri/pdf/Y1R1-17_Final_figliozzi.pdf,* p. 34), suggests the range is probably one year to three years, with EASA suggesting a span of one to four years.

[92] The FAA has heard that the Academy of Model Aeronautics (AMA) has a membership of about 200,000 and each member has nine aircraft on average. This would equate to a 1,800,000 AMA Fleet. The FAA plans to reach out to the AMA to confirm the average number of unique aircraft owned by its members (*i.e.,* an estimate adjusted for double-counting of shared aircraft that includes operational aircraft weighing more than 0.55 pounds)

[93] Based on research of ownership trends and discussions with UAS enthusiasts, the FAA assumes that CBO members spend more money to purchase or build their model aircraft and to maintain their aircraft such that the aircraft last much longer than that of the ''average'' recreational flyer. Additionally, members of CBOs are expected to own more model aircraft, on average, compared to other recreational flyers.

[94] *https://my.rtca.org/nc__store?category=a0L36000003g7jDEAQ.* Accessed November 13, 2018. Average price for the 11 unmanned aircraft standards available at the RTCA website. The 11 standards range in price from $140 to $675 for an average of $313.

[95] Based on analysis of the Association for Unmanned Vehicle Systems International (AUVSI) Unmanned Systems & Robotics Database.

[96] Based on analysis of the Association for Unmanned Vehicle Systems International (AUVSI) Unmanned Systems & Robotics Database.

[97] Source: FAA subject matter expert.

[98] See Section 6.5 Application Package Specifics, page 8. (Source: *https://www.faa.gov/uas/programs_partnerships/data_exchange/laanc_for_industry/media/FAA_USS_LAANC_Onboarding_Process.pdf.*) The FAA determines that the Remote ID USS applicant package will be more complex than the application package for LAANC.

[99] Based on information from the regulatory analysis of the 2019 proposed rule, Operations of Small Unmanned Aircraft Systems Over People (*https://www.regulations.gov/docket?D=FAA-2018-1087*). The regulatory analysis estimated it would take a small UAS manufacturer 25 hours per page of representative activity to compile information, draft, review, and approve remote pilot operating instructions. This estimate is used as a proxy for the time required by a USS service provider applicant to complete each page of the application package submitted to the FAA.

• The FAA assumes each entity operating a UAS would be required to subscribe to a Remote ID USS at a rate of $2.50 per month or $30 per year.[100] Entities that operate UAS without remote identification may only operate within FAA-recognized identification areas and are not required to subscribe to a Remote ID USS.

F. Other

• The FAA assigns the United States Department of Transportation guidance on the hourly value of travel time savings for personal purposes (for limited recreational flyers only). This value is equal to $14.21 per hour and is applicable for the ten-year analysis period.[101]

• The FAA assumes that all Academy of Model Aeronautics (AMA) flying sites will submit requests to become FAA-recognized identification areas, and that 90 percent of the requests will be approved. The remaining ten percent are assumed to be in sensitive areas and therefore will not be approved to become an FAA-recognized identification area.

• The FAA estimates it will conduct 2,002 investigations of UAS incidents annually for each year of the analysis period and that each investigation will range between 1 and 40 hours.[102]

The FAA requests comments, with supporting documentation, on these assumptions.

2. Benefits Summary

The FAA is proposing to require the remote identification of UAS operating in the airspace of the United States. Remote identification of UAS provides situational awareness of operations conducted in the airspace of the United States, fosters accountability of the operators and owners of UAS, and improves the capabilities of the FAA and law enforcement to investigate and mitigate careless, hazardous, and noncompliant operations. The ability to know the location of UAS operating in the airspace of the United States, and to identify and locate their operators, creates a safer environment. This, in turn, enhances safety in air commerce and the efficient use of the airspace of the United States.

First and foremost, the implementation of these proposed remote identification requirements would allow the FAA, as well as law enforcement entities, to have access to new information to help them be better able to perform their responsibilities in protecting users of the airspace as well as people and property on the ground. Remote identification of UAS would enable the FAA, national security agencies, and law enforcement entities to have near real-time awareness of UAS users in the airspace of the United States. This information could be used to distinguish compliant operators from those potentially posing a safety or security risk.

There has been an increase in UAS sightings near airports, some of which have caused travel disruptions and significant financial costs.[103] While remote identification alone will not stop such occurrences, the FAA expects the duration of the event can be reduced by the remote identification capabilities in this proposed rule.[104] London's Gatwick Airport was closed due to unmanned aircraft sightings in July 2017 and again in December 2018. In July 2017, a spokesperson for the airport reported that operations were suspended twice in one day, for a period of nine minutes, and again for a period of five minutes. In the December 2018 incident, Gatwick was closed twice during the holiday travel rush, once for almost 36 hours as police worked to identify those operating unmanned aircraft in the area.[105] The December closures affected approximately 150,000 passengers and resulted in approximately 1,000 flight cancellations,[106] which cost the airlines and the airport approximately $64.5 million [107] and $20 million, respectively.[108] Flights at London Heathrow Airport were suspended in January 2019 after a sighting of an unmanned aircraft.[109] The suspension of flights lasted approximately one hour.

The Dubai International Airport experienced closures due to unauthorized unmanned aircraft activity in 2015, 2016, and 2019.[110] In 2015, the unauthorized activity caused the airport to shut down for 55 minutes. In 2016, unauthorized UAS activity closed the airport three more times. Two of the closures lasted 30 minutes each, and one closure lasted for 115 minutes. Estimated losses for the three closures that occurred in 2016 totaled $16.6 million.[111] During the airport's most recent closure (February 2019), flight departures were suspended for 32 minutes. According to the Emirates Authority for Standardization and Metrology, airports in the United Arab Emirates suffer financial losses averaging $95,368 per minute due to unauthorized UAS activity.

In the United States, New Jersey's Newark Liberty International Airport experienced a closure in January 2019 after receiving two separate reports of a UAS sighting. The FAA reported that 43 flights were required to hold while nine flights were diverted during the event that lasted for 21 minutes.[112] On February 21, 2019, flights at Dublin Airport in Ireland were delayed for 30 minutes due to unauthorized unmanned aircraft activity, and on March 22, Frankfurt International Airport

[100] FAA review of subscription costs to USS for LAANC range from 0$ to $5 per month. The average of $2.50 is used for the regulatory analysis. In this analysis, the FAA assumes the subscription cost will be a flat rate and will not vary by the number of UAS operated by an entity. UAS service providers may charge additional fees for other services not related to this proposed rule.

[101] Time savings is estimated to be median hourly wage plus benefits as described in the U.S. Department of Transportation Revised Departmental Guidance on Valuation of Travel Time in Economic Analysis (Sept. 27, 2016).

[102] The FAA conducted 2,002 investigations in FY 2018.

[103] The FAA has been compiling a database of UAS sightings since November 2014. The database is compiled mostly from reports by pilots submitting statements of possible UAS sightings or encounters to the FAA's air traffic control facilities, but it also contains reports submitted by the general public, law enforcement, air traffic controllers, and others. The reports typically involve sightings of UAS operating around airports or airborne manned aircraft. The FAA analyzed 7,285 records from the database for the 48-month period starting with January 2015 and going through December 2108. During this time, UAS sightings have increased almost two fold, going from about 100 reports per month to just under 200 reports per month. The FAA acknowledges that the data is often not sufficient for the FAA to conduct investigations, and that reported sightings could involve UAS operating in a safe and authorized manner. However, the increase in reported sightings is indicative of a proliferation of UAS operating in the airspace.

[104] *http://www.digitaljournal.com/tech-and-science/technology/q-a-recent-airport-shutdowns-need-drone-interdiction-technology/article/543680.* Accessed February 26, 2019.

[105] *https://www.theguardian.com/uk-news/2018/dec/21/gatwick-airport-reopens-limited-number-of-flights-drone-disruption.* Accessed February 26, 2019.

[106] *https://www.independent.co.uk/travel/news-and-advice/gatwick-drones-arrests-flight-delay-cancelled-airport-christmas-travel-latest-update-a8695846.html.* Accessed February 26, 2019.

[107] *http://fortune.com/2019/01/22/gatwick-drone-closure-cost/.* Accessed February 26, 2019. Extrapolated from EasyJet's announcement that it lost $19.3 million in revenue and customer welfare costs during the shutdown. EasyJet reported 400 flight cancellations, and that the incident affected 82,000 of their passengers, for whom it paid an average of $160.90. Accessed February 26, 2019.

[108] *https://www.independent.co.uk/travel/news-and-advice/gatwick-drone-airport-cost-easyjet-runway-security-passenger-cancellation-a8739841.html.* Accessed February 26, 2019.

[109] *https://www.thenational.ae/world/europe/flights-briefly-stopped-at-heathrow-airport-over-drone-sighting-1.810964.* Accessed February 26, 2019.

[110] *http://www.digitaljournal.com/tech-and-science/technology/q-a-recent-airport-shutdowns-need-drone-interdiction-technology/article/543680.*

[111] *https://www.arabianbusiness.com/content/375851-drone-costs-100000-minute-loss-to-uae-airports.*

[112] *https://www.reuters.com/article/us-usa-drones/faa-details-impact-of-drone-sightings-on-newark-airport-idUSKCN1PH243.* Accessed February 26, 2019.

suspended operations for 29 minutes after an unmanned aircraft was spotted in the area.[113] [114] Frankfurt International Airport was closed again on May 9 for a period of 28 minutes due to a UAS sighting. The May 9 closure resulted in the cancellation of 143 departures with an additional 48 arrivals diverted to other airports.[115]

Currently, personnel that conduct law enforcement and compliance activities lack the ability to have near real-time awareness of UAS users in the airspace of the United States. These challenges are an impediment to the FAA's mission of ensuring the safety of the airspace of the United States. For example, over 200 unmanned aircraft were detected in the no-fly-zone of the 2018 Albuquerque International Balloon Fiesta in spite of the FAA prohibition.[116] This proposed rule could have aided the FAA to identify the operators of these unmanned aircraft.

The FAA believes this proposed rule is crucial for the development of UTM, which would enhance the safety and efficiency of the airspace of the United States. The FAA is collaborating with other government agencies and industry stakeholders to develop UTM, which would be separate from, but complementary to, the ATM system. As of mid-December 2018, there were 1.27 million unmanned aircraft in the unmanned aircraft registry. This is over five times greater than the number of active manned aircraft registered with the FAA. While ADS–B is currently used to track manned aircraft and is mandated for manned aircraft in certain airspace after January 1, 2020, it was not designed to incorporate millions of unmanned aircraft on the same network. Instead, the FAA envisions a community-based traffic management system, where UAS operators have the responsibility to participate in a safe operating environment. This vision for UTM includes services for flight planning, communications, separation, and weather, among others.

The FAA also believes remote identification would provide greater situational awareness of UAS operating in the airspace of the United States to other aircraft in the vicinity of those operations, and provide information to airport operators. Manned aircraft, especially those operating at low altitudes where UAS operations are anticipated to be the most prevalent, such as helicopters and agricultural aircraft, could carry the necessary equipment to display the location of UAS operating nearby. In addition, we expect towered airports will use remote identification information for situational awareness, especially for landing and takeoff operations. Further, an aircraft preparing to take off from a non-towered airport in Class G airspace may have access to greater information than is currently available.

Remote identification is a key stepping stone to facilitating the ability to conduct BVLOS operations. While the FAA acknowledges remote identification of UAS does not, in and of itself, permit BVLOS operations, without remote identification of UAS, BVLOS operations on a large scale are not feasible. BVLOS operations are expected to replace riskier manned activities and to also create new economic opportunities. When UAS are transmitting and broadcasting, as appropriate, remote identification information, they are contributing to a cooperative operating environment which supports detect-and-avoid and aircraft-to-aircraft communication systems that could aid in unmanned aircraft collision avoidance. Remote identification would help enable these operations to occur on a routine basis, rather than through the waiver process.

BVLOS operations enable entities to conduct activity which may otherwise be too expensive, too dangerous, or too impractical to carry out.[117] For example, BVLOS operations allow unmanned aircraft to collect data at costs less than those incurred using the more traditional methods of manned aircraft or satellites.[118] Cost savings from the use of unmanned aircraft for BVLOS operations is validated in a Precision Hawk case study. In this study, the costs of power line inspections using unmanned aircraft versus a manned helicopter were compared.[119] In the electric utilities industry, high tension power lines must be inspected on a regular basis, and these inspections are typically performed with manned helicopters. While requirements and methodologies vary, helicopter inspection costs could range from $40 to $700 per mile.[120] Conversely, utility companies operating UAS BVLOS could spend $10 to $25 per mile of inspection. Based on these costs, the Precision Hawk Study estimates a potential savings of approximately $9 million over a five-year period for a company that must inspect 10,000 miles of power lines per year.[121]

UAS remote identification and BVLOS operations would enable entities to conduct dangerous activities with unmanned aircraft. While UAS remote identification itself does not prevent accidents, accidents involving unmanned aircraft typically have a much lower threat to human life than do accidents involving manned aircraft. One example of an accident where injury could possibly have been prevented if a UAS was substituted for a manned aircraft was for a power line inspection near BWI Marshall Airport, MD Amtrak Rail Station. The helicopter used to perform the inspection crashed, resulting in injuries to the helicopter's three occupants, and subsequently started a brush fire that resulted in a service interruption for Amtrak passengers travelling between Washington, DC,[122] and Baltimore, Maryland. In May of 2018, a helicopter performing a routine transmission line inspection crashed in Louisiana when its landing gear became entangled in transmission lines. Of the three people on board the helicopter, one was killed, and the other two were injured.[123] This loss of life could possibly have been prevented if the inspection had been conducted with a UAS instead of a manned helicopter. In addition to replacing manned aircraft for utility inspections, UAS can also eliminate the need for workers to climb to dangerous heights for inspection of power lines, cellular towers, and wind turbines.[124]

This proposed rule would assist government efforts to address illegal activity and protect national security. Criminal operations create a direct threat to national security and public safety and also pose severe hazards to safety in air commerce. Such risks are multiplied with the increasing sophistication of technology, the availability of UAS equipment, and the enabling of additional types of

[113] *https://dronelife.com/2019/02/22/flights-were-grounded-at-dublin-airport-after-another-drone-sighting/.* Accessed February 26, 2019.

[114] *https://www.ecnmag.com/news/2019/03/drone-sightings-interrupt-germanys-frankfurt-airport.*

[115] *https://www.france24.com/en/20190509-drone-sighting-briefly-grounds-flights-frankfurt-airport.*

[116] *https://www.krqe.com/news/balloon-fiesta/hundreds-violate-faa-s-no-drone-fly-zone-at-balloon-fiesta/1510662538.* Accessed December 18, 2018.

[117] *https://www.precisionhawk.com/beyond-visual-line-of-sight-bvlos-drone-operations/.* Accessed December 19, 2018.

[118] Ibid.

[119] Ibid.

[120] Ibid.

[121] Ibid.

[122] *https://baltimore.cbslocal.com/2016/04/16/helicopter-crash-reported-near-bwi-airport/.* Accessed December 19, 2018.

[123] *https://www.nola.com/traffic/index.ssf/2018/05/victims_in_fatal_boutte_helico.html.*

[124] *https://www.powermag.com/using-drones-to-increase-net-safety-in-the-utility-sector/?pagenum=1.* There are approximately 52,000 utility-scale wind turbines in the United States.

operations across the airspace of the United States. The FAA recognizes the increasing availability and potential use of UAS for illegal activities such as the carrying and smuggling of controlled substances, illicit drugs, and other payloads; the unlawful invasion of privacy; illegal surveillance and reconnaissance; the weaponization of UAS; sabotaging of critical infrastructure; property theft; disruption; and harassment. With this proposed rule, the FAA, first responders, and law enforcement officers would be able to more easily determine who is operating in the airspace and assist in identifying anomalies or dubious operations to determine whether action is warranted to ensure the safety and security of the airspace of the United States and the people on the ground.

Safety and security enforcement can be extremely difficult absent a remote identification requirement that enables the prompt and accurate identification of UAS and their operators. Recently, there have been several instances of unmanned aircraft operating illegally in the areas of wildfires where the FAA typically implements temporary flight restrictions to support U.S. Forest Service activities. Aerial firefighting aircraft typically fly in smoky, windy, turbulent conditions, and unauthorized unmanned aircraft flights near a wildfire could cause injury or death to firefighters and pilots because firefighting aircraft typically fly at very low altitudes, which creates an environment for mid-air collisions.[125] If unmanned aircraft are detected in an unauthorized area, firefighting aircraft could be grounded. The effects of lost aircraft flying time can be compounded by flames moving into untreated terrain, potentially threatening lives and property.[126]

The U.S. Department of Interior tracks private unauthorized unmanned aircraft incursions over wildland fires. In their first year of reporting (2014), there were two incursions of unauthorized unmanned aircraft over wildland fires. In 2015, the number of unauthorized unmanned aircraft incursions increased six-fold from the prior year to total 12 incursions.[127] By 2016, there were 42 unauthorized unmanned aircraft incursions over wildland fires.[128] Of these 42 incursions, 12 resulted in delays of aerial support to firefighters, and several incursions resulted in fire suppression aviators taking evasive action to avoid collisions with unmanned aircraft. During 2017, aerial wildland firefighting efforts ceased 25 times due to unauthorized unmanned aircraft incursions.[129] The most recent report published by the U.S. Department of Interior (August of 2018) shows that firefighting efforts were impacted 15 times due to unauthorized unmanned aircraft incursions over wildland fires.[130]

Delaying firefighting missions creates significant costs and can also delay transportation of firefighters to different locations.[131] During the Lake Fire in California's San Bernardino County in 2015, three planes carrying flame retardant were prevented from dropping their cargo due to interference from a private unmanned aircraft operating in the vicinity and contrary to rules.[132] One aircraft was able to drop its retardant on a different fire, but the other two aircraft had to jettison retardant because they would not be able to land otherwise due to aircraft weight. Officials stated that the failed mission cost between $10,000 and $15,000.

Similarly, a State senator from Utah stated that costs for fighting a fire 300 miles south of Salt Lake City would have been lower instead of actual costs of over $10 million if five unmanned aircraft flights had not interfered with firefighting efforts.[133] Likewise, in the Pinal Fire (Arizona) that occurred during May of 2017, at least four separate incidents involving unauthorized unmanned aircraft hindered firefighting operations.[134] Each of the four incidents involved recreational users. In one of the incidents, an air tanker flying over the fire was forced to release its retardant at a higher altitude for safety reasons, which reduced the retardant's effectiveness for smothering fire. Likewise, unmanned aircraft disrupting fire-fighting efforts at the Lightner Creek Fire (Colorado) in 2017 resulted in two air tankers jettisoning 1,600 gallons of retardant at a cost of approximately $8,000 to $10,000.[135] Lastly, during the Pole Creek Fire (Utah) during October of 2018, all firefighting aircraft in the area were grounded, as well as three helicopters that had been supporting ground crews, due to unmanned aircraft flying in airspace with a temporary flight restriction.[136]

In addition to the remote ID requirements of this proposed rule, this rulemaking proposes that recreational flyers have a single Certificate of Aircraft Registration for each unmanned aircraft operated. Currently, the FAA does not have aircraft-specific data for aircraft operated by recreational flyers. This means that the FAA does not have a data set that includes the serial numbers of all unmanned aircraft registered under part 48, and thus cannot correlate the registration data to the remote identification data which would be transmitted and broadcast, as appropriate, by unmanned aircraft under the proposed rule. Similarly, the FAA is proposing to allow a person to operate foreign-registered civil unmanned aircraft in the United States only if the person submits a notice of identification to the Administrator. These registration and notification requirements are the foundation for both identifying aircraft and for promoting accountability and the safe and efficient use of the airspace of the United States. The lack of aircraft-specific data inhibits the FAA and law enforcement agencies from correlating the remote identification data proposed in this rule with operators of unmanned aircraft.

Conclusion

The FAA expects this proposed rule will result in several important benefits and enhancements to support the safe integration of expanded UAS operations in the airspace of the United States. The proposal would provide situational awareness of UAS operations to other aircraft and airport operators. The proposed rule would provide information to distinguish compliant UAS users from those potentially posing a safety or security risk. The followingtable summarizes the benefits of the proposed rule.

[125] *https://www.usda.gov/media/blog/2016/08/10/unauthorized-drones-near-wildfire-can-cost-and-kill.* Accessed December 21, 2018.

[126] *https://www.usda.gov/media/blog/2016/08/10/unauthorized-drones-near-wildfire-can-cost-and-kill.* Accessed December 21, 2018.

[127] *https://www.doi.gov/pressreleases/interior-expands-information-sharing-initiative-prevent-drone-incursions.*

[128] Ibid.

[129] *https://www.firehouse.com/tech-comm/drones/article/12396869/the-lovehate-relationship-between-drones-wildland-firefighters.* Accessed December 18, 2018.

[130] *https://www.doi.gov/sites/doi.gov/files/uploads/2018_wildland_fire_incursion_events_of_unauthorized_uas.pdf.*

[131] *https://www.doi.gov/sites/doi.gov/files/uploads/2018_wildland_fire_incursion_events_of_unauthorized_uas.pdf.*

[132] *https://arstechnica.com/tech-policy/2015/06/drone-flying-over-forest-fire-diverts-planes-costs-us-forest-service-10k/.* Accessed December 21, 2018.

