ORAL ARGUMENT NOT YET SCHEDULED

No. 15-1075

IN THE UNITED STATES COURT OF APPEALS
DISTRICT OF COLUMBIA CIRCUIT

ELECTRONIC PRIVACY INFORMATION CENTER
Petitioner,

v.

The FEDERAL AVIATION ADMINISTRATION, MICHAEL P. HUERTA, in his official capacity as Administrator of the Federal Aviation Administration, and ANTHONY R. FOXX, in his official capacity as United States Secretary of Transportation,
Respondents.

On Appeal from an Order of the
Federal Aviation Administration

JOINT APPENDIX

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March 8, 2012

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U.S. Department of Transportation,
Docket Operations,
West Building Ground Floor, Room W12-140,
1200 New Jersey Avenue, SE.
Washington, DC 20590

To Whom It May Concern:

Per 14 C.F.R. § 11.63(a)(2), I am forwarding the enclosed petition, which was sent to the FAA Acting Administrator on February 24, 2012.

Thank you,

Amie Stepanovich
National Security Counsel
Electronic Privacy Information Center

February 24, 2012

Michael P. Huerta
Acting Administrator
United States Federal Aviation Administration
800 Independence Avenue, SW
Washington, D.C. 20591
Facsimile (202)-267-5289

Dear Administrator Huerta,

We the undersigned consumer rights, human rights, technology, and civil liberties organizations, members of the EPIC Advisory Board, and members of the general public submit this Petition to the Federal Aviation Administration ("FAA") to urge the Agency to conduct a rulemaking to address the threat to privacy and civil liberties that will result from the deployment of aerial drones within United States.[1] The FAA Modernization and Reform Act of 2012 provides a timely opportunity for you to address this critical question.[2]

Drone Use in the United States is Increasing

A "drone," or "unmanned aircraft," is an aerial vehicle designed to fly without a human pilot onboard. Current regulations only permit civil organizations to operate drones within the United States with an "experimental" designation.[3] Despite this limitation, many individuals have found the means to operate drones within the course of business.[4]

The Bureau of Customs and Border Protection ("CBP") currently operates nine drone vehicles, which were procured specifically to monitor the United States borders.[5] In 2011, CBP allowed a local law enforcement unit in North Dakota the use

[1] This is a petition under the Administrative Procedure Act. 5 U.S.C. § 553(e) (2011).
[2] FAA Modernization and Reform Act of 2012, Pub. L. 112-95 (2012), *available at* http://www.gpo.gov/fdsys/pkg/BILLS-112hr658enr/pdf/BILLS-112hr658enr.pdf.
[3] Unmanned Aircraft Operations in the National Airspace System, 14 C.F.R. 91 (2007), *available at* https://www.federalregister.gov/articles/2007/02/13/E7-2402/unmanned-aircraft-operations-in-the-national-airspace-system#p-12 ("Under FAA policy, operators who wish to fly an unmanned aircraft for civil use must obtain an FAA airworthiness certificate the same as any other type aircraft. The FAA is currently only issuing special airworthiness certificates in the experimental category.").
[4] Drones: Who is Watching You (ABC News 2012), *available at* http://news.yahoo.com/video/us-15749625/drones-who-is-watching-you-28326842.html.
[5] Press Release, United States Bureau of Customs and Border Protection, CBP Receives Fourth Predator-B in Arizona; Agency Now Operates 9 Unmanned Aircraft (Dec. 27, 2011), *available at* http://www.cbp.gov/xp/cgov/newsroom/news_releases/national/2011_news_archive/12272011.xml.

of a drone within the unit's normal operations.[6] This incident represented the first occasion where drone use resulted in an arrest of a U.S. Citizen.[7]

Many law enforcement agencies are acquiring drones that permit new forms of aerial surveillance.[8] In 2011, the Miami-Dade Police Department purchased a Honeywell T-hawk with funds from the federal stimulus.[9] Later that year, The Montgomery County Sheriff's Office in Texas purchased a ShadowHawk with a grant from the Department of Homeland Security ("DHS").[10] Drones are also used by police in South Carolina and Colorado, and drones may soon be used for surveillance in New York City.[11] Experts estimate that up to 30,000 new drones could be launched in the United States in the next decade.[12]

Drones Pose Substantial Threats to Privacy

Drones greatly increase the capacity for domestic surveillance.[13] Gigapixel cameras used to outfit drones are among the highest definition cameras available, and can "provide real-time video streams at a rate of 10 frames a second."[14] On some drones, operators can track up to 65 different targets across a distance of 65 square miles.[15] Drones may also carry infrared cameras, heat sensors, GPS, sensors

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[6] Brian Bennett, *Police Employ Predator Drone Spy Planes on Home Front*, Los Angeles Times (Dec. 10, 2011), http://articles.latimes.com/2011/dec/10/nation/la-na-drone-arrest-20111211.
[7] *Id.*
[8] Ana Campoy, *The Law's New Eye in the Sky; Police Departments' Use of Drones is Raising Concerns Over Privacy and Safety*, Wall Street Journal (Dec. 13, 2011), http://online.wsj.com/article/SB10001424052970204319004577088891361782010.html ("As of September, there were 285 active permits requested by 85 government groups, including public universities, federal law enforcement agencies, and police departments.").
[9] *Drone May be Coming to Miami-Dade*, WSVN-TV (Jan. 6, 2011), http://www.wsvn.com/news/articles/local/21003198189967/; *The Law's New Eye in the Sky*, *supra* note 8.
[10] Clay Dillow, *A Texas Sheriff's Department is Launching an Unmanned Helodrone that Could Carry Weapons*, PopSci (Nov. 3, 2011, 8:27 AM), *available at* http://www.popsci.com/technology/article/2011-11/texas-sheriffs-department-launching-unmanned-helo-could-carry-weapons.
[11] *The Law's New Eye in the Sky*, *supra* note 8; Brian Naylor, *Look, Up in the Sky! It's a Drone, Looking at You*, NPR (Dec. 5, 2011), http://www.npr.org/2011/12/05/143144146/drone-technology-finding-its-way-to-american-skies.
[12] Lynn Herman, *30,000 Drones in American Skies, Civil Liberties in Jeopardy*, Digital Journal (Feb. 13, 2012), http://