[133] *https://apnews.com/0e8053dc251f4efbacbd249f3aa8573c.* Accessed December 21, 2018.

[134] *https://wildfiretoday.com/2017/05/26/drones-interfere-with-aviation-operations-on-pinal-fire/.*

[135] *https://durangoherald.com/articles/169962*

[136] *https://universe.byu.edu/2018/09/21/firefighters-make-headway-fighting-pole-creek-bald-mountain-fires-1/*

[137] ''Because these operations have a potential impact on public safety and national security, the FAA does not intend to promulgate a final rule to

TABLE 6—SUMMARY OF BENEFITS OF PROPOSED RULE

Safety and Security	• Provides situational awareness of UAS flying in the airspace of the United States to other aircraft in the vicinity of those operations and airport operators. • Provides information to distinguish compliant UAS users from those potentially posing a safety or security risk. • Enables the FAA, national security agencies, and law enforcement entities to obtain situational awareness of UAS in the airspace of the United States in near real-time. • Provides additional registration and notification requirements for identifying aircraft and promoting accountability and the safe and efficient use of the airspace of the United States.
Enables Expanded Operations and UAS Integration.	• Assists in the implementation of operations of small UAS over people and at night. A final rule for operation of small UAS over people and at night is contingent upon a final action for UAS with remote identification being effective.[137] • Provides UAS-specific data to facilitate future, more advanced operational capabilities, such as detect-and-avoid and aircraft-to-aircraft communications that support beyond visual line of sight (BVLOS) operations. • Provides UAS-specific data contributing to a comprehensive UAS traffic management (UTM) system that would facilitate the safe expansion of operations.

In addition, the proposed rule provides flexibility through minimum performance requirements that would accommodate future innovation and improve the efficiency of UAS operations. The proposal also does not preclude early compliance for producers or operators to realize earlier expanded operations and commercial opportunities.

3. Cost and Savings Summary

UAS owners, operators, and producers, as well as Remote ID USS and developers of remote identification means of compliance, would play important roles in the remote identification of UAS. The following subsections summarize costs and cost savings by affected groups within the scope of the proposed rule.

i. UAS Owners and Operators

Registration Provisions

The FAA is proposing to require the owners of UAS to register under part 47 or part 48 and to provide the serial number of the unmanned aircraft, unless the aircraft is specifically excepted from registration. If an unmanned aircraft is currently registered, its owner would be required to update the aircraft's registration to include the serial number by the compliance date of the final rule or the first registration renewal after a rule becomes effective, whichever is earlier.

Part 48 currently requires that registration of aircraft operated under part 107 include the make, model, and serial number, if available, of the aircraft as part of the aircraft registration. Since regulations require these registrations to be renewed every three years, and the compliance date for the requirement to include the make, model, and serial number is 36 months after the effective date of the final rule, some owners of registered aircraft operated under part 107 would not incur additional costs. Likewise, unmanned aircraft registering under part 47 are currently required to include make, model, and serial number, so some owners of these aircraft would not incur additional costs as well.

However, a portion of the part 107 fleet will be replaced early as a result of the proposed one-year operational compliance period, which will trigger the requirement to register the new aircraft at a time earlier than would otherwise have been. The 10-year present value incremental cost incurred for registering new aircraft is about $0.03 million at a three percent discount rate and $0.02 million at a seven percent discount rate. The incremental annualized costs are about $0.003 million at either a three percent or seven percent discount rate.

The FAA also proposes to revise the registration requirements in part 48 to remove the provisions that allow small unmanned aircraft to register as model aircraft under a single Certificate of Aircraft Registration and to require the individual registration of each aircraft, regardless of its intended use.[138] This means that every small unmanned aircraft registered under part 48 would need to have its own Certificate of Aircraft Registration.

The FAA estimates additional costs for recreational flyers to amend the part 48 aircraft registry to register each unmanned aircraft owned and update each individual registration to include make, model, and serial number. The FAA estimates the 10-year present value costs to affected recreational flyers is about $1.1 million at a three percent discount rate and about $0.89 million at a seven percent discount rate. The incremental annualized costs are about $0.13 million at either a three percent or seven percent discount rate.

Recreational flyers will also be required to pay a $5 registration fee to the FAA for each additional aircraft registered. Government fees and taxes are considered transfer payments per OMB Circular A–4 and are not considered a societal cost. These transfers are reported separately from the costs of this proposed rule.[139] Over the 10-year period of analysis, the present value of incremental fees paid by recreational flyers for registration of additional aircraft totals $8.1 million at a three percent discount rate and $6.6 million at a seven percent discount rate. The annualized fees are about $1 million at either a three percent or seven percent discount rate.

Effects of Retrofits and One Year Operational Compliance

The proposed rule would require persons responsible for the production of standard remote identification UAS or limited remote identification UAS to provide UAS with remote identification two years after the effective date of the final rule. Operators of UAS would have

allow these operations until a regulation finalizes the requirements regarding remote identification of small UAS.'' Safe and Secure Operations of Small Unmanned Aircraft Systems, Advance Notice of Proposed Rulemaking, February 13, 2019 (84 FR 3732).

[138] This proposal uses the term ''limited recreational operations'' when discussing registration requirements under part 48. Part 48 uses the term ''model aircraft'' to describe recreational UAS operations. The FAA considers that model aircraft under part 48 are consistent with the ''limited recreational operations'' described in 49 U.S.C. 44809, therefore ''limited recreational operations'' has been used throughout to ensure consistency of terminology with current statutory requirements.

[139] See the ''Separate Reporting of Transfers'' per OMB Circular A–4 (*https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/circulars/A4/a-4.pdf*).

one additional year beyond the production compliance date to begin using UAS with remote identification.[140] The exception is for operators of UAS without remote identification. The FAA determined this affected group could fly UAS without remote identification at FAA-recognized identification areas. Under the proposed construct, any person (*e.g.,* a limited recreational flyer) who flies exclusively at FAA-recognized identification areas could use a UAS without remote identification.

As previously discussed in the ''Key Assumptions and Data Sources'' section, during the development of this rulemaking the FAA received information from industry suggesting part of the existing fleet of UAS can be retrofit to comply with remote identification requirements (*e.g.,* by a software update or ''push'' through the internet) and this could be achieved within the first year after the effective date of the final rule given the availability of FAA-accepted means of compliance. The FAA estimates at least 93% of the current part 107 fleet and at least 20% of the current recreational fleet would be eligible for retrofits. Besides reducing costs, retrofits would enable early compliance with remote identification for persons operating a portion of the existing UAS fleet and those UAS purchased during the proposal's 24-month period before compliance with proposed production requirements. For example, retrofits of UAS purchased in year 1 of the analysis period would enable them to be operated for their entire lifespan (*i.e.,* one year after the three year full compliance date of the proposal).[141]

Therefore, the group of retrofit UAS used in this analysis are based on the following assumptions: (1) These UAS are purchased during year 1 of the analysis period and have a lifespan of three years; (2) the producers of these UAS have identified an FAA-accepted means of compliance for remote identification that can be used for retrofits during year 1 of the analysis period; and, (3) these UAS are capable of being retrofit with relative ease, little downtime from operations, and at minimal costs for at least 93% of the UAS in the part 107 fleet and at least 20% of the UAS in the recreational fleet purchased in year 1. Without the availability of retrofits, UAS purchased during year 1 would not be equipped with Remote Id and therefore grounded in year 4.

As a result of the proposed compliance period for UAS operators and the potential for retrofits, a portion of about 7% of the UAS in the part 107 fleet and 80% of the UAS in the recreational fleet *purchased* in year 1 of the analysis would not be compliant with the proposal in year 4 of the analysis (after the full compliance date) and would effectively become obsolete prior to the end of useful life.[142] The FAA uses a straight line depreciation method to estimate a measure of expense or cost to part 107 operators and recreational flyers for early replacement of UAS as a result of the proposed compliance period.[143] In the case of the part 107 operators, this measure of depreciation represents the cost to entities for an early outlay of funds for replacing UAS with remaining useful life.[144] For the recreational flyers, the estimate is used as a proxy for the opportunity cost for loss of use of UAS with remaining useful life.

The estimated straight-line depreciation is based on average UAS purchase prices of $2,500 for the part 107 consumer fleet and about $114 for the fleet of UAS flown by recreational flyers. For each of these categories, the purchase price is spread equally across 36 months to estimate the monthly depreciation expense (36 months is the lifespan of a small UAS).[145] [146] The early depreciation expense is only applicable to the portion of the UAS fleet purchased in year 1 of the analysis period, as this group of UAS will be grounded due to the proposed rule's requirement that all UAS have remote identification by the end of year 3 of the analysis period. Therefore, some of the UAS purchased in year 1 will lose up to one year of useful life (and correspondingly up to one year of depreciation expense).[147] The following table presents loss of use quantified as depreciation loss for year 4.[148]

TABLE 7—COST IMPACT OF PROPOSED OPERATIONAL COMPLIANCE PERIOD, LOSS OF USE QUANTIFIED AS DEPRECIATION EXPENSE

[$ millions]

Affected UAS fleet	Number of UAS sold in year 1	Depreciation expense (units sold in year 1) *
Pt 107—Consumer	12,489	*$4.8

[140] After the proposed full compliance date of 36-months past the effective date of the final rule, UAS without remote identification that weigh more than 0.55 pounds may only be operated at FAA-recognized identification areas.

[141] This analysis uses an average three year lifespan for affected UAS (not including those UAS operated by members of community based organizations that fly exclusively within FAA-recognized identification areas, see the ''Key Assumptions and Data Sources'' section above). Based on the three year lifespan and the proposed 36-month full compliance period, affected UAS purchased in year 1 of the analysis period, or 12 months after the effective date of the final rule, would be effectively grounded in year 4 of the analysis unless retrofit.

[142] This equates to eighteen percent of the overall affected UAS fleet in year 4 would likely be replaced prior to the end of useful life. This excludes UAS that are flown by members of CBO, since the FAA assumes this affected group would fly UAS at FAA-recognized identification areas.

[143] The straight line depreciation method is a common default method of depreciation that is calculated by dividing the difference between an asset's cost and its expected salvage value by the number of years it is expected to be used (*https://corporatefinanceinstitute.com/resources/knowledge/accounting/straight-line-depreciation/* or *https://www.investopedia.com/terms/s/straightlinebasis.asp*).

[144] The FAA uses this depreciation analysis as a means to measure lost utility or useful life of UAS due to the proposed compliance period. However, these estimates may be offset through tax savings. Companies and other entities may use depreciation expenses to generate tax savings, which is a transfer effect that might reduce the impact on companies, but not reduce the social costs of the rule. U.S. tax rules allow depreciation expenses to be used as tax deductions against revenue in arriving at taxable income. The higher the depreciation expense, the lower the taxable income and the greater the tax savings.

[145] Page 47 of The FAA Aerospace Fleet Forecast FY 2019–2039 identifies cost for consumer UAS. The estimated average purchase price for UAS used by limited recreational operators is based on research of UAS used by hobbyists. The monthly depreciation expense for consumer UAS and limited recreational UAS is $69.44 and $3.16, respectively.

[146] Annual UAS sales are spread evenly over a 12-month period to estimate monthly sales.

[147] For ease of calculation, sales of UAS are presumed to occur on the first day of the month. Therefore, units sold in January of year 1 of the analysis period are fully depreciated by December of year 3 and thus there is no loss of useful life; units sold in February of year 1 lose one month of useful life (which is January of year 4); units sold in March of year 1 lose two months of useful life (which are Jan-Feb of Year 4); units sold in April of year 1 lose three months of useful life (which are Jan-Mar of year 4); etc.

[148] See the Regulatory Impact Analysis for this proposed rulemaking for the derivation of these estimates.

TABLE 7—COST IMPACT OF PROPOSED OPERATIONAL COMPLIANCE PERIOD, LOSS OF USE QUANTIFIED AS DEPRECIATION EXPENSE—Continued

[$ millions]

Affected UAS fleet	Number of UAS sold in year 1	Depreciation expense (units sold in year 1) *
Recreational	299,252	5.2
Undiscounted Total		10.0
3% PV		8.9
7% PV		7.6

Table notes: (i) Row and column totals may not sum due to rounding. (ii) Affected UAS will be depreciated for a period of one to eleven months, depending on the month of purchase.

The present value cost impact of the loss of UAS use for operators is $8.9 million at a three percent discount rate and $7.6 million at a seven percent discount rate. The annualized cost impact of loss of use is about $1 million at either a three percent or seven percent discount rate. If the estimated level of retrofits are possible, then this impact represents only about two percent of the total costs of the proposed rule. If fewer retrofits are possible, then costs related to the loss of UAS use for operators would increase proportional to the number of retrofits available by model and share of the model in the fleet.

The FAA believes this cost impact is justified in order to reduce the delay for law enforcement, security partners, the FAA, and airports to use remote ID information. The FAA considered allowing three years beyond the producer compliance date for owners and operators to comply with the remote identification requirements of this proposed rule in the ''Alternatives Considered'' section. This period of time coincides with the three-year lifespan of a small UAS and would have prevented costly grounding or replacement of UAS prior to the end of useful life. However, the FAA determined that the three-year compliance period was less preferable, because it prolonged safety and security risks to air traffic and airports by delaying the ability of law enforcement personnel to identify unauthorized UAS operations. To reduce the delay in implementing remote identification, the operational compliance period was reduced from three years to one year.

ii. Remote ID USS Subscription Fee

The FAA is proposing that three years following the effective date of a final rule, standard remote identification UAS and limited remote identification UAS would be required to transmit remote identification messages through the internet to a Remote ID USS. In addition, standard remote identification UAS would also be required to broadcast the same message elements directly from the unmanned aircraft. UAS that are unable to comply with the requirements for standard remote identification UAS or limited remote identification UAS would be required to operate exclusively within an FAA-recognized identification area.

The FAA does not intend to provide remote identification services to UAS operators, but instead would enter into MOAs with Remote ID USS in a manner similar to LAANC USS. The FAA anticipates that UAS operators would subscribe to a Remote ID USS and then connect to the internet using their existing internet service provider. Based on the LAANC USS business model,[149] the subscription to a Remote ID USS may range in cost from $0 to $5 per month, per operator, for a midpoint of $2.50 per month.[150] For purposes of this regulatory evaluation, the FAA determines that each operator of a standard remote identification UAS or limited remote identification UAS would be required to subscribe to a Remote ID USS at a fee of $2.50 per month.

Based on the compliance dates for this rulemaking, the FAA determines that an app to connect standard remote identification UAS and limited remote identification UAS to a Remote ID USS would be available at the start of year 2 of the analysis period. The number of new and renewed Remote ID USS subscriptions is approximately 3.1 million for part 107 operators and 5.7 million for recreational flyers. The present value cost of subscriptions to affected UAS operators totals $242 million at a three percent discount rate and $192 million at a seven percent discount rate. The annualized costs of the subscriptions is about $28 million at either a three percent or seven percent discount rate.

The FAA notes that the $2.50 subscription fee could be considered a transfer payment that is representative of the cost for Remote ID USS to provide remote identification services.

iii. UAS Producers

For each UAS designed and produced for operation in the United States, the producer (with limited exceptions included in the proposal) would be required to:

- Produce the UAS in accordance with the minimum performance requirements of the proposed rule using an FAA-accepted means of compliance;
- Issue each unmanned aircraft a serial number that complies with the ANSI/CTA–2063–A serial number standard;
- Label the unmanned aircraft to indicate that it is remote identification-compliant and indicate whether the UAS is a standard remote identification UAS or limited remote identification UAS; and,
- Submit a declaration of compliance for acceptance by the FAA, declaring that the UAS complies with the minimum performance requirements of the proposed rule.

As discussed in this preamble, the FAA would require persons responsible for the production of standard remote identification UAS and limited remote identification UAS to comply with the minimum performance requirements of the proposed rule using an FAA-accepted means of compliance and would require the person to issue serial numbers that comply with the ANSI/CTA–2063–A serial number standard. Presently, an FAA-accepted means of compliance for UAS remote identification does not exist, but the FAA is aware of UAS remote identification standards being developed. The FAA estimates the cost

[149] The selection process for LAANC providers is approximately 10 months. *https://www.faa.gov/news/updates/?newsId=93047&omniRss=news_updatesAoc&cid=101_N_U.*

[150] The cost of $0 to $5 is based on an internet search of LAANC USS providers. LAANC USS also provide services through apps, such as AirMap and Kittyhawk.

to each producer to obtain a copy of a standard that could be an FAA-accepted means of compliance for remote identification to be $313.[151] It is anticipated that a standard for means of compliance for remote identification may not be available until year 2 of the analysis period [152], and during this year, the FAA estimates 157 U.S. producers and 324 foreign producers would purchase the standard to be used as an FAA-accepted means of compliance.[153] For the remaining years of the analysis period, the FAA estimates three additional U.S. producers and six additional foreign producers would enter the market annually and would also incur the cost to purchase a means of compliance.

The proposed rule would require a person responsible for the production of standard remote identification UAS or limited remote identification UAS to label the UAS to show that it was produced with remote identification technology capable of meeting the proposed rule. The label must be in English and be legible, prominent, and permanently affixed to the unmanned aircraft. The proposed labeling requirement would assist the person manipulating the flight controls of the UAS to know that his or her UAS is eligible to conduct operations within the airspace of the United States. The proposed labeling requirement would also assist the FAA in its oversight role because it provides an efficient means for an inspector to determine whether a UAS meets the requirements of the proposed rule.

The FAA estimates that it would take twenty hours to design a label for each model of aircraft produced. The costs would begin in year 2 of the analysis period at which time the FAA estimates 313 U.S. models of aircraft and 787 models of foreign aircraft would require labeling.[154] For the remainder of the analysis period, an additional eighteen models of U.S. and foreign produced aircraft would require labeling design on an annual basis.

Over the 10-year period of analysis, the present value costs to producers for labeling is about $2.0 million at a three percent discount rate and $1.7 million at a seven percent discount rate.

The proposed rule would require the producers of UAS to submit a DOC to the FAA identifying the means of compliance used to determine that the UAS meets the applicable performance requirements. The FAA would rely on a producer's DOC to ensure that the make and model of UAS is compliant with the proposed requirements at the time of manufacture.

The FAA estimates that the test report and/or substantiating data for the DOC would average 50 pages and would take five hours per page to generate. The five hours consists of one hour for documenting results and four hours for performing tests that demonstrate compliance with the remote identification equipage requirements.[155] For this analysis, the FAA assumes that five percent of DOCs would not be accepted and have to be resubmitted, possibly with updated analysis, for acceptance. The FAA also assumes that after a producer rewrites and resubmits a DOC, the FAA would accept the revised DOC. The proposed rule requires manufacturers to retain a test report or any other substantiating data that supports their DOC.

In total, estimated costs over the ten-year period of analysis for producers to perform tests and generate substantiating data to support their DOC is approximately $25.2 million at a present value discount rate of three percent and $22.9 million at a present value discount rate of seven percent. Annualized costs at a three percent discount rate and a seven percent discount rate are approximately $3 million.

Any producer of a UAS with remote identification will be required to submit a one-page DOC form to the FAA to affirm that the UAS meets the performance requirements and was designed and produced using an FAA-accepted means of compliance for UAS with remote identification.[156] The time required to complete the form and submit it through an FAA web portal is estimated to be 15 minutes at a cost of $20.73 per model.[157] In addition to the 15 minutes for submitting the DOC form, there is an additional 19.75 hours expended by multiple levels of a producer's organization for the purpose of review and quality checking. The cost to submit a declaration of compliance occurs largely in year 2 of the analysis period so that UAS producers are able to manufacture inventory with remote identification for availability to operators beginning with year 3 of the analysis period. Producers would incur additional costs for submitting a declaration of compliance during years 3 through 10 of the proposed rule as they design new models of UAS. The FAA assumes that five percent of the submissions will not be accepted initially, but will then be resubmitted and accepted by the FAA.

Over the 10-year period of analysis, the present value costs to producers for submitting the declaration of compliance form is about $27.2 million at a three percent discount rate or $24.8 million at a seven percent discount rate for annualized costs of approximately $3.5 million and 3.2 million, respectively.

Beginning in year 3 of the analysis period, producers would be required to provide UAS with remote identification.[158] Standard remote identification UAS would be required to transmit message elements through the internet to a Remote ID USS and to broadcast the same message elements directly from the unmanned aircraft. Limited remote identification UAS would be required to be designed and produced such that the aircraft can operate no more than 400 feet from the control station and cannot broadcast remote identification message elements.

The FAA estimates the incremental cost to a producer of standard remote identification UAS would include the cost of a computer chip for broadcasting the remote identification message elements ($5) and a cost to make the remote identification equipment tamper

[151] *https://my.rtca.org/nc__store?category=a0L36000003g7jDEAQ.* Accessed November 13, 2018. Average price for the 11 unmanned aircraft standards available at the RTCA website. The 11 standards range in price from $140 to $675 for an average of $313.

[152] Noting the potential for earlier compliance and retrofits, the FAA may adjust its analysis of costs associated with available means of compliance for the final rule based on information received during the comment period.

[153] Based on AUVSI Unmanned Systems & Robotics Database for Air Platforms (Association for Unmanned Vehicle Systems International).

[154] Based on AUVSI Unmanned Systems & Robotics Database for Air Platforms. (Association for Unmanned Vehicle Systems International.

[155] The report length is equivalent to the report generated in NOS for the DOC. It is used as a proxy for the report that producers will generate to substantiate compliance with remote ID requirements.

[156] The time allotted in the FAA information collection related to the registration of small unmanned aircraft is used as a proxy to estimate the cost to producers for submitting a declaration of compliance for remote identification. In the Registration of Small Unmanned Aircraft information collection, it was estimated that seven minutes was required for an individual to complete a small unmanned aircraft registration. Since the DoC requires approximately twice as much information as a registration for unmanned aircraft, the FAA estimates the DoC form will take approximately 15 minutes to complete.

[157] In this calculation, the FAA assumes the fully burdened wage (compensation + benefits) to be similar to that of the wage of FAA technical subject matter expert, which is increased by a factor of 1.466 to become a fully burdened wage of $82.93 per hour, or $20.73 for 15 minutes.

[158] Note the exceptions to this rule (military, law enforcement, government not conducting operations as civil aircraft). Additionally, the FAA determines that members of a community based organization choose not to integrate remote identification into existing aircraft.

resistant ($15). For limited remote identification UAS, the incremental cost to a producer would include a software update that prevents the aircraft from flying beyond 400 feet from the operator ($5) and a cost to make the remote identification equipment tamper resistant ($15).

Operators of limited remote identification UAS must transmit message elements to the Remote ID USS from the control station, which could be an electronic device such as a smart phone or tablet.[159] For purposes of this analysis, the FAA determines that operators of limited remote identification UAS would already have a cell phone or electronic device capable of transmitting the message elements through an internet connection to the Remote ID USS and thus incur no additional costs for the purchase of a device to transmit messages to a Remote ID USS.[160]

The present value costs to U.S. producers to build UAS with remote identification totals $105 million at a three percent discount rate and $85 million at a seven percent discount rate. The annualized costs are about $12 million at either a three percent or seven percent discount rate.

iv. Developers of Remote Identification Means of Compliance

Under the proposed rule, a means of compliance would have to be accepted by the FAA before it is used in the design and production of UAS with remote identification. Means of compliance are developed by persons or organizations to describe methods by which a person responsible for the production of standard remote identification UAS or limited remote identification UAS may comply with the minimum performance requirements of this proposed rule. The FAA would review the means of compliance to determine if it meets the minimum performance requirements, and testing and validation procedures of the proposed rule. Specifically, the person or entity would have to submit a detailed description of the means of compliance, a justification for how the means of compliance meets the minimum performance requirements of the proposed rule, and any substantiating material the person or entity wishes the FAA to consider as part of the application. The FAA would indicate acceptance of a means of compliance by placing a notice in the **Federal Register** identifying the means of compliance as accepted and by notifying the submitter of the acceptance of the proposed means of compliance.

A UAS remote identification standard that could be one potential means of compliance to the proposed rule is currently being developed by ASTM International, and, for purposes of this analysis, the FAA anticipates it would be available by the beginning of year 2 of the analysis period. Total present value costs incurred by industry consensus standard-setting entities to develop and maintain a remote identification means of compliance is $1.23 million at a three percent discount rate and $1.08 million at seven percent discount rate over the ten-year period of analysis. The annualized costs are about $0.15 million at either a three percent or seven percent discount rate.

For purposes of this rulemaking, it is assumed that one additional individual or entity, would submit a means of compliance to the FAA for remote identification on an annual basis for years 2 through 10 of the analysis period. The costs would include time to initially submit the means of compliance and recurring time to accommodate changes in broadcast technology and evolution in the UTM/network requirements. Total present value costs incurred by entities to develop and maintain a remote identification means of compliance is $1.6 million at a three percent discount rate and $1.3 million at seven percent discount rate over the ten-year period of analysis. [161] The annualized costs are about $0.2 million at either a three percent or seven percent discount rate.

v. Remote ID USS MOA

The proposed rule would require persons operating UAS to transmit the message elements to a Remote ID USS over the internet. Remote ID USS will be FAA-qualified third party service providers. Each Remote ID USS would be required to establish a contractual relationship with the FAA through a MOA and to comply with a series of terms, conditions, limitations, and technical requirements, and outline how the Remote ID USS must interpret and provide data to external users, as well as store and protect such data. To implement remote identification, the FAA anticipates establishing a cooperative data exchange mechanism between the FAA and Remote ID USS.

The FAA estimates ten entities would apply to the FAA to become a Remote ID USS during year 1 of the analysis period, and nine entities would be approved.[162] Over the remaining years of the analysis period, the FAA estimates one additional entity per year would submit an application to become a Remote ID USS, and that entity would be approved by the FAA. Each of the entities would address technical requirements in the application to become a Remote ID USS that results in a 40-page document, which is then submitted to the FAA. Each of the documents would take 25 hours per page to prepare at full compensation wage of $92.72 per hour.[163] Total costs to Remote ID USS applicants during years 1 through 10 of the analysis period is about $1.6 million at a three percent discount rate and $1.4 million at a seven percent discount rate. The annualized costs are about $0.19 million at either a three percent or seven percent discount rate.

vi. FAA-Recognized Identification Areas

The FAA is proposing to allow UAS to operate without remote identification if they do so within visual line of sight within FAA-recognized identification areas. By identifying a defined location where operations of UAS without remote identification would be occurring, the FAA-recognized identification area itself becomes the form of identification. The intent is to minimize the regulatory burden for operators of UAS without remote identification, while still meeting the intent of the rule. This proposal would not preclude UAS with remote identification from operating in or transiting the airspace over FAA-recognized identification areas; it would simply limit UAS without remote identification from operating anywhere else.

Certain flying sites established within the programming of a community based organization (CBO) recognized by the Administrator would be eligible to become FAA-recognized identification areas to enable operations of UAS without remote identification within those areas, if they meet certain criteria and application deadlines. CBOs can request that an existing flying site be established as an FAA-recognized identification areas, where UAS may

[159] Based on research of publicly available UAS information, the FAA found that operators of limited remote identification UAS already typically own a smartphone or other electronic device which is capable of transmitting the location of the control station to the internet.

[160] In 2018, 77 percent of the adults in the United States owned a smart phone (*https://www.statista.com/statistics/219865/percentage-of-us-adults-who-own-a-smartphone/*).

[161] See the Regulatory Impact Analysis for this proposed rulemaking for the derivation of these estimates.

[162] Based on the number of LAANC USS.

[163] The full compensation wage (salary and benefits) is based on a 2019 FAA ''Technical'' Pay Band.

operate without remote identification equipment. The application would have to be submitted within 12 calendar months from the effective date of a final rule. After that date, the number of FAA-recognized identification areas could therefore only remain the same or decrease. The FAA also expects that as compliance with remote identification requirements becomes cheaper and easier, the need to operate only at FAA-recognized identification areas would likely decrease. The establishment of an FAA-recognized identification area is approved by the FAA until 48 calendar months after the date on which the request for establishment was approved. A person wishing to renew the establishment of the FAA-recognized identification area would have to submit a request for renewal.

The FAA estimates it would receive approximately 2,500 requests for a flying site to become an FAA-recognized identification area, and that as many as 10 percent could be disapproved due to the flying site being in a sensitive area.[164] The FAA estimates that in year 1, each request would require two hours to complete at a total compensation wage of $58.12 per hour.[165] The FAA anticipates that renewals would require less time to submit since the process is expected to be electronic, thus in years five and nine, the time estimated to complete a renewal is 30 minutes. Over the 10-year period of analysis, costs incurred by CBOs for submitting requests for FAA-recognized identification areas total $0.39 million at a three percent discount rate and $0.35 million at a seven percent discount rate. The annualized costs are about $0.05 million at either a three percent or seven percent discount rate.

Individuals that are unable to use a flying site due to FAA disapproval of the application for establishment of an FAA-recognized identification area would have the option to fly UAS with remote identification or to drive to an alternate FAA-recognized identification area. For purposes of this preliminary analysis, the FAA assumes this affected group would choose to drive to the next closest FAA-recognized identification area near their home, which would increase their driving distance to an FAA-recognized identification area an additional 32 miles per round trip, on average.[166] The FAA estimates that ten percent of the members belonging to a CBO would be travelling an additional 32 miles per outing, and that this group would travel 52 times per year to an FAA-recognized identification area for a total present value expense of $136 million at a three percent discount rate and $109 million at a seven percent discount rate over the ten-year period of analysis.[167] The annualized costs are about $16 million at a three percent and seven percent discount rate. The FAA provides a sensitivity analysis of these costs based on a range of trips per year in the Regulatory Impact Analysis report available in the docket.

The FAA requests comments on the costs and frequency of additional travel to FAA-recognized identification areas for recreational flyers affected by this provision.

vii. FAA

The FAA will incur costs to support the implementation of the proposed remote identification rule. These costs include updating the website portal for the part 48 unmanned aircraft registry to aid recreational flyers to register each unmanned aircraft individually and to facilitate foreign operators of unmanned aircraft to provide notification of identification; establishing MOAs with entities seeking to become Remote ID USS; accepting or not accepting submissions of means of compliance; accepting or not accepting submissions of declarations of compliance; approving or denying requests from CBOs for FAA-recognized identification areas; developing a website for identifying FAA-accepted means of compliance and declarations of compliance; updating the aircraft registry website; and finally, establishing a network for the data exchange between Remote ID USS and the FAA. The present value costs of this proposed rule to FAA total $56.9 million at a three percent discount rate and $50.3 million at a seven percent discount rate. The annualized costs are approximately $7.0 million at either a three percent or seven percent discount rate.

The FAA also receives cost savings from this proposed rule resulting from a reduction in hours expended on UAS investigations by aviation safety inspectors. This analysis includes quantified savings to the FAA only. A variety of other entities involved with airport operations, facility and infrastructure security, and law enforcement would also save time and resources involved with UAS identification and incident reporting, response and investigation. The FAA plans to update its estimates of savings for additional information and data identified during the comment period and development of the final rule. The present value cost savings to FAA total $2.4 million at a three percent discount rate and $1.8 million at a seven percent discount rate. The annualized costs savings are almost $0.3 million at either a three percent or seven percent discount rate.

Additionally, part 107 allows individuals to request waivers from certain provisions, including those prohibiting operations over people and at night. This proposed rule, in concert with the proposed rule for operations over people would create a cost savings for the FAA resulting from a reduction of time expended by FAA personnel processing waivers for these activities.[168]

4. Total Costs and Cost Savings

The total costs of the proposed remote identification rule include costs incurred by UAS owners, CBOs, UAS operators, UAS producers, developers of remote identification means of compliance, candidates to be Remote ID USS, and the FAA. In addition to the costs incurred by the various entities impacted by the proposed rule, the FAA has a cost savings from avoided aviation safety inspector costs due to a reduction in hours expended on UAS investigations.

Over the 10-year period of analysis, using the primary estimate this proposed rule would result in present value costs of $584 million at a three percent discount rate and $475 million at a seven percent discount rate. These costs are partially offset by present value cost savings of $2.5 million and $1.8 million at a three percent and seven percent discount rate, respectively. As a result, the net present value costs are $582 million at a three percent discount rate with annualized net costs of $68 million. At a seven percent discount rate, the net present value costs are $474 million with annualized net costs of $67 million.

The following table presents a summary of the primary, low and high estimates of the net costs of the proposed rule.

[164] *https://www.modelaircraft.org/about-ama.*

[165] U.S. Bureau of Labor Statistics, Aerospace Engineering or Operations Technician Data.

[166] Source: FAA analysis of travel distance to current flying sites based on zip codes of addresses on record for unmanned aircraft registrations for limited recreational operators show that over 94% of registered owners are within 16 miles (32 miles round trip) of a flying site that may be considered for application as an FAA-recognized identification area.

[167] Estimated using United States Department of Transportation guidance on the hourly value of travel time savings for personal purposes, the IRS mileage rate of 20 cents per mile, and the additional 32 miles are traveled at a rate of 50 miles per hour.

[168] See the appendix of the Remote Identification of Unmanned Aircraft Systems Preliminary Regulatory Impact Analysis for a quantification of these cost savings.

TABLE 8a—PRELIMINARY ESTIMATES OF NET COSTS OF PROPOSED RULE ($MILLIONS) * BASE SCENARIO—PRIMARY ESTIMATE

Affected entity/category	10-year present value (at 3%)	Annualized (at 3%)	10-year present value (at 7%)	Annualized (at 7%)
UAS Owners/Operators	$145.87	$17.10	$117.48	$16.73
Remote ID USS Subscription	241.72	28.34	191.74	27.30
UAS Producers (US and Foreign)	134.58	15.78	111.58	15.89
Developers of Remote ID Means of Compliance	2.85	0.33	2.36	0.34
Remote ID USS Memoranda of Agreement	1.60	0.188	1.43	0.2038
Community Based Organizations	0.39	0.05	0.35	0.05
FAA Costs	56.96	6.68	50.33	7.17
Total Costs	583.98	68.46	475.27	67.67
Cost Savings	(2.45)	(0.29)	(1.82)	(0.26)
Net Costs	581.52	68.17	473.46	67.41

* **Table notes:** Column totals may not sum due to rounding and parenthesis, "( )", around numbers to indicate savings.

TABLE 8b—PRELIMINARY ESTIMATES OF NET COSTS OF PROPOSED RULE ($MILLIONS) * LOW SCENARIO

Affected entity/category	10-year present value (at 3%)	Annualized (at 3%)	10-year present value (at 7%)	Annualized (at 7%)
UAS Owners/Operators	$140.99	$16.53	$113.64	$16.18
Remote ID USS Subscription	206.58	24.22	164.24	23.38
UAS Producers (US and Foreign)	116.53	13.66	97.25	13.85
Developers of Remote ID Means of Compliance	2.85	0.33	2.36	0.34
Remote ID USS Memoranda of Agreement	1.60	0.188	1.43	0.2038
Community Based Organizations	0.39	0.05	0.35	0.05
FAA Costs	56.96	6.68	50.33	7.17
Total Costs	525.91	61.65	429.61	61.17
Cost Savings	(2.45)	(0.29)	(1.82)	(0.26)
Net Costs	523.46	61.36	427.80	60.91

* **Table notes:** (i) Column totals may not sum due to rounding and parenthesis, "( )", around numbers to indicate savings. (ii) The low and high forecast scenarios are not symmetric around the base—please see the forecast report for more information. The FAA Aerospace Forecast Fiscal Years 2019–2039, available at *https://www.faa.gov/data_research/aviation/aerospace_forecasts/media/FY2019-39_FAA_Aerospace_Forecast.pdf.* The forecast provides a base (*i.e.,* likely) with high (or optimistic) and low (or pessimistic) scenarios.

TABLE 8c—PRELIMINARY ESTIMATES OF NET COSTS OF PROPOSED RULE ($MILLIONS) * HIGH SCENARIO

Affected entity/category	10-year present value (at 3%)	Annualized (at 3%)	10-year present value (at 7%)	Annualized (at 7%)
UAS Owners/Operators	$159.32	$18.68	$127.87	$18.21
Remote ID USS Subscription	336.14	39.41	264.22	37.62
UAS Producers (US and Foreign)	181.51	21.28	148.26	21.11
Developers of Remote ID Means of Compliance	2.85	0.33	2.36	0.34
Remote ID USS Memoranda of Agreement	1.60	0.188	1.43	0.2038
Community Based Organizations	0.39	0.05	0.35	0.05
FAA Costs	56.96	6.68	50.33	7.17
Total Costs	738.78	86.61	594.81	84.69
Cost Savings	(2.45)	(0.29)	(1.82)	(0.26)
Net Costs	736.33	86.32	593.00	84.43

* **Table notes:** column totals may not sum due to rounding and parenthesis, "()", around numbers to indicate savings.

The following table presents an itemized list of preliminary estimates of costs and cost savings from this proposed rule.

TABLE 9—REMOTE IDENTIFICATION COSTS AND COST SAVINGS

[$Millions]

Affected entity	3% PV	7% PV
UAS Owners/Operators:		
Registration—Recreational Flyers	$1.070	$0.887
Travel Expense*—Recreational Flyers	135.911	108.960
Registration—Part 107	0.025	0.021
Loss of UAS Use—Recreational Flyers	4.625	3.972
Loss of UAS Use—Pt 107 Operators	4.238	3.639
Community Based Organizations:		
Letters of Agreement Submission	0.389	0.354
USS Subscription Fee:		
Part 107	93.752	73.787
Limited Recreational Flyers	147.969	117.954
UAS Producers:		
Equipage Cost	105.325	84.891
Declaration of Compliance	27.178	24.795
Industry Consensus Standard—Remote ID	0.160	0.146
Industry Consensus Standard—Serial #	0.000	0.000
Labeling Requirement	1.917	1.749
Developers of Remote Identification MoC:		
Industry Consensus Standard	1.230	1.083
Developers of Remote ID MoC (Others)	1.620	1.276
Remote Identification USS:		
Cost to submit MoA with FAA	1.601	1.431
FAA Costs:		
Onboard USS Service Suppliers	2.179	1.913
Accept/Not Accept MoC	0.144	0.115
Accept/Not Accept Mfr DoC*	0.000	0.000
Web Portal Update—Registration/Notification of Identification	0.728	0.701
Approve/Disapprove Flying Field as an FAA-Recognized Identification Areas	4.669	3.966
Website for Means of Compliance/Declarations of Compliance	2.294	2.000
Remote Identification USS Data Exchange	46.950	41.631
Total Costs	583.975	475.271
Cost Savings: Reduced Hours FAA UAS Investigations	(2.453)	(1.815)
Total Cost Savings	(2.453)	(1.815)
Net Costs	581.522	473.456
Annualized Net Costs	68.172	67.409

* Automated approval through FAA drone zone portal.
Note: Column totals may not sum due to rounding.

The estimated costs are presented on an annual basis in the table below.

TABLE 10—REMOTE IDENTIFICATION COSTS AND COST SAVINGS—YEARS 1–10

[$Millions]

Costs by affected entity	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Costs:											
UAS Owners (3% PV) ...	$0.167	$15.818	$15.714	$24.420	$15.394	$15.247	$15.070	$14.867	$14.688	$14.483	$145.87
UAS Owners (7% PV) ...	0.161	14.656	14.018	20.968	12.724	12.130	11.541	10.961	10.424	9.894	117.48
Community Based Org. (3% PV)	0.282	.....	.....	.....	0.056	.....	.....	.....	0.050	.....	0.39
Community Based Org. (7% PV)	0.272	.....	.....	.....	0.047	.....	.....	.....	0.036	.....	0.35
USS Subscription Fee (3% PV)	.....	13.058	29.430	29.681	29.384	28.962	28.491	28.031	27.572	27.112	241.72
USS Subscription Fee (7% PV)	.....	12.099	26.252	25.485	24.288	23.042	21.819	20.667	19.568	18.520	191.74
UAS Manufacturer (3% PV)	0.000	39.446	16.244	8.366	12.709	14.362	9.066	11.955	13.038	9.396	134.58
UAS Manufacturer (7% PV)	0.000	36.550	14.489	7.182	10.505	11.426	6.943	8.814	9.253	6.418	111.58
Developers of Remote ID MoC (3% PV)	0.589	0.215	0.226	0.236	0.245	0.253	0.261	0.268	0.275	0.280	2.85
Developers of Remote ID MoC (7% PV)	0.567	0.200	0.202	0.203	0.203	0.202	0.200	0.198	0.195	0.192	2.36
Remote ID USS (3% PV)	0.900	0.087	0.085	0.082	0.080	0.078	0.075	0.073	0.071	0.069	1.60
Remote ID USS (7% PV)	0.867	0.081	0.076	0.071	0.066	0.062	0.058	0.054	0.050	0.047	1.43

TABLE 10—REMOTE IDENTIFICATION COSTS AND COST SAVINGS—YEARS 1–10—Continued
[$Millions]

Costs by affected entity	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
FAA (3% PV)	28.694	3.298	3.202	3.109	3.990	2.930	2.845	2.762	3.545	2.590	56.96
FAA (7% PV)	27.619	3.055	2.856	2.669	3.297	2.331	2.178	2.036	2.515	1.769	50.33
Total Costs—3% PV	30.632	71.922	64.901	65.894	61.858	61.832	55.809	57.957	59.239	53.930	583.98
Total Costs—7% PV	29.485	66.641	57.892	56.578	51.130	49.193	42.740	42.730	42.041	36.840	475.27
Costs Savings—3% PV						(0.520)	(0.505)	(0.490)	(0.476)	(0.462)	(2.453)
Costs Savings—7% PV						(0.414)	(0.387)	(0.361)	(0.338)	(0.316)	(1.815)
Net Costs—3% PV	30.632	71.922	64.901	65.894	61.858	61.312	55.304	57.467	58.763	53.468	581.52
Net Costs—7% PV	29.485	66.641	57.892	56.578	51.130	48.779	42.354	42.368	41.703	36.524	473.46

Table notes: PV = Present Value and "( )" = denotes savings.

The key cost driver of the proposed rule is the USS subscription fee, followed by travel expenses for a select group of recreational flyers, and the cost of compliance for UAS producers. The present value cost of USS subscription fees is $241.7 million at a three percent discount rate and $191.7 million at a seven percent discount rate. The annualized cost of USS subscription fees is $28.3 million at a three percent and $27.3 million at a seven percent discount rate. This impact represents over 41.4 percent of the total costs of the proposed rule. The travel expense for a select group of recreational users represents 23.3 percent of the proposed rule's total costs, and costs to UAS producers are 23.0 percent of the total costs.

The FAA believes this cost impact is justified in order to reduce the delay (by two years) in implementing for law enforcement, security partners, the FAA, and airports to use remote ID information. The FAA alternatively considered allowing three years beyond the producer compliance date for owners and operators to comply with the remote identification requirements of this proposed rule in the ''Alternatives Considered'' section. This period of time coincides with the three-year lifespan of a small UAS and would have prevented grounding or replacement of UAS prior to the end of useful life. However, the FAA determined that the three-year compliance period was less preferable, because it prolonged safety and security risks to air traffic and airports by delaying the ability of law enforcement personnel to identify unauthorized UAS operations. To reduce the delay in implementing remote identification, the operational compliance period was reduced from three years to one year.[169]

A potential offsetting benefit of the one-year operational compliance period is that a portion of part 107 operators may be able to immediately perform operations over people and operations at night without a waiver once their UAS has remote identification. As many as 68.4 million operations over people and at night could be enabled by the proposed shortening the of the operational compliance period. Assuming that the flight time for each of these 68.4 million operations lasts 30 minutes and the wage for a remote pilot is $12.09 per operation, the economic benefit in terms of pilot wages alone is about $827 million undiscounted (not present value).[170]

5. Alternatives Considered

The FAA considered both more and less costly alternatives as part of the proposed rule. The alternatives and the FAA's reasons for rejecting those alternatives are discussed below.

i. Alternative Compliance Periods—Producers

The chosen compliance period to estimate producer costs is two years beyond the effective date of the final rule. The FAA considered a producer compliance period of one year, especially considering potential retrofits, however this alternative was determined to be impractical since no FAA-accepted means of compliance currently available for producers to build to. Until an FAA-accepted means of compliance exists, producers would not be able to submit a declaration of compliance. Accordingly, the FAA believes it is practical for an industry consensus standard to be developed that could be submitted for acceptance as a means of compliance by the end of year 1 after the effective date of the final rule, with an additional year for producers to design, build, and test UAS that meet the standard.

The two-year compliance period for producers is consistent with information on timelines for available technology from the UAS–ID ARC Report and expected availability of USS. The ARC found technologies similar to planned Remote ID USS transmissions have a ''readiness for implementation'' of one year or less. This means products would be available for original equipment manufacturers within one year of the requirements being known. This one-year period would start after the availability of FAA-accepted means of compliance and Remote ID USS—the FAA expects means of compliance and Remote ID USS availability to take up to one year after the effective date of the final rule.

At this time, the two-year producer compliance period appears reasonable and has a technical basis. The FAA has not identified or analyzed an alternative. The current proposal does not preclude earlier producer compliance (in light of a potential economic incentive to comply earlier). Likewise, this proposal would not preclude producer compliance through retrofits within the two-year producer compliance period or earlier, as long as retrofits use an FAA-accepted means of compliance.

ii. Alternative Operational Compliance Period

The FAA considered allowing three years beyond the producer compliance date for owners and operators to comply with the remote identification requirements of this proposed rule. This

[169] As previously discussed, the proposal does not preclude early compliance for producers or operators to realize earlier expanded operations and commercial opportunities. The FAA provides a sensitivity analysis of costs for earlier developer and producer compliance by the effective date of the final rule (60 days after publication). This analysis shows that if Remote ID USS and UAS with remote identification are available by the effective date of the final rule (as proposed), then total net costs reduce by about 60–70% and operations over people and at night would be enabled beginning in the first year after publication.

[170] *https://www.payscale.com/research/US/Job=Drone_Pilot/Hourly_Rate.*

period of time coincides with the three-year lifespan of a small UAS and would have prevented grounding or replacement of UAS prior to end of useful life. However, the FAA determined that the three-year compliance period was less preferable since it prolonged safety and security risks to air traffic and airports by delaying the ability of law enforcement personnel to identify unauthorized UAS operations. In addition, as previously discussed, some producers would be able to retrofit UAS in the existing fleet and comply early. To reduce the delay in implementing remote identification, the owner/operator compliance period was reduced from three years to one year.

The FAA analyzed the costs of allowing up to three years for owners/operators to be in compliance and found this alternative minimizes costs to owners/operators of existing UAS that could not be retrofit, since on average the affected existing fleet of UAS could be replaced at the end of useful life (three years). In addition, this alternative is more likely to reduce uncertainty of adverse impacts to producers with inventories of UAS produced before the compliance date that would likely not meet the remote identification provisions of this proposal, including with retrofits. Given the average three-year UAS lifespan, the three-year operational compliance period would likely assist producers in depleting existing non-compliant inventories with reduced impact compared to the proposed one-year compliance period.

Under this alternative, present value costs at a three percent discount rate total $494.2 million with annualized costs of $57.9 million. The present value costs at a seven percent discount rate total $394.4 million with annualized costs of $56.2 million. Present value cost savings at a three percent discount rate total $2.45 million with annualized cost savings of $0.29 million. At a seven percent discount rate, present value costs savings total $1.82 million with annualized cost savings of $0.26 million. As a result, present value net costs at a three percent discount rate are $491.7 million with annualized net costs of $57.7 million. At a seven percent discount rate, present value net costs are $392.6 million with annualized net cost of $55.9 million. The cost associated with this alternative are slightly less than the proposal that assumes producers would be capable of retrofits within one year of the effective date of the final rule.

iii. Requiring ADS–B Out

The FAA could have proposed transponders or ADS–B Out for UAS as a means to remotely identify those aircraft. The FAA does not propose the use of transponders or ADS–B Out for remote identification for three primary reasons. First, the use of these technologies would require significant additional infrastructure, including radars and receivers, to cover the lower altitudes where unmanned aircraft are expected to primarily operate. Second, the FAA expects that, due to the volume of unmanned aircraft operations projected, the additional radio frequency signals would saturate the available spectrum and degrade the overall cooperative surveillance system. Finally, transponders and ADS–B Out do not provide any information about the location of control stations, as these systems were designed for manned aircraft. For these reasons, the FAA has determined that existing cooperative surveillance systems are incapable of supporting UAS remote identification and is proposing a new cooperative surveillance technology specifically for UAS.

iv. FAA Provided Remote Identification Services

The proposed rule assumes that Remote ID USS would come forward to offer remote identification services to indiviRequireduals operating UAS in the airspace of the United States. The alternative would be for the FAA to provide these services directly to operators of UAS instead of providing them through a third-party provider. The FAA chose the Remote ID alternative for several reasons. First, the LAANC service model has been effective due to the success of public and private sector partnerships in implementing LAANC and clear Congressional approval of the model. Second, similar to LAANC USS, the FAA will not provide payment for the development or operation of Remote ID USS products or services. The FAA anticipates that the Remote ID USS would recoup the costs of providing services either through the sale of subscriptions for remote identification services, online advertising, or ''value added'' services that can be purchased from the service provider.

v. Not Allowing FAA-Recognized Identification Areas

The FAA considered not allowing FAA-recognized identification areas. If the proposed rule did not allow for these areas, operators of UAS with no remote identification equipment would not be allowed to operate unless the UAS were redesigned to have remote identification. By identifying a defined location where operations of UAS without remote identification would be occurring, the FAA-recognized identification area itself becomes the form of identification. The intent for allowing FAA-recognized identification areas is to minimize the regulatory burden for operators of existing UAS used exclusively for limited recreational operations that do not have remote identification equipment, while still meeting the intent of the rule.

Assumptions

- Individuals want to operate UAS without remote identification within FAA-recognized identification areas.
- Each individual owns two aircraft which are used for limited recreational operations.
- These unmanned aircraft have a lifespan that extends beyond the 10-year analysis period of the proposed rulemaking.

Should the FAA not allow FAA-recognized identification areas for the operation of UAS without remote identification, it is estimated that as many as 400,000 UAS that are used for recreational flying would be grounded at the end of year 3.

vi. Requiring All UAS To Be Standard Remote Identification UAS (Except for UAS Without Remote Identification Operated at FAA-Recognized Identification Areas)

The preferred alternative allows operators of limited remote identification UAS to operate at places other than FAA-recognized identification areas. The FAA considered requiring all UAS to be standard remote identification UAS. Under this alternative, owners desiring to operate any UAS that is not a standard remote identification UAS would be required to travel to an FAA-recognized identification area. The FAA analyzed the shortest distance between zip codes for each online hobbyist registration and the zip code closest to one of over 2,000 AMA flying fields.[171] The zip code analysis indicates a person operating UAS that are not standard remote identification UAS would be required to travel an average of 16 miles one-way to the nearest FAA-recognized identification area.

Assumptions

- Operators of UAS that are not standard remote identification UAS are

[171] As of April 26, 2019, there are 1,013,893 individuals registered as hobbyists.

willing to travel to an FAA-recognized identification area.

• The average distance between an FAA-recognized identification area and the homes for operators of UAS used for limited recreational operations is 32 miles round trip.

On average, operators of UAS that are not standard remote identification UAS would travel to an FAA-recognized identification area 52 times per year.

• The share of the UAS fleet operated by recreational flyers that is not a standard remote identification UAS is assumed to be 82 percent.

Based on these assumptions, the present value travel costs and opportunity cost of time accrued to recreational flyers is $2,276 million at a seven percent discount rate. These costs accrue during years 4–10 of the analysis period. Additionally, under this alternative, affected recreational flyers would no longer be required to subscribe to a Remote ID USS since they would only be flying at an FAA-recognized identification area. Thus this affected group would avert subscription costs. Averted present value subscription costs in this alternative total $72.7 million at a seven percent discount rate.

As discussed above, the costs of this alternative are calculated based on individuals traveling an average of 52 times per year to an FAA-recognized identification area. Given that there is uncertainty regarding the average number of trips that this affected group would take on an annual basis, the FAA conducted a sensitivity analysis by varying the input for travel frequency. Using 26 trips per year, the total cost becomes $1,138 million, and using 90 trips per year the cost is $3,939.5 million.[172]

vii. Grandfathering of Legacy UAS

The FAA considered allowing UAS that would not be able to retrofit to continue operating in the airspace of the United States using software-based flight notification with telemetry.[173] This would be accomplished through software based mission planning services. The UAS operator would self-declare information pertaining to area their drone would be flying in, including altitude, duration and type of aircraft. This information would be shared prior to flight to enable authorities to clearly identify compliant operations. Software apps are currently available on the marketplace that would support this alternative.

The FAA did not pursue this option because it would not meet the mission needs of the proposed rule for security, performance, and information quality. While this alternative would allow for the rapid adoption of Remote ID and Tracking for nearly all classes of UAS, it relies on the individual operator to proactively report their location to a USS. Conversely, the proposed rule requires remote identification UAS to automatically connect to a USS. If the UAS cannot connect to the USS, the unmanned aircraft will not take off.

B. Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (Pub. L. 96–354) (RFA) establishes ''as a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of the businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure that such proposals are given serious consideration.'' The RFA covers a wide range of small entities, including small businesses, not-for-profit organizations, and small governmental jurisdictions.

Agencies must perform a review to determine whether a rule will have a significant economic impact on a substantial number of small entities. If the agency determines that it will, the agency must prepare a regulatory flexibility analysis as described in the RFA.

The FAA believes this proposed rule would have a significant economic impact on a substantial number of small entities. Therefore, under Section 603(b) of the RFA, the initial analysis must address:

• Description of reasons the agency is considering the action.

• Statement of the legal basis and objectives for the proposed rule.

• Description of the record-keeping and other compliance requirements of the proposed rule.

• All Federal rules that may duplicate, overlap, or conflict with the proposed rule.

• Description and estimated number of small entities to which the proposed rule will apply.

• Description of Significant Regulatory Alternatives for Small Entities.

1. Description of Reasons the Agency Is Considering the Action

The remote identification of UAS is necessary to ensure public safety and the safety and efficiency of the airspace of the United States. The remote identification framework would provide UAS-specific data, which could be used in tandem with new technologies and infrastructure to facilitate more advanced operational capabilities (such as detect-and-avoid and aircraft-to-aircraft communications that support beyond visual line of sight operations) and to develop the necessary elements for UTM. Furthermore, remote identification of UAS would provide airspace awareness to the FAA, national security agencies, and law enforcement entities, which could be used to distinguish compliant airspace users from those potentially posing a safety or security risk.

Current rules for registration and marking of unmanned aircraft facilitate the identification of the owners of unmanned aircraft, but normally only upon physical examination of the aircraft. Existing electronic surveillance technologies, like transponders and ADS–B, were considered as potential solutions for the remote identification of UAS but were determined to be unsuitable due to the lack of infrastructure for these technologies at lower altitudes and potential saturation of available radio frequency spectrum. Currently, the lack of real-time and historical data regarding UAS operations affects the ability of the FAA to oversee the safety and security of the airspace of the United States, creates challenges for national security agencies and law enforcement entities in identifying threats, and impedes the further integration of UAS into the airspace of the United States. The FAA proposes to address the identification issues associated with UAS by requiring the use of systems and technology to enable the remote identification of UAS.

The proposed requirement is consistent with the FAA's safety mission of overseeing and promoting safety in air commerce and national security and promoting the safe and

[172] These trip frequencies assume that an individual travels, on average, every other weekend (26 trips/year), every weekend (52 trips/year), or once every four days (90 trips/year) to an FAA-Recognized Identification Area. This is used as a sensitivity analysis of the number of times an individual would travel to an FAA-recognized identification area in the period of one year. The lower bound of the sensitivity analysis is based on the average number of rounds a golfer plays in a year (Source: *https://www.ngf.org/golf-industry-research/#golfers*). The upper bound of the sensitivity analysis is based on the number of times in a year a person engages in a running/jogging/trail running activity (Source: *https://outdoorindustry.org/resource/2018-outdoor-participation-report/*. Page 23).

[173] This option was discussed in the UAS Identification and Tracking (UAS ID) Aviation Rulemaking Committee (ARC)—ARC Recommendations Final Report, September 30, 2017.

efficient use of the navigable airspace and would serve the public interest by creating situational awareness of all UAS flying in the airspace of the United States. It would also strengthen the FAA's oversight of UAS operations and support efforts of law enforcement to address and mitigate disruptive behavior and hazards, which may threaten the safety and security of the airspace of the United States, other UAS, manned aviation, and persons and property on the ground. The near real-time access to remote identification information would also assist Federal security partners in threat discrimination—allowing them to identify an operator and make an informed decision regarding the need to take actions to mitigate a perceived security or safety risk. The proposed rule would enhance the FAA's ability to monitor compliance with applicable regulations; would contribute to the FAA's ability to undertake compliance, enforcement, and educational actions required to mitigate safety risks; and would advance the safe integration of UAS into the airspace of the United States.

2. Statement of the Legal Basis and Objectives for the Proposed Rule

Statement of the legal basis. The FAA promulgates this rulemaking pursuant to various authorities. First, under 49 U.S.C. 40103(b)(1) and (2), the FAA is directed to issue regulations: (1) To ensure the safety of aircraft and the efficient use of airspace; and (2) to govern the flight of aircraft for purposes of navigating, protecting and identifying aircraft, and protecting individuals and property on the ground.

Second, under 49 U.S.C. 44701(a)(5), the FAA must promote safe flight of civil aircraft by prescribing regulations the FAA finds necessary for safety in air commerce and national security.

Third, under section 2202 of Public Law 114–190, the Administrator must convene industry stakeholders to facilitate the development of consensus standards for remotely identifying operators and owners of UAS and associated unmanned aircraft and to issue regulations or guidance based on any standards developed.

Fourth, under 49 U.S.C. 44805, the Administrator must establish a process for, among other things, accepting risk-based consensus safety standards related to the design and production of small UAS.

Fifth, under 49 U.S.C. 44805(b)(7), the Administrator must take into account any consensus identification standard regarding remote identification of unmanned aircraft developed pursuant to section 2202 of Public Law 114–190.

Sixth, under 49 U.S.C. 44809(f), the Administrator is not prohibited from promulgating rules generally applicable to unmanned aircraft, including those unmanned aircraft eligible for the exception for limited recreational operations of unmanned aircraft. Among other things, this authority extends to rules relating to the registration and marking of unmanned aircraft and the standards for remotely identifying owners and operators of UAS and associated unmanned aircraft.

Seventh, the FAA has authority to regulate registration of aircraft under 49 U.S.C. 44101–44106 and 44110–44113 which require aircraft to be registered as a condition of operation and establish the requirements for registration and registration processes.

Lastly, this rulemaking is promulgated under the authority described in 49 U.S.C. 106(f), which establishes the authority of the Administrator to promulgate regulations and rules, and 49 U.S.C. 40101(d), which authorizes the FAA to consider in the public interest, among other things, the enhancement of safety and security as the highest priorities in air commerce, the regulation of civil and military operations in the interest of safety and efficiency, and assistance to law enforcement agencies in the enforcement of laws related to regulation of controlled substances, to the extent consistent with aviation safety.

Objectives for the proposed rule. The FAA is integrating UAS operations into the airspace of the United States through a phased, incremental, and risk-based approach.[174]

On June 28, 2016, the FAA achieved a major step towards UAS integration when it issued the final rule for Operation and Certification of Small Unmanned Aircraft Systems.[175] This was one of multiple UAS-related regulatory actions taken by the FAA to enable the safe integration of UAS into the airspace of the United States. As technology progresses and the utility of UAS increases, the FAA anticipates a need for further rulemaking to continue to foster the safe, secure, and efficient use of the airspace of the United States. The FAA believes that the next step in the regulatory process involves the enactment of regulatory requirements to enable the remote identification of UAS operating in the airspace of the United States.

This action would implement requirements for the remote identification of UAS. The remote identification of UAS in the airspace of the United States would address safety, security, and law enforcement concerns regarding the further integration of these aircraft into the airspace while also enabling greater operational capabilities.

3. Description of the Record-Keeping and Other Compliance Requirements of the Proposed Rule

UAS owners, UAS operators (including pilots, remote pilots, and persons manipulating the flight controls of UAS), UAS manufacturers (*i.e.,* persons responsible for the production of UAS), developers of remote identification means of compliance, and Remote ID USS would have important roles in the remote identification of UAS. Please see section I.C of this preamble for additional detail describing the roles and responsibilities of each group within the scope of the proposed rule.

This proposed rule imposes recordkeeping requirements. First, all entities intending to use the small unmanned aircraft for limited recreational operations would be required to include the manufacturer, model, and serial number of each small unmanned aircraft in the registration of that aircraft. Requiring the manufacturer, model, and serial number would obligate registrants to add this additional information to the registration for all their aircraft used for limited recreational operations.

Next, the FAA is proposing that persons who develop standards that the FAA may accept as a means of compliance submit those standards for review and acceptance by the FAA. A person who submits a means of compliance is proposed to be required to retain the data for as long as the means of compliance is accepted plus an additional 24 calendar months.

The FAA is proposing that persons who produce UAS with remote identification must meet the minimum performance requirements of the proposed rule using an FAA-accepted means of compliance. To demonstrate the UAS has been produced to meet the minimum performance requirements using an FAA-accepted means of compliance, persons responsible for the production of UAS would be required to submit to the FAA a declaration of compliance. A person who submits a declaration of compliance would be required to retain the data submitted for 24 calendar months after the cessation

[174] Consult *http://www.faa.gov/uas* for additional information regarding UAS operations.

[175] 81 FR 42064.

of production of the UAS with remote identification.

The proposed rule would require a producer to label the UAS to show that it was produced with remote identification technology capable of meeting the proposed rule. The proposed labeling requirement would inform the operator that the UAS is eligible to conduct operations within the airspace of the United States.

The FAA proposes standard remote identification UAS and limited remote identification UAS be designed and produced to connect to the internet and transmit remote identification message elements to Remote ID USS. The collection of this information in the form of message elements is necessary to comply with the statutory requirement to develop standards for remotely identifying operators and owners of UAS and associated unmanned aircraft. The information transmitted between the UAS and the Remote ID USS is collected electronically without input from the human operator, thus there is no burden on the person manipulating the flight controls of the unmanned aircraft to manually submit information to the Remote ID USS. There would be an exchange of information between the Remote ID USS and the FAA when identification of the UAS is required. At this time, it is unknown how often exchanges between the FAA and Remote ID USS will occur.

To support the transmission of these message elements, the FAA envisions that a Remote ID USS (an FAA-qualified third party service provider) demonstrate four primary capabilities: (1) The ability to share the remote identification message elements in near real-time with the FAA upon request; (2) the ability to maintain remote identification information; (3) the ability to meet contractually-established technical parameters; and (4) the ability to inform the FAA when their services are active and inactive. Each Remote ID USS would be required to establish a contractual relationship with the FAA through a Memorandum of Agreement (MOA), and to comply with a series of terms, conditions, limitations, and technical requirements, and to outline how the Remote ID USS must interpret and provide data to external users, as well as store and protect such data.

The FAA is proposing that representatives of CBOs submitting applications for flying sites to become FAA-recognized identification areas may apply for such designation in a form and manner acceptable to the FAA. The application would collect certain information regarding the location and requirements of the flying site, and require the CBO representative to confirm certain information regarding the site.

4. All Federal Rules That May Duplicate, Overlap, or Conflict With the Proposed Rule

The FAA is unaware that the proposed rule will overlap, duplicate or conflict with existing Federal rules.

5. Description and an Estimated Number of Small Entities to Which the Proposed Rule Will Apply

This proposed rule would apply to four communities of small entities: Producers of UAS, entities that either own or operate UAS, community based organizations, and Remote ID USS.

The first affected group of small entities discussed will be producers. For purposes of this rulemaking, the FAA estimates that there are approximately 154 U.S. entities that produce small UAS as of January 2019.[176] Out of these 154 U.S. entities, data on entity size, as defined by number of employees, was available for only 117. Out of the 117 entities for which data was available, 87 of the entities are categorized as small, 12 of the entities are categorized as medium, and 18 are categorized as large.[177] Data for the remaining 37 entities was not available and thus the entity size could not be determined, however a majority are believed to be small. NAICS code 336411 is titled ''Miscellaneous Aircraft Manufacturing.'' The manufacture of unmanned and robotic aircraft are included in this code. The SBA defines industries within this code to be small if they employ 1,500 employees or less.

The next group of entities affected by the proposed rule are owners and operators of UAS that conduct operations under part 107 or part 91. Based on analysis conducted by the Association for Unmanned Vehicle Systems International (AUVSI), over 85 percent of part 107 waivers granted have been to small businesses.[178] Using this finding based on part 107 waiver data as a proxy for the size of all entities operating UAS under part 107, the FAA assumes that approximately 85 percent of the entities operating under part 107 are small. The FAA requests information on this assumption and the number of small entities affected by the proposal.

Model aircraft organizations [179] currently operating flying sites are affected by this rulemaking. These organizations would be required to submit a request to the FAA to have an established flying site approved as an FAA-recognized identification area. Based on membership of AMA (Academy of Model Aeronautics), it is estimated that each flying club has, on average, 78 members.[180] SBA standards for NAICS code 713990 ''All Other Amusement and Recreation Activities'' is $7.5 million in annual receipts, or less, to be considered a small entity. Financial records for these individual community based organizations are not public information, but it is believed that none have receipts totaling $7.5 million, and thus each is considered a small entity.

The last group of entities affected by the proposed rule are Remote ID USS. Because Remote ID USS do not yet exist, the FAA is unable to classify the entities as either small or large.

The FAA determines that a majority of entities impacted by this proposed rule are small. Therefore, the FAA determines this proposed rule would have a significant economic impact on a substantial number of small entities.

6. Description of Significant Regulatory Alternatives Considered for Small Entities

The FAA considered both more and less costly alternatives as part of the proposed rule because the RFA requires the agency to consider significant regulatory alternatives that meet the agency's statutory objectives and minimize the costs to small entities. The alternatives and the FAA's reasons for rejecting those alternatives are discussed below.

i. Alternative Compliance Periods—Producers

The chosen compliance period to estimate producer costs is two years beyond the effective date of the final rule. The FAA considered a producer compliance period of one year; however, this alternative was determined to be impractical. One

[176] AUVSI Air Platform Database. Accessed January 2019.

[177] This is based on AUVSI criteria for number of employees. The AUVSI criteria for a manufacturer of unmanned aircraft to be identified as a small entity is 49 employees or fewer. The criteria to be identified as a medium entity is 50–499 employees. Large entities are determined to have 500 or more employees.

[178] (AUVSI) Association of Unmanned Vehicle Systems International. As of July 31, 2017, 1,074 waivers had been issued of which 85 percent were granted to small entities (entities with less than 10 employees).

[179] Academy of Model Aeronautics (AMA), *http://www.modelaircraft.org/aboutama/whatisama.aspx;* more than 2,500 AMA fields.

[180] Ibid. Based on 2018 AMA membership of 195,000 and approximately 2,500 AMA fields, the average membership per field is estimated to be 78 individuals.

reason that the alternative was not chosen is that there is no FAA-accepted means of compliance currently available for producers to build to. Until an FAA-accepted means of compliance exists, producers would not be able to submit a declaration of compliance. Accordingly, the FAA believes it is practical for an industry consensus standard to be developed that could be submitted for acceptance as a means of compliance by the end of year one after the effective date of the final rule, with an additional year for producers to design, build, and test UAS that meet the standard.

The two-year compliance period for producers is consistent with information on timelines for available technology from the UAS–ID ARC Report and expected availability of USS. The ARC found technologies similar to planned Remote ID USS transmissions have a ''readiness for implementation'' of one year or less. This means products would be available for original equipment manufacturers (producers) within one year of the requirements being known. This one-year period would start after the availability of FAA-accepted means of compliance and services from Remote ID USS—we expect means of compliance and Remote ID USS availability to take up to one year after the effective date of the proposed rule.

At this time, the two-year producer compliance period appears reasonable and has a technical basis. The FAA has not identified or analyzed an alternative. The current proposal does not preclude earlier producer compliance (potential economic incentive to comply earlier). The FAA requests comments on alternative compliance periods that would minimize costs for small producers.

ii. Alternative Operational Compliance Periods

The FAA considered three years beyond the producer compliance date for owners and operators to comply with the remote identification requirements of this proposed rule. This period of time coincides with the three-year lifespan of a small UAS and would have prevented costly grounding or replacement of UAS prior to end of useful life. However, the FAA determined that the three-year compliance period was unacceptable since it prolonged safety and security risks to air traffic and airports by delaying the ability of law enforcement personnel to identify unauthorized UAS operations. To reduce the delay in implementing remote identification, the owner/operator compliance period was reduced from three years down to one year.

The FAA analyzed the costs of allowing up to three years for owners/operators to be in compliance and found this alternative minimizes costs to owners/operators since on average the affected existing fleet of UAS could be replaced at the end of useful life (three years). In addition, this alternative is more likely to reduce uncertainty of adverse impacts to producers with inventories of UAS produced before the compliance date that would likely not meet the remote identification provisions of this proposal. Given the average three-year UAS lifespan, the three-year operational compliance period would likely assist producers in depleting existing non-compliant inventories with reduced impact compared to the proposed one-year compliance period.

Under this alternative, net present value costs at a three percent discount rate are $491.7 million with annualized net costs of $57.7 million. At a seven percent discount rate, net present value costs are $392.6 million with annualized net cost of $55.9 million. These costs are lower than the costs of the proposed rule: the proposal results in present value costs of about $582 million at a three percent discount rate with annualized net costs of about $68.2 million, and net present value costs of about $473 million at a seven percent discount rate with annualized net costs of about $67.4 million. This alternative would likely minimize impacts on small entities affected by this proposed rule. This alternative does not include impacts and costs related to the loss of use associated with UAS that cannot be retrofit and earlier Remote ID USS subscription fees that would occur under the proposed rule.

iii. FAA-Provided Remote Identification Services

The proposed rule assumes that Remote ID USS will come forward to offer remote identification services to individuals operating UAS in the airspace of the United States. The alternative would be for the FAA to provide these services directly to operators of UAS instead of providing them through a third party provider. The FAA is uncertain how it would recoup costs for these services, at least in the short run. The FAA chose the preferred alternative for several reasons. First, the LAANC service model has been effective due to the success of public and private sector partnerships in implementing LAANC and clear Congressional approval of the model. Second, similar to LAANC USS, the FAA will not provide payment for the development or operation of Remote ID USS products or services. The FAA anticipates that the Remote ID USS would recoup the costs of providing services either through the sale of subscriptions for remote identification services, on-line advertising, or ''value added'' services that can be purchased from the service provider. The FAA requests comments on alternatives for remote identification services that would minimize cost to small entities.

C. International Trade Impact Assessment

The Trade Agreements Act of 1979 (Pub. L. 96–39), as amended by the Uruguay Round Agreements Act (Pub. L. 103–465), prohibits Federal agencies from establishing standards or engaging in related activities that create unnecessary obstacles to the foreign commerce of the United States. Pursuant to these Acts, the establishment of standards is not considered an unnecessary obstacle to the foreign commerce of the United States, so long as the standard has a legitimate domestic objective, such as the protection of safety, and does not operate in a manner that excludes imports that meet this objective. The statute also requires consideration of international standards and, where appropriate, that they be the basis for U.S. standards.

The FAA has assessed the potential effect of this proposed rule and determined that it ensures the safety of the American public and does not exclude imports that meet this objective. As a result, this proposed rule is not considered as creating an unnecessary obstacle to foreign commerce.

The FAA has considered the ongoing work of international organizations and other countries. No international (*e.g.,* ICAO) standards currently exist for the types of operations the FAA proposes in this rule. The FAA will maintain its awareness of other countries' and international organizations' work in developing potential standards relevant to UAS operations.

D. Unfunded Mandates Assessment

Title II of the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4) requires each Federal agency to prepare a written statement assessing the effects of any Federal mandate in a proposed or final agency rule that may result in an expenditure of $100 million or more (in 1995 dollars) in any one year by State, local, and tribal governments, in the aggregate, or by the private sector; such a mandate is deemed to be a ''significant regulatory action.'' The FAA currently

uses an inflation-adjusted value of about $155 million in lieu of $100 million.

Although this proposed rule is a significant regulatory action, it does not contain a mandate that would impose costs of more than $155 million annually. As a result, the requirements of Title II of the Act do not apply.

E. Paperwork Reduction Act

The Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)) requires that the FAA consider the impact of paperwork and other information collection burdens imposed on the public.

There are several new information collections that the FAA is proposing as part of this rule, as well as an existing information collection that is proposed to be revised.

1. New Information collection: Additions to Small Unmanned Aircraft Registration System

In this rule, the FAA is proposing to require that all persons registering small unmanned aircraft under part 48 include one or more telephone number(s) of the applicant, and the manufacturer, model, and serial number of the unmanned aircraft as part of the registration information. This information would then be included on the Certificate of Aircraft Registration.

The FAA recognizes that persons who currently register their small unmanned aircraft intending to use the small unmanned aircraft as other than a model aircraft are already required to provide the manufacturer, model, and serial number, if available, under § 48.100(a). The FAA proposes to require all persons who register their small unmanned aircraft to include manufacturer name, model name, serial number, and telephone number(s) in the registration. Thus, some persons who have previously registered small unmanned aircraft, but did not include telephone number, manufacturer, model, and serial number information, would be required to update the registration of that aircraft.

The FAA is also proposing to require all individuals intending to use the small unmanned aircraft exclusively as a model aircraft to include the telephone number(s) of the applicant, and the manufacturer, model, and serial number of each small unmanned aircraft in the registration. Requiring the telephone number(s), manufacturer, model, and serial number would necessitate amending the registration for all registered model aircraft. Additionally, the FAA proposes to revise the registration requirements in Part 48 to remove the provisions that allow small unmanned aircraft to register as model aircraft under a single Certificate of Aircraft Registration and to require the individual registration of each aircraft, regardless of its intended use.[181] This means that every small unmanned aircraft registered under part 48 would need to have its own Certificate of Aircraft Registration.

As has been discussed, the FAA recognizes that some small unmanned aircraft would already have serial numbers, while others would require the FAA to assign serial numbers as part of the process of amending the registration. Requiring owners of unmanned aircraft to provide their telephone numbers as part of the registration process would assist FAA and law enforcement to disseminate safety and security related information to the registrant in near real-time.

Therefore, the FAA is proposing a new information collection, Additions to Small Unmanned Aircraft Registration System, to reflect the additional burden of adding the telephone number, manufacturer, model, and serial number to each registration and to reflect the burden of having each unmanned aircraft registered separately.

Use: The FAA would use the telephone number, manufacturer, model, and serial number to assist with the remote identification of unmanned aircraft systems. The serial number, which may be transmitted as the unique identifier of an unmanned aircraft, would help to identify the aircraft and associate the aircraft with its owner. The FAA would use the telephone number of the owner to disseminate safety and security-related information to the registrant.

TABLE 11—SMALL UNMANNED AIRCRAFT REGISTRATION—LIMITED RECREATIONAL OPERATIONS INCREMENTAL HOURLY BURDEN AND COST

[$Mil.]

Year	Registrations	Hourly burden	Total cost ($Mil.)
1	442,623	12,082	$0.17
2	335,236	8,040	0.11
3	372,127	8,899	0.13
Total	1,149,986	29,021	0.41

Row and column totals may not sum due to rounding.

2. New Information Collection: Identification of Foreign-Registered Civil Unmanned Aircraft Operating in the Airspace of the United States

The FAA is proposing to extend the operational requirements of part 89 to persons operating foreign civil unmanned aircraft in the United States. These persons would have to comply with the remote identification requirements, which means that these persons would have to operate foreign civil unmanned aircraft that qualify as standard remote identification UAS, limited remote identification UAS, or that have no remote identification equipment but are operated within an FAA-recognized identification area.

The FAA is proposing to allow a person to operate foreign-registered civil unmanned aircraft in the United States only if the person submits a notice of identification to the Administrator. The notice would include the following information to allow FAA to associate an unmanned aircraft to a responsible person:

(1) The name of the operator and, for an operator other than an individual, the name of the authorized

[181] This proposal uses the term ''limited recreational operations'' when discussing registration requirements under part 48. Part 48 uses the term ''model aircraft'' to describe recreational UAS operations. The FAA considers that model aircraft under part 48 are consistent with the ''limited recreational operations'' described in 49 U.S.C. 44809, therefore ''limited recreational operations'' has been used throughout to ensure consistency of terminology with current statutory requirements.

representative providing the notification.

(2) The physical address of the operator and, for an operator other than an individual, the physical address for the authorized representative. If the operator or authorized representative does not receive mail at the physical address, a mailing address must also be provided.

(3) The physical address of the operator in the United States.

(4) One or more telephone number(s) where the operator can be reached while in the United States.

(5) The email address of the operator or, for an operator other than an individual, the email address of the authorized representative.

(6) The aircraft manufacturer and model name.

(7) The serial number of the aircraft.

(8) The country of registration of the aircraft.

(9) The registration number of the aircraft.

Once a person submits a notice of identification, the FAA would issue a confirmation of identification. A person operating a foreign-registered unmanned aircraft in the United States would have to maintain the confirmation of identification at the UAS' control station and would have to produce it when requested by the FAA or a law enforcement officer. The holder of a confirmation of identification would have to ensure that the information provided remains accurate and is current prior to operating a foreign registered civil unmanned aircraft system in the United States.

Use: The FAA would use information provided by operators of foreign-registered civil unmanned aircraft operating in the airspace of the United States to identify those aircraft.

TABLE 12—NOTICE OF IDENTIFICATION

[Unit cost]

Year	Minutes to establish account [182]	Additional minutes per aircraft	Total minutes	Part 107 opportunity cost of time ($1.55/minute) [183]	Recreational flyer opportunity cost of time ($0.237/minute) [184]
1	5	1	6	$9.30/notification	$1.42/notification.
2	5	1	6	$9.30/notification	$1.42/notification.
3	5	1	6	$9.30/notification	$1.42/notification.

3. New Information Collection: Remote Identification Means of Compliance, Declaration of Compliance, and Labeling Requirements

i. Means of Compliance

The FAA is proposing to require persons who develop standards that the FAA may accept as means of compliance for the production of UAS with remote identification to submit those standards for review and acceptance by the FAA. The means of compliance would include requirements for producer demonstration of how the UAS with remote identification performs its intended functions and meets the performance requirements by analysis, ground test, or flight test, as appropriate. A person who submits a means of compliance that is accepted by the FAA would be required to retain the following data for as long as the means of compliance is accepted and an additional 24 calendar months: All documentation and substantiating data submitted for the acceptance of the means of compliance; records of all test procedures, methodology, and other procedures, if applicable; and any other information necessary to justify and substantiate how the means of compliance enables compliance with the remote identification requirements of part 89.

Use: The FAA would use the means of compliance as a way for persons responsible for the production of standard remote identification UAS or limited remote identification UAS to demonstrate compliance with the requirements for remote identification of UAS.

TABLE 14—MEANS OF COMPLIANCE HOURLY BURDEN AND COST

Year	MOC submitted	Total pages	Hrs per page	Total hours	Cost per hour	Total cost
1	1	12	1	12	$92.72	$1,112.64
2	1	12	1	12	92.72	1,112.64
3	1	12	1	12	92.72	1,112.64
Total	3	36	3	36		3,337.92

Row and column totals may not sum due to rounding.

ii. Declaration of Compliance

The FAA is proposing to require persons responsible for the production of UAS with remote identification to produce those UAS to meet the minimum performance requirements of the rule using an FAA-accepted means of compliance. To demonstrate that a UAS has been produced using an FAA-accepted means of compliance, producers would be required to submit

[182] *https://www.faa.gov/news/updates/media/2015-12-13_2120-AK82_RIA.pdf.* See Page 13 of the Regulatory Impact Analysis of the Interim Final Rule Regulatory Evaluation for the Registration and Marking Requirements for Small Unmanned Aircraft. RIN 2120–AK82.

[183] The FAA estimates the wage earned by Part 107 operators to be similar to that of a fully burdened wage (compensation + benefits) of an FAA technical subject matter expert, which is $92.72 per hour ($1.55 per minute).

[184] Department of Transportation Departmental Guidance on Valuation of Travel Time in Economic Analysis, September 27, 2016. Table 4 Recommended Hourly Values of Travel Time Savings, Page 17. In constant dollars, the hourly value of time for personal travel is $14.21 per hour ($.237 per minute). This value is used as a proxy for the value of time of someone operating UAS for recreational operations.

to the FAA a declaration of compliance containing:

- The name, physical address, telephone number, and email address of the person responsible for production of the standard remote identification UAS or limited remote identification UAS.
- The UAS make and model.
- The UAS serial number, or the range of serial numbers for which the person responsible for production is declaring compliance.
- The means of compliance used in the design and production of the UAS and whether the UAS is a standard remote identification UAS or a limited remote identification UAS.
- Whether the declaration of compliance is an initial declaration or an amended declaration, and if the declaration of compliance is an amended declaration, the reason for the amendment.
- A declaration that the person responsible for the production of the UAS:

○ Can demonstrate that the UAS was designed and produced to meet the minimum performance requirements of standard remote identification UAS or limited remote identification UAS by using an FAA-accepted means of compliance.

○ Will, upon request, allow the Administrator to inspect its facilities, technical data, and any UAS produced with remote identification, and to witness any tests necessary to determine compliance with part 89, subpart D.

○ Will perform independent audits on a recurring basis, and whenever the FAA provides notice of noncompliance or of potential noncompliance, to demonstrate compliance with the requirements of subpart F of part 89, and will provide the results of those audits to the FAA upon request.

○ Will maintain product support and notification procedures to notify the public and the FAA of any defect or condition that causes the UAS to no longer meet the requirements of subpart F of part 89, within 15 calendar days of the date the person becomes aware of the defect or condition.

A person who submits a declaration of compliance that is accepted by the FAA would be required to retain the following data for 24 calendar months after the cessation of production of the UAS with remote identification: The means of compliance, all documentation, and substantiating data related to the means of compliance used; records of all test results; and any other information necessary to demonstrate compliance with the means of compliance so that the UAS meets the remote identification requirements of part 89.

Use: The FAA would use the declaration of compliance to determine that the person responsible for the production of standard remote identification UAS or limited remote identification UAS has demonstrated compliance with the requirements for remote identification of UAS.

TABLE 13—DECLARATION OF COMPLIANCE HOURLY BURDEN AND COST

[$Mil.]

Year	DoC submitted	Pages per DoC	Hours per page	Hourly burden	Cost per hour	Total cost
1	.....	.....	.....	.....	.....	.....
2	1,155	50	1	57,750	$82.93	$4.79
3	19	50	1	945	82.93	0.08
Total	1,174	.....	.....	58,695	82.93	4.87

Row and column totals may not sum due to rounding.

iii. Labeling

For standard remote identification UAS and limited remote identification UAS, the proposed rule would require the person responsible for production of the UAS to label the unmanned aircraft to show that it was produced with remote identification technology that meets the requirements of the proposed rule and to indicate whether it is a standard remote identification UAS or a limited remote identification UAS. The label would be in English and be legible, prominent, and permanently affixed to the unmanned aircraft. The proposed labeling requirement would assist the operator to know that his or her UAS is eligible to conduct operations within the airspace of the United States.

Use: The proposed labeling requirement would assist the FAA and owners and operators of UAS to determine if the UAS meets the remote identification requirements of the proposed rule.

TABLE 14—LABELING REQUIREMENT HOURLY BURDEN AND COST

[$Mil.]

Year	Number of platforms	Hours per design	Hourly burden	Cost per hour	Total cost
1	.....	.....	.....	.....	.....
2	1,100	2	2,200	$82.93	$0.182
3	18	2	36	82.93	0.003
Total	1,118	.....	2,236	.....	0.185

Row and column totals may not sum due to rounding.

4. New Information Collection: UAS Remote Identification Message Elements

The FAA is proposing that standard remote identification UAS and limited remote identification UAS be designed and produced to connect to the internet and transmit remote identification message elements to Remote Identification UAS Service Suppliers (Remote ID USS). The collection of this information in the form of message elements is necessary to comply with

the statutory requirement to develop standards for remotely identifying operators and owners of UAS and associated unmanned aircraft. Furthermore, remote identification of UAS would provide airspace awareness to the FAA, national security agencies, and law enforcement entities, which could be used to distinguish compliant airspace users from those potentially posing a safety or security risk.

Under this proposed rule, no person would be able to operate a UAS required to have remote identification within the airspace of the United States unless the UAS is capable of connecting to the internet and transmitting certain remote identification message elements throughout the operation. Persons operating UAS would comply with remote identification in one of three ways. First, standard remote identification UAS would connect to the internet and transmit remote identification message elements through that internet connection to a Remote ID USS and broadcast those message elements directly from the unmanned aircraft. These message elements would include the UAS Identification (either the unmanned aircraft's serial number or session ID), latitude, longitude, and barometric pressure altitude of both the control station and the unmanned aircraft, a time mark, and an emergency status code that would transmit only when applicable. A standard remote identification UAS that could no longer broadcast the message elements would have to land as soon as practicable.

Second, limited remote identification UAS would be required to connect to the internet and transmit similar remote identification message elements through that internet connection to a Remote ID USS. If the connection to the internet were unavailable or if the UAS could no longer transmit remote identification message elements to a Remote ID USS, the unmanned aircraft would not be able to take off. Limited remote identification UAS would be designed and produced to operate no more than 400 feet from the control station, cannot broadcast remote identification message elements, and would have to be operated within visual line of sight.

The third way to comply with the UAS remote identification requirements would be to operate a UAS without remote identification at an FAA-Recognized Identification Area. Because these types of operations do not involve any information exchanges with a Remote ID USS, they were not considered as part of this information collection.

Use: The remote identification message elements would be sent from the UAS to the Remote ID USS over the internet. The Remote ID USS would, in turn, transmit the information collected to the FAA as required. To implement remote identification, the FAA anticipates establishing a cooperative data exchange mechanism between the FAA and Remote ID USS.

The information transmitted between the UAS and the Remote ID USS is collected electronically without input from the human operator, thus there is no burden on the person manipulating the flight controls of the UAS to submit information to the Remote ID USS. There would be an exchange of information between the Remote ID USS and the FAA when identification of the owner of the unmanned aircraft or the location of the UAS is required. At this time, it is unknown how often exchanges between the FAA and Remote ID USS would occur. The following table shows the number of estimated respondents that would transmit messages through the internet to a Remote ID USS and the number of Remote ID USS that would exchange data with the FAA.

TABLE 15—TRANSMIT USS MESSAGE ELEMENTS

Year	Remote ID respondents	Remote ID USS respondents
1		
2	422,498	10
3	972,258	11
Total	1,394,756	26

5. New Information Collection: Application for FAA-Recognized Identification Areas

The FAA is proposing that community-based organization (CBO) representatives submitting applications for flying sites to become FAA-recognized identification areas may apply for such establishment in a form and manner acceptable to the FAA. The application would collect certain information regarding the location of the flying site, and require the CBO representative to confirm certain information regarding the site.

An applicant for an FAA-recognized identification area would be required to submit: (1) The name of the CBO making the request; (2) a declaration that the person making the request has the authority to act on behalf of the CBO; (3) the name and contact information, including telephone number, of the primary point of contact for communications with the FAA; (4) the physical address of the proposed FAA-recognized identification area; (5) the latitude and longitude coordinates delineating the geographic boundaries of the proposed FAA-recognized identification area, and (6) if applicable, a copy of any existing letter of agreement regarding the flying site.

Use: Applications would permit CBOs recognized by the Administrator to apply for FAA-recognized identification area status.

TABLE 16—CBO REQUEST FOR FAA-RECOGNIZED IDENTIFICATION AREA HOURLY BURDEN AND COST

[$Mil]

Year	Requests submitted	Pages per request	Total pages	Hours per page	Total hours	Hourly burden	Total cost
1	2,500	4	10,000	0.5	5000	$58.12	$0.29
2							
3							
Total	2,500		10,000		5,000		0.29

Row and column totals may not sum due to rounding.

6. Requirements for Which Information Collections Are Not Proposed

i. Existing Information Collection 2120–0042: Aircraft Registration

While the FAA is proposing to clarify in new § 47.14 that all unmanned aircraft registering under part 47 must include a serial number as part of the registration, the FAA is not proposing to revise existing information collection 2120–0042, Aircraft Registration. The inclusion of a serial number in registrations under part 47 has always been required and a revision to this information collection is not necessary.

ii. Existing Information Collection 2120–0021: Certification: Pilots and Flight Instructors

While the FAA is proposing to require that new questions regarding remote identification of UAS be included on the initial and recurrent aeronautical knowledge tests described in § 107.73, and that new training be included in the initial and recurrent training described in § 107.74, for persons seeking a remote pilot certificate with a small UAS rating, the FAA does not believe that the addition of these questions would necessitate further time on the part of applicants to complete the test or training. Therefore, the FAA is not proposing to revise existing information collection 2120–0021, Certification: Pilots and Flight Instructors.

iii. Remote ID USS

While the FAA envisions the use of Remote ID USS for the transmission of UAS remote identification information, the FAA is still developing the concepts and requirements for those USS. Because the FAA is uncertain at this time regarding the requirements for application by persons to be Remote ID USS, the FAA is not proposing here to establish an information collection for Remote ID USS.

Individuals and organizations may send comments on the information collection requirement to the address listed in the **ADDRESSES** section at the beginning of this preamble by March 2, 2020. Comments may also be submitted to the Office of Management and Budget, Office of Information and Regulatory Affairs, Attention: Desk Officer for FAA, New Executive Office Building, Room 10202, 725 17th Street NW, Washington, DC 20053.

F. International Compatibility and Cooperation

In keeping with U.S. obligations under the Convention on International Civil Aviation, it is FAA policy to conform to International Civil Aviation Organization Standards and Recommended Practices to the maximum extent practicable. The FAA has reviewed the corresponding ICAO Standards and Recommended Practices and has identified no differences with these regulations. Additionally, the FAA regularly reaches out to its international partners on a bilateral and multilateral basis to harmonize regulations to the maximum extent possible. The FAA's international outreach efforts include the following:

- Discussions with the Switzerland Federal Office of Civil Aviation (FOCA) regarding plans for use of remote identification to facilitate U-Space [185] operations and plans to allow multiple UAS Service Suppliers to serve a range of U-Space operators in concept similar to current and future FAA USS plans;
- Collaboration with the European Aviation Safety Agency (EASA) on the EASA U-Space Regulatory Framework;
- Cooperation in the Joint Authorities for Rulemaking on Unmanned Systems (JARUS) on UTM/U-Space and other regulatory recommendations under development;
- Collaboration with the Transport Canada Civil Aviation (TCCA) Remotely Piloted Aircraft Systems (RPAS) Task Force on policy, rulemaking, regulatory, and research and development topics related to UAS and beyond visual line of sight operations;
- Hosting the Sharing Best Practices for Managing Unmanned Aircraft Systems (UAS) With Association of Southeast Asian Nations (ASEAN) Member States workshop in Singapore; and
- Meetings with the Australia Civil Aviation Safety Authority (CASA) to share best practices and lessons learned on UAS integration.

In addition, the FAA has assessed the European Commission regulations for UAS remote identification and compared them to the requirements in this proposal. One difference between the two is that the European Commission regulations require only a remote identification broadcast, whereas the FAA's proposal includes both a broadcast and a requirement that the same information be transmitted through an internet connection to a third-party service supplier. Another difference is that the European regulation requires the broadcast of both the unmanned aircraft registration number and the serial number, whereas the FAA's proposal uses the unmanned aircraft serial number or session ID as the unique identifier in the remote identification message set. Other differences include that the European regulation requires message elements for the route course and speed of the unmanned aircraft, while the FAA's proposal does not and the FAA proposal includes remote identification message elements for emergency status and a time mark, but the European regulation does not. At the same time, there are similarities. The European regulation and the FAA's proposal both include the position of the unmanned aircraft and the control station as remote identification message elements.

G. Environmental Analysis

FAA Order 1050.1F identifies FAA actions that are categorically excluded from preparation of an Environmental Assessment or Environmental Impact Statement under the National Environmental Policy Act (NEPA) in the absence of extraordinary circumstances. The FAA has determined this rulemaking action qualifies for the categorical exclusion identified in paragraph 5–6.6f of this order and involves no extraordinary circumstances.

This rulemaking action provides a framework for the remote identification of all UAS operating in the airspace of the United States. It does not affect the frequency of UAS operations in the airspace of the United States. The FAA has reviewed the implementation of the rulemaking action and determined it is categorically excluded from further environmental review. Possible extraordinary circumstances that would preclude the use of a categorical exclusion have been examined and the FAA has determined that no such circumstances exist. After careful and thorough consideration of the rulemaking action, the FAA finds that it does not require preparation of an Environmental Assessment or Environmental Impact Statement in accordance with the requirements of NEPA, Council on Environmental Quality (CEQ) regulations, and FAA Order 1050.1F.

XX. Executive Order Determinations

A. Executive Order 13132, Federalism

The FAA has analyzed this proposed rule under the principles and criteria of Executive Order 13132, Federalism. The agency has determined that this action would not have a substantial direct effect on the States, or the relationship

[185] As described by the Single European Sky ATM Research (SESAR) Joint Undertaking, ''U-space is a set of new services relying on a high level of digitalization and automation of functions and specific procedures designed to support safe, efficient and secure access to airspace for large numbers of drones.'' *https://www.sesarju.eu/U-space.*

between the Federal Government and the States, or on the distribution of power and responsibilities among the various levels of government, and, therefore, would not have Federalism implications.

B. Executive Order 13211, Regulations That Significantly Affect Energy Supply, Distribution, or Use

The FAA analyzed this proposed rule under Executive Order 13211, Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use (May 18, 2001). The agency has determined that it would not be a ''significant energy action'' under the executive order and would not be likely to have a significant adverse effect on the supply, distribution, or use of energy.

C. Executive Order 13609, Promoting International Regulatory Cooperation

Executive Order 13609, Promoting International Regulatory Cooperation, (77 FR 26413, May 4, 2012) promotes international regulatory cooperation to meet shared challenges involving health, safety, labor, security, environmental, and other issues and to reduce, eliminate, or prevent unnecessary differences in regulatory requirements.

For significant regulations that the agency identifies as having significant international impacts, the FAA has to consider, to the extent feasible, appropriate, and consistent with law, any regulatory approaches by a foreign government that the United States has agreed to consider under a regulatory cooperation council work plan. A significant regulatory action under Executive Order 13609 has the same meaning as in section 3(f) of Executive Order 12866. An international impact, as defined in Executive Order 13609, means ''a direct effect that a proposed or final regulation is expected to have on international trade and investment, or that otherwise may be of significant interest to the trading partners of the United States.''

As discussed in the International Compatibility and Cooperation section of this proposed rule, in keeping with U.S. obligations under the Convention on International Civil Aviation, the FAA seeks to conform to International Civil Aviation Organization Standards and Recommended Practices to the maximum extent practicable. The FAA has reviewed the corresponding ICAO Standards and Recommended Practices and has identified no differences with these regulations. Additionally, the FAA regularly reaches out to its international partners on a bi-lateral and multi-lateral basis to harmonize regulations to the maximum extent possible. Thus, the FAA believes that the proposed rule should have no effect on international regulatory cooperation.

XXI. Tribal Considerations

Consistent with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments,[186] and FAA Order 1210.20, American Indian and Alaska Native Tribal Consultation Policy and Procedures,[187] the FAA ensures that Federally Recognized Tribes (Tribes) are given the opportunity to provide meaningful and timely input regarding proposed Federal actions that have the potential to affect uniquely or significantly their respective Tribes. At this point, the FAA has not identified any unique or significant effects, environmental or otherwise, on tribes resulting from this proposed rule.

XXII. Privacy

With regard to the information manufacturers and operators may submit in accordance with this proposed rule's requirements, the FAA conducted a privacy impact assessment (PIA) under section 522(a)(5) of division H of the FY 2005 Omnibus Appropriations Act, Public Law 108–447, 118 Stat. 3268 (Dec. 8, 2004) and section 208 of the E-Government Act of 2002, Public Law 107–347, 116 Stat. 2889 (Dec. 17, 2002). The PIA found the NPRM requirements that affect privacy include: the registration of the UAS with the FAA, the transmission of data from the UAS to Remote ID USS, the broadcast of data from standard remote identification UAS to any person capable of receiving broadcasts, the use of PII in the manufacturer's declaration of compliance, and the use of PII in applications to establish FAA-recognized identification areas for UAS flying.

The PIA points to several mitigation strategies including: limiting collection to only relevant and necessary PII, limiting the use of PII to the specific purpose for which it was collected, using security measures to protect PII collected, notifying individuals of collection practices prior to collection, and the voluntary nature of all PII submitted. Additionally, the FAA would enter into contractual agreements with the Remote ID USS including directions for the use, protection, and storage of the data. Section XIV discusses the data security requirements the FAA intends to impose upon FAA-qualified Remote ID USS. Although the message elements themselves would be publicly accessible information, the ability to cross-reference that information with registry data would not be publicly available and would be limited to the FAA and law enforcement for security purposes.

In the 2016 Rule, the FAA acknowledged various organizations' and commenters' concerns regarding the use of small UAS to collect information about individuals. In that rule, the FAA noted that privacy concerns were beyond the scope of the FAA's mission to ensure safety and efficiency of aviation operations in the airspace of the United States, but discussed various methods by which the FAA intended to continue addressing privacy concerns through engagement and collaboration with the public, stakeholders, and other agencies with authority and subject matter expertise in privacy law and policy.

As part of the PIA, the FAA analyzed the effect the proposed rule might have on collecting, storing, and disseminating personally identifiable information (PII) of manufacturers and UAS operators. The FAA also examined and evaluated protections and alternative information-handling processes in developing the proposed rule to mitigate potential privacy risks. A copy of the draft PIA is posted in the docket for this rulemaking.[188]

XXIII. Additional Information

A. Comments Invited

The FAA invites interested persons to participate in this rulemaking by submitting written comments, data, or views. The agency also invites comments relating to the economic, environmental, energy, or federalism impacts that might result from adopting the proposals in this document. The most helpful comments reference a specific portion of the proposal, explain the reason for any recommended change, and include supporting data. To ensure the docket does not contain duplicate comments, commenters should send only one copy of written comments, or if comments are filed electronically, commenters should submit only one time.

The FAA will file in the docket all comments it receives. Before acting on this proposal, the FAA will consider all

[186] 65 FR 67249 (Nov. 6, 2000).

[187] FAA Order No. 1210.20 (Jan. 28, 2004), available at *http://www.faa.gov/documentLibrary/media/1210.pdf.*

[188] Upon finalization, PIAs are posted on the Department of Transportation's Privacy Program page, available at *https://www.transportation.gov/individuals/privacy/privacy-impact-assessments#Federal%20Aviation%20Administration%20(FAA).*

comments it receives on or before the closing date for comments. The agency may change this proposal in light of the comments it receives.

B. Confidential Business Information

Confidential Business Information (CBI) is commercial or financial information that is both customarily and actually treated as private by its owner. Under the Freedom of Information Act (FOIA) (5 U.S.C. 552), CBI is exempt from public disclosure. If your comments responsive to this NPRM contain commercial or financial information that is customarily treated as private, that you actually treat as private, and that is relevant or responsive to this NPRM, it is important that you clearly designate the submitted comments as CBI. Please mark each page of your submission containing CBI as ''PROPIN.'' The FAA will treat such marked submissions as confidential under the FOIA, and they will not be placed in the public docket of this NPRM. Submissions containing CBI should be sent to the person in the **FOR FURTHER INFORMATION CONTACT** section of this document. Any commentary that the FAA receives which is not specifically designated as CBI will be placed in the public docket for this rulemaking.

C. Availability of Rulemaking Documents

An electronic copy of rulemaking documents may be obtained from the internet by:

- Searching the Federal eRulemaking Portal (*http://www.regulations.gov*);
- Visiting the FAA's Regulations and Policies at *https://www.faa.gov/regulations_policies;* or
- Accessing the Government Publishing Office at *https://www.govinfo.gov.*

Copies may also be obtained by sending a request to the Federal Aviation Administration, Office of Rulemaking, ARM–1, 800 Independence Avenue SW, Washington, DC 20591, or by calling (202) 267–9677. Commenters must identify the docket or notice number of this rulemaking.

All documents the FAA considered in developing this proposed rule, including economic analyses and technical reports, may be accessed from the internet through the Federal eRulemaking Portal referenced above.

D. Small Business Regulatory Enforcement Fairness Act

The Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA) requires FAA to comply with small entity requests for information or advice about compliance with statutes and regulations within its jurisdiction. A small entity with questions regarding this document may contact its local FAA official, or the person listed under the **FOR FURTHER INFORMATION CONTACT** heading at the beginning of the preamble. To find out more about SBREFA on the internet, visit *https://www.faa.gov/regulations_policies/rulemaking/sbre_act/.*

List of Subjects

14 CFR Part 1

Air transportation.

14 CFR Part 47

Aircraft, Reporting and recordkeeping requirements.

14 CFR Part 48

Aircraft, Reporting and recordkeeping requirements.

14 CFR Part 89

Aircraft, Airmen, Air traffic control, Aviation safety, Incorporation by reference, Reporting and recordkeeping requirements, Security measures.

14 CFR Part 91

Air traffic control, Aircraft, Airmen, Aviation safety, Reporting and recordkeeping requirements, Security measures.

14 CFR Part 107

Aircraft, Airmen, Aviation safety, Security measures.

The Proposed Amendment

In consideration of the foregoing, the Federal Aviation Administration proposes to amend chapter I of title 14, Code of Federal Regulations as follows:

PART 1—DEFINITIONS AND ABBREVIATIONS

■ 1. The authority citation for part 1 is revised to read as follows:

Authority: 49 U.S.C. 106(f), 106(g), 40113, 44701.

■ 2. In § 1.1, add the terms ''unmanned aircraft system,'' ''unmanned aircraft system service supplier'' and ''visual line of sight'' in alphabetical order to read as follows:

§ 1.1 General definitions.

* * * * *

Unmanned aircraft system means an unmanned aircraft and its associated elements (including communication links and the components that control the unmanned aircraft) that are required for the safe and efficient operation of the unmanned aircraft in the airspace of the United States.

Unmanned aircraft system service supplier means a person qualified by the Administrator to provide aviation-related services to unmanned aircraft systems.

* * * * *

Visual line of sight means the ability of a person manipulating the flight controls of the unmanned aircraft or a visual observer (if one is used) to see the unmanned aircraft throughout the entire flight with vision that is unaided by any device other than corrective lenses.

* * * * *

■ 3. In § 1.2, add the abbreviation ''USS'' in alphabetical order to read as follows:

§ 1.2 Abbreviations and symbols.

* * * * *

USS means an unmanned aircraft system service supplier.

* * * * *

PART 47—AIRCRAFT REGISTRATION

■ 4. The authority citation for part 47 is revised to read as follows:

Authority: 4 U.S.T. 1830; Public Law 108–297, 118 Stat. 1095 (49 U.S.C. 40101 note, 49 U.S.C. 44101 note); 49 U.S.C. 106(f), 106(g), 40113–40114, 44101–44108, 44110–44113, 44703–44704, 44713, 44809(f), 45302, 45305, 46104, 46301.

■ 5. Add § 47.14 to read as follows:

§ 47.14 Serial numbers for unmanned aircraft.

The unmanned aircraft serial number provided as part of any application for aircraft registration of a standard remote identification unmanned aircraft or a limited remote identification unmanned aircraft must be the serial number issued by the manufacturer of the unmanned aircraft in accordance with the design and production requirements of part 89.

PART 48—REGISTRATION AND MARKING REQUIREMENTS FOR SMALL UNMANNED AIRCRAFT

■ 6. The authority citation for part 48 is revised to read as follows:

Authority: 49 U.S.C. 106(f), 106(g), 40101, 40103, 40113–40114, 41703, 44101–44103, 44105–44106, 44110–44113, 44809(f), 45302, 45305, 46104, 46301, 46306.

■ 7. Revise § 48.5 to read as follows:

§ 48.5 Compliance dates.

(a) Except as provided in paragraph (b) or (c) of this section, compliance with the requirements of this part or part 47 of this chapter is required prior to operation of the small unmanned aircraft.

(b) For small unmanned aircraft registered prior to [EFFECTIVE DATE

OF FINAL RULE], compliance with the requirements of this part or part 47 of this chapter is required no later than [COMPLIANCE DATE 36 MONTHS FROM EFFECTIVE DATE OF FINAL RULE] or upon renewal of the registration, whichever is sooner.

(c) For small unmanned aircraft registered exclusively as model aircraft prior to [EFFECTIVE DATE OF THE FINAL RULE], compliance with the requirements of this part or part 47 of this chapter is required no later than [COMPLIANCE DATE 36 MONTHS FROM THE EFFECTIVE DATE OF THE FINAL RULE] or upon renewal of the registration, whichever is sooner.

■ 8. In § 48.15, revise paragraph (b) to read as follows:

§ 48.15 Requirement to register.

* * * * *

(b) The aircraft is used exclusively for limited recreational operations and weighs 0.55 pounds or less on takeoff, including everything that is on board or otherwise attached to the aircraft; or

* * * * *

■ 9. Revise § 48.30 to read as follows

§ 48.30 Fees.

The fee for issuing or renewing a Certificate of Aircraft Registration for aircraft registered in accordance with § 48.100 is $5.00 per aircraft. Each application for and renewal of a Certificate of Aircraft Registration must be accompanied by the fee, paid to the Federal Aviation Administration through the web-based small unmanned aircraft registration system, or in another manner if prescribed by the Administrator.

■ 10. Revise § 48.100 to read as follows:

§ 48.100 Application.

(a) *Required information.* Each applicant for a Certificate of Aircraft Registration issued under this part must submit all of the following information to the Registry:

(1) Applicant name and, for an applicant other than an individual, the name of the authorized representative applying for a Certificate of Aircraft Registration.

(2) Applicant's physical address and, for an applicant other than an individual, the physical address for the authorized representative. If the applicant or authorized representative does not receive mail at their physical address, a mailing address must also be provided.

(3) Applicant's email address or, for applicants other than individuals, the email address of the authorized representative.

(4) Applicant's telephone number(s).

(5) The aircraft manufacturer and model name.

(6) For any standard remote identification unmanned aircraft or limited remote identification unmanned aircraft, the serial number issued by the manufacturer of the unmanned aircraft in accordance with the design and production requirements of part 89.

(7) Other information as required by the Administrator.

(b) *Provision of information.* The information identified in paragraph (a) of this section must be submitted to the Registry through the web-based small unmanned aircraft registration system in a form and manner prescribed by the Administrator.

(c) *Issuance of Certificate of Aircraft Registration.* The FAA will issue a Certificate of Aircraft Registration upon completion of the application requirements provided in paragraph (a) of this section.

■ 11. In § 48.110, revise the section heading and paragraph (a) to read as follows:

§ 48.110 Aircraft Registration.

(a) *Certificate of Aircraft Registration.* A Certificate of Aircraft Registration issued in accordance with § 48.100 constitutes registration only for the small unmanned aircraft identified on the application.

* * * * *

§ 48.115 [Reserved]

■ 12. Remove and reserve § 48.115.

■ 13. Amend § 48.200 by revising paragraphs (b)(1) and (2) to read as follows:

§ 48.200 General.

* * * * *

(b) * * *

(1) The registration number issued by the Administrator upon completion of the registration process provided by this part; or

(2) If authorized by the Administrator, the small unmanned aircraft serial number provided with the application for Certificate of Aircraft Registration under § 48.100.

■ 14. Add part 89 to subchapter F to read as follows:

PART 89—REMOTE IDENTIFICATION OF UNMANNED AIRCRAFT SYSTEMS

Subpart A—General

Subpart B—Operating Requirements

Subpart C—FAA-Recognized Identification Areas

Subpart D—Requirements for Unmanned Aircraft Systems with Remote Identification

Subpart E—Means of Compliance

Subpart F—Design and Production of Unmanned Aircraft Systems With Remote Identification

Authority: 49 U.S.C. 106(f), 106(g), 40101(d), 40103(b), 44701, 44805, 44809(f), Section 2202 of Pub. L. 114–190.

Subpart A—General

§ 89.1 Definitions.

The following definitions apply to this part. If there is a conflict between the definitions of this part and the

definitions specified in § 1.1 of this chapter, the definitions in this part control for purposes of this part:

Amateur-built unmanned aircraft system means an unmanned aircraft system the major portion of which has been fabricated and assembled by a person who undertook the construction project solely for their own education or recreation.

Broadcast means to send information from an unmanned aircraft using radio frequency spectrum.

Remote ID USS means a USS qualified by the Administrator to provide remote identification services.

§ 89.5 Falsification, reproduction, alteration, or omission.

(a) No person may make or cause to be made:

(1) Any fraudulent or intentionally false statement in any document related to any acceptance, application, approval, authorization, certificate, declaration, designation, qualification, record, report, request for reconsideration, or similar, submitted under this part.

(2) Any fraudulent or intentionally false statement in any document required to be developed, provided, kept, or used to show compliance with any requirement under this part.

(3) Any reproduction or alteration, for fraudulent purpose, of any document related to any acceptance, application, approval, authorization, certificate, declaration, designation, qualification, record, report, request for reconsideration, or similar, submitted or granted under this part.

(b) No person may, by omission, knowingly conceal or cause to be concealed, a material fact in:

(1) Any document related to any acceptance, application, approval, authorization, certificate, declaration, designation, qualification, record, report, request for reconsideration, or similar, submitted under this part.

(2) Any document required to be developed, provided, kept, or used to show compliance with any requirement under this part.

(c) The commission by any person of an act prohibited under paragraphs (a) or (b) of this section is a basis for:

(1) Denial, suspension, rescission, or revocation of any acceptance, application, approval, authorization, certificate, declaration, declaration of compliance, designation, document, filing, qualification, means of compliance, record, report, request for reconsideration, or similar instrument issued or granted by the Administrator and held by that person; or

(2) A civil penalty.

Subpart B—Operating Requirements

§ 89.101 Applicability.

This subpart applies to the following:

(a) Persons operating unmanned aircraft registered or required to be registered under part 47 or part 48 of this chapter.

(b) Persons operating foreign civil unmanned aircraft in the United States.

§ 89.105 Remote identification requirement.

Except as otherwise authorized by the Administrator, after [COMPLIANCE DATE 36 MONTHS FROM EFFECTIVE DATE OF FINAL RULE], no person may operate an unmanned aircraft system within the airspace of the United States unless the operation is conducted under one of the following conditions:

(a) The unmanned aircraft system is a standard remote identification unmanned aircraft system and that person complies with the requirements of § 89.110.

(b) The unmanned aircraft system is a limited remote identification unmanned aircraft system and that person complies with the requirements of § 89.115.

(c) The unmanned aircraft system does not have remote identification equipment and that person complies with the requirements of § 89.120.

§ 89.110 Standard remote identification unmanned aircraft systems.

A person operating a standard remote identification unmanned aircraft system is responsible for complying with this section.

(a) *Remote identification.* Unless otherwise authorized by the Administrator, a person may operate a standard remote identification unmanned aircraft system only if the unmanned aircraft system sends the remote identification message elements of § 89.305, from takeoff to landing, in one of the following ways:

(1) If the internet is available at takeoff, a standard remote identification unmanned aircraft system must:

(i) Connect to the internet and transmit the message elements through that internet connection to a Remote ID USS; and

(ii) Broadcast the message elements directly from the unmanned aircraft.

(2) If the internet is unavailable at takeoff, or if during the flight, the unmanned aircraft system can no longer transmit through an internet connection to a Remote ID USS, the standard remote identification unmanned aircraft system must broadcast the message elements directly from the unmanned aircraft.

(b) *In-flight loss of broadcast capability.* Unless otherwise authorized by the Administrator, the person manipulating the flight controls of the aircraft must land as soon as practicable if a standard remote identification unmanned aircraft system can no longer broadcast the message elements of § 89.305.

(c) *Operation of standard remote identification unmanned aircraft systems.* Unless otherwise authorized by the Administrator, a person may operate a standard remote identification unmanned aircraft system only if it meets the following requirements:

(1) Its serial number is listed on an FAA-accepted declaration of compliance.

(2) Its remote identification equipment is functional and complies with the requirements of this part from takeoff to landing.

(3) Its remote identification equipment and functionality have not been disabled.

§ 89.115 Limited remote identification unmanned aircraft systems.

A person operating a limited remote identification unmanned aircraft system is responsible for complying with this section.

(a) *Remote identification.* Unless otherwise authorized by the Administrator, a person may operate a limited remote identification unmanned aircraft system only if, from takeoff to landing:

(1) The unmanned aircraft system connects to the internet and transmits the remote identification message elements of § 89.315 through that internet connection to a Remote ID USS.

(2) The unmanned aircraft system is operated within visual line of sight.

(b) *In-flight loss of remote identification.* Unless otherwise authorized by the Administrator, the person manipulating the flight controls of the unmanned aircraft must land as soon as practicable if a limited remote identification unmanned aircraft system in-flight can no longer transmit the message elements of § 89.315 to a Remote ID USS.

(c) *Operation of limited remote identification unmanned aircraft systems.* Unless otherwise authorized by the Administrator, a person may operate a limited remote identification unmanned aircraft system only if it meets the following requirements:

(1) Its serial number is listed on an FAA-accepted declaration of compliance.

(2) Its remote identification equipment is functional and complies with the requirements of this part from takeoff to landing.

(3) Its remote identification equipment and functionality have not been disabled.

§ 89.120 Unmanned aircraft systems without remote identification.

A person may operate an unmanned aircraft system that does not meet the requirements for a standard remote identification unmanned aircraft system under § 89.110 or a limited remote identification unmanned aircraft system under § 89.115 only if the requirements of (a) or (b) are met.

(a) *Operations at FAA-recognized identification areas.* Unless otherwise authorized by the administrator:

(1) The unmanned aircraft system is operated within visual line of sight.

(2) The unmanned aircraft system is operated within an FAA-recognized identification area.

(b) *Operations for aeronautical research.* The person is authorized by the administrator to operate the unmanned aircraft system without remote identification for the purpose of aeronautical research or to show compliance with regulations.

§ 89.125 Automatic Dependent Surveillance-Broadcast (ADS–B) Out prohibition.

Automatic Dependent Surveillance-Broadcast (ADS–B) Out equipment required under subpart C of part 91 of this chapter may not be used to comply with the remote identification requirements of this part.

§ 89.130 Confirmation of identification.

(a) *Notification requirement.* No person may operate a foreign registered civil unmanned aircraft in the United States unless, prior to the operation, the person submits a notice of identification in a form and manner acceptable to the Administrator. The notice of identification must include:

(1) The name of the operator and, for an operator other than an individual, the name of the authorized representative providing the notification.

(2) The physical address of the operator and, for an operator other than an individual, the physical address for the authorized representative. If the operator or authorized representative does not receive mail at the physical address, a mailing address must also be provided.

(3) The physical address of the operator in the United States.

(4) The telephone number(s) where the operator can be reached while in the United States.

(5) The email address of the operator or, for an operator other than an individual, the email address of the authorized representative.

(6) The aircraft manufacturer and model name.

(7) The serial number of the aircraft.

(8) The country of registration of the aircraft.

(9) The registration number of the aircraft.

(b) *Issuance of a Confirmation of Identification.*

(1) The FAA will issue a Confirmation of Identification upon completion of the notification requirements provided in paragraph (a) of this section.

(2) The filing of a notification under paragraph (a) of this section and the Confirmation of Identification issued under paragraph (b)(1) of this section do not have the effect of U.S. aircraft registration.

(c) *Proof of notification.* No person may operate a foreign registered civil unmanned aircraft in the United States unless the person obtains a Confirmation of Identification under paragraph (b)(1) of this section, maintains such Confirmation of Identification at the unmanned aircraft system's control station, and produces the Confirmation of Identification when requested by the FAA or a law enforcement officer.

(d) *Requirement to maintain current information.* The holder of a Confirmation of Identification must ensure that the information provided under § 89.130(a) remains accurate and must update the information prior to operating a foreign registered civil unmanned aircraft system in the United States.

§ 89.135 Record retention.

The Administrator shall require any Remote ID USS to retain any remote identification message elements listed in § 89.305 or § 89.315 obtained in the course of offering services to persons operating under this subpart for 6 months from the date when the remote identification message elements are received or otherwise come into the possession of the Remote ID USS.

Subpart C—FAA-Recognized Identification Areas

§ 89.201 Applicability.

This subpart prescribes procedural requirements to establish an FAA-recognized identification area.

§ 89.205 Eligibility.

Only a community based organization recognized by the Administrator may apply for the establishment of an FAA-recognized identification area under this subpart.

§ 89.210 Requests for establishment of an FAA-recognized identification area.

(a) *Application.* A community based organization requesting the establishment of an FAA-recognized identification area under this subpart must submit an application in a form and manner acceptable to the Administrator within 12 calendar months from [EFFECTIVE DATE OF FINAL RULE].

(b) *Required documentation.* A request under this subpart must contain the following information:

(1) The name of the community based organization making the request.

(2) A declaration that the person making the request has the authority to act on behalf of the community based organization.

(3) The name and contact information, including telephone number(s), of the primary point of contact for communications with the FAA.

(4) The physical address of the proposed FAA-recognized identification area.

(5) The latitude and longitude coordinates delineating the geographic boundaries of the proposed FAA-recognized identification area.

(6) If applicable, a copy of any existing letter of agreement regarding the flying site.

§ 89.215 Approval of FAA-recognized identification areas.

The Administrator will assess applications for FAA-recognized identification areas and may require additional information or documentation, as needed, to supplement an application. The Administrator will approve or deny an application, and may take into consideration matters such as, but not limited to:

(a) The effects on existing or contemplated airspace capacity.

(b) The effect on critical infrastructure, existing or proposed manmade objects, natural objects, or the existing use of the land, within or close to the proposed FAA-recognized identification area.

(c) The safe and efficient use of airspace by other aircraft.

(d) The safety and security of persons or property on the ground.

§ 89.220 Amendment.

(a) From the time of application until expiration or termination of an FAA-recognized identification area, any change to the information submitted in the application including but not limited to a change to the point of contact for the FAA-recognized identification area or a change to the

community based organization's affiliation with the FAA-recognized identification area must be submitted to the FAA within 10 calendar days of the change.

(b) If the community based organization wishes to change the geographic boundaries of the FAA-recognized identification area, the organization must submit the request to the FAA for review. The geographic boundaries of the FAA-recognized identification area will not change until they have been approved or denied in accordance with § 89.215.

(c) The establishment of an FAA-recognized identification area is subject to ongoing review by the Administrator. All changes to the information submitted in the application may be reviewed in accordance with § 89.215 and may result in the termination of the FAA-recognized identification area pursuant to § 89.230.

§ 89.225 Duration of an FAA-recognized identification area.

(a) *Duration.* An FAA-recognized identification area will be in effect for 48 calendar months after the date the FAA approves the request for establishment of an FAA-recognized identification area.

(b) *Renewal.* A person wishing to renew an FAA-recognized identification area must submit a request for renewal no later than 120 days prior to the expiration of the FAA-recognized identification area in a form and manner acceptable to the Administrator. The Administrator may deny requests submitted after that deadline or requests submitted after the expiration.

§ 89.230 Expiration and termination.

(a) *Expiration.* Unless renewed, an FAA-recognized identification area issued under this subpart will be automatically cancelled and will have no further force or effect as of the day immediately after its expiration date.

(b) *Termination prior to expiration*—(1) *Termination by request.* A community based organization may submit a request to the Administrator to terminate an FAA-recognized identification area issued under this subpart. Once an FAA-recognized identification area is terminated, that community based organization may not reapply to have that flying site reestablished as an FAA-recognized identification area, and neither may any other person apply to have that site reestablished as an FAA-recognized identification area.

(2) *Termination by FAA.* The FAA may terminate an FAA-recognized identification area for cause or upon a finding that the FAA-recognized identification area may pose a risk to aviation safety, public safety, or national security, a finding that the FAA-recognized identification area is no longer associated with a community based organization recognized by the Administrator, or a finding that the person who submitted a request for establishment of an FAA-recognized identification area provided false or misleading information during the submission, amendment, or renewal process. The Administrator will notify the primary point of contact of the decision to terminate the FAA-recognized identification area and the reasons for the termination. Except as provided in paragraph (c) of this section, once an FAA-recognized identification area is terminated, a community based organization may not apply to have that flying site established as an FAA-recognized identification area.

(c) *Petition to reconsider the FAA's decision to terminate an FAA-recognized identification area.* Within 30 calendar days of a termination under this section, the Administrator may be petitioned to reconsider the decision. That petition must state the reasons justifying the reconsideration and include any supporting documentation. Upon consideration of the information submitted by the petitioner, the Administrator will notify the petitioner of the decision.

(d) *Inapplicability of part 13, subpart D, of this chapter.* Part 13, subpart D, of this chapter does not apply to the procedures of paragraphs (b) and (c) of this section.

Subpart D—Requirements for Unmanned Aircraft Systems With Remote Identification

§ 89.301 Applicability.

This subpart prescribes the minimum message element set and minimum performance requirements for standard remote identification unmanned aircraft systems and limited remote identification unmanned aircraft systems.

§ 89.305 Minimum message elements broadcast and transmitted by standard remote identification unmanned aircraft systems.

A standard remote identification unmanned aircraft system must transmit the following remote identification message elements through an internet connection to a Remote ID USS and must broadcast the following remote identification message elements:

(a) The identity of the unmanned aircraft system consisting of:

(1) A serial number assigned to the unmanned aircraft by the person responsible for the production of the standard remote identification unmanned aircraft system; or

(2) A session ID assigned by a Remote ID USS.

(b) An indication of the latitude and longitude of the control station.

(c) An indication of the barometric pressure altitude of the control station.

(d) An indication of the latitude and longitude of the unmanned aircraft.

(e) An indication of the barometric pressure altitude of the unmanned aircraft.

(f) A time mark identifying the Coordinated Universal Time (UTC) time of applicability of a position source output.

(g) An indication of the emergency status of the unmanned aircraft system.

§ 89.310 Minimum performance requirements for standard remote identification unmanned aircraft systems.

A standard remote identification unmanned aircraft system must meet the following minimum performance requirements:

(a) *Control station location.* The location of the control station of the unmanned aircraft system must be generated and encoded into the message elements and must correspond to the location of the person manipulating the flight controls of the unmanned aircraft system.

(b) *Automatic Remote ID USS connection.* From takeoff to landing, the unmanned aircraft system must automatically maintain a connection to the internet and transmit the message elements through that internet connection to a Remote ID USS when the internet is available.

(c) *Time mark.* The time mark message element must be synchronized with all other remote identification message elements.

(d) *Self-Testing and monitoring.* (1) When the unmanned aircraft system is powered on, it must automatically test the remote identification functionality and notify the person manipulating the flight controls of the unmanned aircraft system of the result of the test.

(2) The unmanned aircraft must not be able to take off if the remote identification equipment is not functional.

(3) The unmanned aircraft system must continuously monitor the remote identification functionality from takeoff to landing and must provide notification of malfunction or failure to the person manipulating the flight controls of the unmanned aircraft system.

(e) *Tamper resistance.* The unmanned aircraft system must be designed and

produced in a way that reduces the ability of a person to tamper with the remote identification functionality.

(f) *Connectivity.* (1) If the internet is available at takeoff, the unmanned aircraft must not be able to take off unless it is:

(i) Connected to the internet and transmitting the message elements in § 89.305 through that internet connection to a Remote ID USS; and

(ii) Broadcasting the message elements in § 89.305 directly from the unmanned aircraft.

(2) If the internet is unavailable at takeoff, the unmanned aircraft must not be able to take off unless it is broadcasting the message elements in § 89.305.

(3) The unmanned aircraft system must continuously monitor its connection to the internet and the unmanned aircraft system's transmission of the remote identification message elements through that internet connection to a Remote ID USS. If the connection to the internet is lost or the unmanned aircraft system is no longer transmitting the remote identification message elements to a Remote ID USS, the unmanned aircraft system must notify the person manipulating the flight controls of the unmanned aircraft system.

(g) *Error correction.* The remote identification equipment must incorporate error correction in the transmission or broadcast of the message elements in § 89.305.

(h) *Interference considerations.* The remote identification equipment must not interfere with other systems or equipment installed on the unmanned aircraft system, and other systems or equipment installed on the unmanned aircraft system must not interfere with the remote identification equipment.

(i) *Message transmission.* (1) The unmanned aircraft system must be capable of transmitting the message elements for standard remote identification unmanned aircraft systems in § 89.305 through an internet connection to a Remote ID USS.

(2) The unmanned aircraft must be capable of broadcasting the message elements in § 89.305 using a non-proprietary broadcast specification and using radio frequency spectrum in accordance with part 15 of title 47, Code of Federal Regulations, where operations may occur without an FCC individual license that is compatible with personal wireless devices. Any broadcasting device used to meet the requirements of this section must be integrated into the unmanned aircraft without modification to its authorized radio frequency parameters and designed to maximize the range at which the broadcast can be received, while complying with 47 CFR part 15 and any other laws in effect as of the date the declaration of compliance is submitted to the FAA for acceptance.

(j) *Message elements performance requirements.* (1) The message elements in § 89.305 transmitted through an internet connection to a Remote ID USS from the unmanned aircraft system and broadcast from the unmanned aircraft must be identical.

(2) The reported position of the unmanned aircraft and the control station must be accurate to within 100 feet of the true position, with 95 percent probability.

(3) The reported barometric pressure altitude of the unmanned aircraft and control station must be accurate to within 20 feet of the true barometric pressure altitude for pressure altitudes ranging from 0 to 10,000 feet.

(4) The unmanned aircraft system must transmit through an internet connection to a Remote ID USS and broadcast the latitude, longitude, and barometric pressure altitude of the unmanned aircraft and its control station no later than 1.0 second from the time of measurement to the time of transmission and broadcast.

(5) The unmanned aircraft system must transmit through an internet connection to a Remote ID USS and broadcast the message elements at a rate of at least 1 message per second.

(k) *Cybersecurity.* The unmanned aircraft system must incorporate cybersecurity protections for the transmission and broadcast of the message elements in § 89.305.

§ 89.315 Minimum message elements transmitted by limited remote identification unmanned aircraft systems.

A limited remote identification unmanned aircraft system must transmit the following remote identification message elements through an internet connection to a Remote ID USS:

(a) The identity of the unmanned aircraft system consisting of:

(1) A serial number assigned to the unmanned aircraft by the person responsible for the production of the limited remote identification unmanned aircraft system; or

(2) A session ID assigned by a Remote ID USS.

(b) An indication of the latitude and longitude of the control station.

(c) An indication of the barometric pressure altitude of the control station.

(d) A time mark identifying the Coordinated Universal Time (UTC) time of applicability of a position source output.

(e) An indication of the emergency status of the unmanned aircraft system.

§ 89.320 Minimum performance requirements for limited remote identification unmanned aircraft systems.

A limited remote identification unmanned aircraft system must meet the following minimum performance requirements:

(a) *Control station location.* The location of the control station of the unmanned aircraft system must be generated and encoded into the message elements and must correspond to the location of the person manipulating the flight controls of the unmanned aircraft system.

(b) *Automatic Remote ID USS connection.* From takeoff to landing, the unmanned aircraft system must automatically maintain a connection to the internet, when available, and must transmit the appropriate message elements through that internet connection to a Remote ID USS.

(c) *Time mark.* The time mark message element must be synchronized with all other remote identification message elements.

(d) *Self-Testing and monitoring.* (1) When the unmanned aircraft system is powered on, it must automatically test the remote identification functionality and notify the person manipulating the flight controls of the unmanned aircraft system of the result of the test.

(2) The unmanned aircraft must not be able to take off if the remote identification equipment is not functional.

(3) The unmanned aircraft system must continuously monitor the remote identification functionality from takeoff to landing and must provide notification of malfunction or failure to the person manipulating the flight controls of the unmanned aircraft system.

(e) *Tamper resistance.* The unmanned aircraft system must be designed and produced in a way that reduces the ability of a person to tamper with the remote identification functionality.

(f) *Connectivity.* (1) The unmanned aircraft must not be able to take off unless it is connected to the internet and transmitting the message elements in § 89.315 through that internet connection to a Remote ID USS.

(2) The unmanned aircraft system must continuously monitor its connection to the internet and the unmanned aircraft system's transmission of the remote identification message elements through that internet connection to a Remote ID USS. If the connection to the internet is lost or the unmanned aircraft system is no longer transmitting the remote

identification message elements to a Remote ID USS, the unmanned aircraft system must notify the person manipulating the flight controls of the unmanned aircraft system.

(g) *Error correction.* The remote identification equipment must incorporate error correction in the transmission of the message elements in § 89.315.

(h) *Interference considerations.* The remote identification equipment must not interfere with other systems or equipment installed on the unmanned aircraft system, and other systems or equipment installed on the unmanned aircraft system must not interfere with the remote identification equipment.

(i) *Message transmission.* The unmanned aircraft system must be capable of transmitting the message elements for limited remote identification unmanned aircraft systems in § 89.315 through an internet connection to a Remote ID USS.

(j) *Message elements performance requirements.* (1) The reported position of the control station must be accurate to within 100 feet of the true position, with 95 percent probability.

(2) The reported barometric pressure altitude of the control station must be accurate to within 20 feet of the true barometric pressure altitude for pressure altitudes ranging from 0 to 10,000 feet.

(3) The unmanned aircraft system must transmit the latitude, longitude, and barometric pressure altitude of the control station no later than 1.0 second from the time of measurement to the time of transmission.

(4) The unmanned aircraft system must transmit the message elements at a rate of at least 1 message per second.

(k) *Cybersecurity.* The unmanned aircraft system must incorporate cybersecurity protections for the transmission of the message elements in § 89.315.

(l) *Range limitation.* The unmanned aircraft must be designed to operate no more than 400 feet from its control station.

(m) *Broadcast limitation.* The unmanned aircraft cannot broadcast any of the remote identification message elements identified in § 89.305 or § 89.315.

Subpart E—Means of Compliance

§ 89.401 Applicability.

This subpart prescribes—

(a) Requirements for means of compliance.

(b) Procedural requirements for the submission and acceptance of means of compliance used in the design and production of standard remote identification unmanned aircraft systems or limited remote identification unmanned aircraft systems to ensure such unmanned aircraft systems meet the minimum performance requirements of this part.

(c) Rules governing persons submitting means of compliance for FAA acceptance.

§ 89.405 Submission of a means of compliance for FAA acceptance.

(a) *Eligibility.* Any person may submit a means of compliance for acceptance by the FAA.

(b) *Required information.* A person requesting acceptance of a means of compliance must submit the following information to the FAA in a form and manner acceptable to the Administrator:

(1) The name of the person or entity submitting the means of compliance, the name of the main point of contact for communications with the FAA, the physical address, email address, and other contact information.

(2) A detailed description of the means of compliance.

(3) An explanation of how the means of compliance addresses all of the minimum performance requirements established in subpart D of this part so that any standard remote identification unmanned aircraft system or limited remote identification unmanned aircraft system designed and produced in accordance with such means of compliance meets the remote identification requirements of this part.

(4) Any substantiating material the person wishes the FAA to consider as part of the request.

(c) *Testing and validation.* A means of compliance submitted for acceptance by the FAA must include testing and validation procedures for persons responsible for the production of standard remote identification unmanned aircraft systems or limited remote identification unmanned aircraft systems to demonstrate through analysis, ground test, or flight test, as appropriate, how the standard remote identification unmanned aircraft system or the limited remote identification unmanned aircraft system performs its intended functions and meets the requirements in subpart D of this part, including any FAA performance requirements for radio station operation.

§ 89.410 Acceptance of a means of compliance.

(a) A person requesting acceptance of a means of compliance must demonstrate to the Administrator that the means of compliance addresses all of the requirements of subparts D and E of this part, and that any standard remote identification unmanned aircraft system or limited remote identification unmanned aircraft system designed and produced in accordance with such means of compliance would meet the performance requirements of subpart D of this part.

(b) The Administrator will evaluate a means of compliance that is submitted to the FAA and may request additional information or documentation, as needed, to supplement the means of compliance.

(c) If the Administrator determines the person has demonstrated that the means of compliance meets the requirements of subparts D and E, the FAA will notify the person that the Administrator has accepted the means of compliance. If the Administrator determines the person has not provided sufficient evidence to demonstrate that the means of compliance meets the requirements of subpart D or E, the FAA will notify the person that the Administrator has not accepted the means of compliance.

§ 89.415 Rescission.

(a) *Rescission of an FAA-accepted means of compliance.* (1) A means of compliance is subject to ongoing review by the Administrator. The Administrator may rescind its acceptance of a means of compliance if the Administrator determines that a means of compliance does not meet any or all of the requirements of subpart D or E of this part.

(2) The Administrator will publish a notice of rescission in the **Federal Register**.

(b) *Inapplicability of part 13, subpart D, of this chapter.* Part 13, subpart D, of this chapter does not apply to the procedures of paragraph (a) of this section.

§ 89.420 Record retention.

A person who submits a means of compliance that is accepted by the Administrator under this subpart must retain the following information for as long as the means of compliance is accepted plus an additional 24 calendar months, and must make available for inspection by the Administrator the following:

(a) All documentation and substantiating data submitted to the FAA for acceptance of the means of compliance.

(b) Records of all test procedures, methodology, and other procedures, as applicable.

(c) Any other information necessary to justify and substantiate how the means of compliance enables compliance with

the remote identification requirements of this part.

Subpart F—Design and Production of Unmanned Aircraft Systems With Remote Identification

§ 89.501 Applicability.

(a) This subpart prescribes—

(1) Requirements for the design and production of unmanned aircraft systems operated in the United States.

(2) Procedural requirements for the submission, acceptance, and rescission of declarations of compliance.

(3) Rules governing persons submitting declarations of compliance for FAA acceptance under this part.

(b) Except as provided in paragraph (c) of this section, this subpart applies to the design and production of unmanned aircraft systems operated in the United States.

(c) Unless the unmanned aircraft system is a standard remote identification unmanned aircraft system or a limited remote identification unmanned aircraft system, this subpart does not apply to the design or production of:

(1) Amateur-built unmanned aircraft systems.

(2) Unmanned aircraft systems of the United States Government.

(3) Unmanned aircraft systems where the unmanned aircraft weighs less than 0.55 pounds including the weight of anything attached to or carried by the aircraft.

(4) Unmanned aircraft systems designed or produced exclusively for the purpose of aeronautical research or to show compliance with regulations.

§ 89.505 Serial numbers.

Serial number required. No person may produce a standard remote identification unmanned aircraft system or a limited remote identification unmanned aircraft system unless the unmanned aircraft is issued a serial number that complies with ANSI/CTA–2063–A. ANSI/CTA–2063–A, *Small Unmanned Aerial Systems Serial Numbers* (September 2019) is incorporated by reference into this section with the approval of the Director of the Office of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. All approved material is available for inspection at the FAA's Office of Rulemaking (ARM–1), 800 Independence Avenue SW, Washington, DC 20590 (telephone 202–267–9677) and is available from Consumer Technology Association, 1919 South Eads Street, Arlington, VA 22202 or at *https://www.cta.tech*. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email *fedreg.legal@nara.gov,* or go to *www.archives.gov/federal-register/cfr/ibr-locations.html.*

§ 89.510 Production requirements.

(a) *General production requirements.* After [DATE 24 MONTHS AFTER THE EFFECTIVE DATE OF THE FINAL RULE], no person may produce an unmanned aircraft system unless:

(1) The unmanned aircraft system is designed and produced to meet the minimum performance requirements for standard remote identification unmanned aircraft systems established in § 89.310 or for limited remote identification unmanned aircraft systems established in § 89.320 and in accordance with an FAA-accepted means of compliance.

(2) The unmanned aircraft system meets the requirements of this subpart.

(3) The FAA has accepted a declaration of compliance for that unmanned aircraft system.

(b) *Inspection, audit, and notification requirements.* A person responsible for the production of standard remote identification unmanned aircraft systems or limited remote identification unmanned aircraft systems must:

(1) Upon request, allow the Administrator to inspect its facilities, technical data, and any standard remote identification unmanned aircraft system or limited remote identification unmanned aircraft system the person produces, and to witness any tests necessary to determine compliance with this subpart.

(2) Perform independent audits on a recurring basis, and whenever the FAA provides notice of noncompliance or of potential noncompliance, to demonstrate the unmanned aircraft systems listed under a declaration of compliance meet the requirements of this subpart. The person responsible for the production of standard remote identification unmanned aircraft systems or limited remote identification unmanned aircraft systems must provide the results of all such audits to the FAA upon request.

(3) Maintain product support and notification procedures to notify the public and the FAA of any defect or condition that causes an unmanned aircraft system to no longer meet the requirements of this subpart, within 15 calendar days of the date the person becomes aware of the defect or condition.

§ 89.515 Labeling.

No person may produce a standard remote identification unmanned aircraft system or a limited remote identification unmanned aircraft system unless it displays a label indicating that the unmanned aircraft system meets the remote identification requirements of this part and indicating whether the unmanned aircraft system is a standard remote identification unmanned aircraft system or a limited remote identification unmanned aircraft system. The label must be in English and be legible, prominent, and permanently affixed to the unmanned aircraft.

§ 89.520 Submission of a declaration of compliance for FAA acceptance.

(a) *Eligibility.* A person responsible for the production of standard remote identification unmanned aircraft systems or limited remote identification unmanned aircraft systems must submit a declaration of compliance for acceptance by the FAA.

(b) *Required information.* The person responsible for the production of a standard remote identification unmanned aircraft system or a limited remote identification unmanned aircraft system requesting acceptance of a declaration of compliance must declare that the unmanned aircraft system complies with the requirements of this subpart by submitting a declaration of compliance to the FAA in a form and manner acceptable to the Administrator. The declaration must include at a minimum the following information:

(1) The name, physical address, telephone number, and email address of the person responsible for production of the unmanned aircraft system.

(2) The unmanned aircraft system's make and model.

(3) The unmanned aircraft's serial number, or the range of serial numbers for which the person responsible for production is declaring compliance.

(4) The means of compliance used in the design and production of the unmanned aircraft system and whether the unmanned aircraft system is a standard remote identification unmanned aircraft system or a limited remote identification unmanned aircraft system.

(5) Whether the declaration of compliance is an initial declaration or an amended declaration, and if the declaration of compliance is an amended declaration, the reason for the amendment.

(6) A declaration that the person responsible for the production of the unmanned aircraft system:

(i) Can demonstrate that the unmanned aircraft system was designed and produced to meet the minimum performance requirements of § 89.310 or § 89.320 by using an FAA-accepted means of compliance.

(ii) Complies with the requirements of § 89.510(b).

(7) Statement that 47 CFR-compliant radio frequency equipment is used and is integrated into the unmanned aircraft system without modification to its authorized radio frequency parameters.

§ 89.525 Acceptance of a declaration of compliance.

(a) The Administrator will evaluate a declaration of compliance that is submitted to the FAA and may request additional information or documentation, as needed, to supplement the declaration of compliance.

(b) If the Administrator determines that the submitter has demonstrated compliance with the requirements of this subpart, the FAA will notify the submitter that the Administrator has accepted the declaration of compliance. If the Administrator determines the submitter has not demonstrated compliance, the FAA will notify the submitter that the Administrator has not accepted the declaration of compliance.

§ 89.530 Rescission and reconsideration.

(a) *Rescission of the FAA's acceptance of a declaration of compliance.* (1) A declaration of compliance is subject to ongoing review by the Administrator. The Administrator may rescind acceptance of a declaration of compliance under circumstances including but not limited to the following:

(i) A standard remote identification unmanned aircraft system or a limited remote identification unmanned aircraft system listed under an accepted declaration of compliance does not meet the minimum performance requirements of § 89.310 or § 89.320.

(ii) A previously FAA-accepted declaration of compliance does not meet any of the requirements of this subpart.

(iii) The FAA rescinds acceptance of the means of compliance listed in an FAA-accepted declaration of compliance.

(2) The Administrator will notify the person who submitted the FAA-accepted declaration of compliance of any issue of noncompliance.

(3) If the Administrator determines that it is in the public interest, prior to rescinding acceptance of a declaration of compliance, the Administrator may provide a reasonable period of time for the person who submitted the declaration of compliance to remediate the noncompliance. A failure to remediate the noncompliance constitutes cause for rescission of the FAA's acceptance of the declaration of compliance.

(4) The Administrator will notify the person who submitted the declaration of compliance of the decision to rescind acceptance of the declaration of compliance by publishing a notice of rescission in the **Federal Register**.

(b) *Petition to reconsider the FAA's decision to rescind acceptance of a declaration of compliance.* (1) The person who submitted the FAA-accepted declaration of compliance or any person adversely affected by the rescission of the Administrator's acceptance of a declaration of compliance may petition for a reconsideration of the decision by submitting a request to the FAA in a form and manner acceptable to the Administrator within 60 calendar days of the date of publication in the **Federal Register** of notification of rescission.

(2) A petition to reconsider the rescission of the Administrator's acceptance of a declaration of compliance must show that the petitioner is an interested party and has been adversely affected by the decision of the FAA. The petition must also demonstrate at least one of the following:

(i) The petitioner has a significant additional fact not previously presented to the FAA.

(ii) The Administrator made a material error of fact in the decision to rescind acceptance of the declaration of compliance.

(iii) The Administrator did not correctly interpret a law, regulation, or precedent.

(3) Upon consideration of the information submitted by the petitioner, the Administrator will notify the petitioner and the person who submitted the declaration of compliance (if different) of the decision to reinstate or to not reinstate the Administrator's acceptance of the declaration of compliance.

(c) *Inapplicability of part 13, subpart D, of this chapter.* Part 13, subpart D, of this chapter does not apply to the procedures of paragraphs (a) and (b) of this section.

§ 89.535 Record retention.

A person who submits a declaration of compliance under this subpart that is accepted by the Administrator must retain the following information for as long as the UAS listed on that declaration of compliance are produced plus an additional 24 calendar months, and must make available for inspection by the Administrator the following:

(a) The means of compliance, all documentation, and substantiating data related to the means of compliance used.

(b) Records of all test results.

(c) Any other information necessary to demonstrate compliance with the means of compliance so that the unmanned aircraft system meets the remote identification requirements and the design and production requirements of this part.

PART 91—GENERAL OPERATING AND FLIGHT RULES

■ 15. The authority citation for part 91 continues to read as follows:

Authority: 49 U.S.C. 106(f), 106(g), 40101, 40103, 40105, 40113, 40120, 44101, 44111, 44701, 44704, 44709, 44711, 44712, 44715, 44716, 44717, 44722, 46306, 46315, 46316, 46504, 46506–46507, 47122, 47508, 47528–47531, 47534, Pub. L. 114–190,130 Stat. 615 (49 U.S.C. 44703 note); articles 12 and 29 of the Convention on International Civil Aviation (61 Stat. 1180), (126 Stat. 11).

■ 16. Amend § 91.215 by revising paragraphs (b) introductory text and (c) and adding paragraph (e) to read as follows:

§ 91.215 ATC transponder and altitude reporting equipment and use.

* * * * *

(b) *All airspace.* Unless otherwise authorized or directed by ATC, and except as provided in paragraph (e)(1) of this section, no person may operate an aircraft in the airspace described in paragraphs (b)(1) through (5) of this section, unless that aircraft is equipped with an operable coded radar beacon transponder having either Mode 3/A 4096 code capability, replying to Mode 3/A interrogations with the code specified by ATC, or a Mode S capability, replying to Mode 3/A interrogations with the code specified by ATC and intermode and Mode S interrogations in accordance with the applicable provisions specified in TSO C–112, and that aircraft is equipped with automatic pressure altitude reporting equipment having a Mode C capability that automatically replies to Mode C interrogations by transmitting pressure altitude information in 100-foot increments. This requirement applies—

* * * * *

(c) *Transponder-on operation.* Except as provided in paragraph (e)(2) of this section, while in the airspace as specified in paragraph (b) of this section or in all controlled airspace, each person operating an aircraft equipped

with an operable ATC transponder maintained in accordance with § 91.413 of this part shall operate the transponder, including Mode C equipment if installed, and shall reply on the appropriate code or as assigned by ATC, unless otherwise directed by ATC when transmitting would jeopardize the safe execution of air traffic control functions.

* * * * *

(e) *Unmanned aircraft systems.* (1) The requirements of paragraph (b) of this section do not apply to a person operating an unmanned aircraft system under this part unless the operation is conducted under a flight plan and the person operating the unmanned aircraft system maintains two-way radio communication with ATC.

(2) No person may operate an unmanned aircraft system under this part with a transponder on unless:

(i) The operation is conducted under a flight plan and the person operating the unmanned aircraft system maintains two-way radio communication with ATC; or

(ii) The use of a transponder is otherwise authorized by the Administrator.

■ 17. Amend § 91.225 by revising paragraphs (a) introductory text, (b) introductory text, (d) introductory text, and (f) introductory text and adding paragraph (i) to read as follows:

§ 91.225 Automatic Dependent Surveillance-Broadcast (ADS–B) Out equipment and use.

(a) After January 1, 2020, except as provided in paragraph (i) of this section or unless otherwise authorized by ATC, no person may operate an aircraft in Class A airspace unless the aircraft has equipment installed that—

* * * * *

(b) After January 1, 2020, except as provided in paragraph (i) of this section or unless otherwise authorized by ATC, no person may operate an aircraft below 18,000 feet MSL and in airspace described in paragraph (d) of this section unless the aircraft has equipment installed that—

* * * * *

(d) After January 1, 2020, except as provided in paragraph (i) of this section or unless otherwise authorized by ATC, no person may operate an aircraft in the following airspace unless the aircraft has equipment installed that meets the requirements in paragraph (b) of this section:

* * * * *

(f) Except as provided in paragraph (i) of this section, each person operating an aircraft equipped with ADS–B Out must operate this equipment in the transmit mode at all times unless—

* * * * *

(i) For unmanned aircraft systems:

(1) The requirements of paragraph (b) of this section do not apply to a person operating an unmanned aircraft system under this part unless the operation is conducted under a flight plan and the person operating the unmanned aircraft system maintains two-way radio communication with ATC.

(2) No person may operate an unmanned aircraft system under this part with Automatic Dependent Surveillance-Broadcast Out equipment in transmit mode unless:

(i) The operation is conducted under a flight plan and the person operating the unmanned aircraft system maintains two-way radio communication with ATC; or

(ii) The use of ADS–B Out is otherwise authorized by the Administrator.

PART 107—SMALL UNMANNED AIRCRAFT SYSTEMS

■ 18. The authority citation for part 107 is revised to read as follows:

Authority: 49 U.S.C. 106(f), 40101 note, 40103(b), 44701(a)(5), 44807.

§ 107.53 [Redesignated as § 107.56]

■ 19. Redesignate § 107.53 as § 107.56.

■ 20. Add §§ 107.52 and new 107.53 to subpart B to read as follows:

§ 107.52 ATC transponder equipment prohibition.

Unless otherwise authorized by the Administrator, no person may operate a small unmanned aircraft system under this part with a transponder on.

§ 107.53 ADS–B Out Prohibition

Unless otherwise authorized by the Administrator, no person may operate a small unmanned aircraft system under this part with Automatic Dependent Surveillance-Broadcast (ADS–B) Out equipment in transmit mode.

Issued in Washington, DC, under the authority of 49 U.S.C. 106(f), 40101, 40103, 44701(a)(5), 44805, 44809, and section 2202 of Pub. L. 114–190, on December 20, 2019.

Steve Dickson,

Administrator.

[FR Doc. 2019–28100 Filed 12–26–19; 11:15 am]

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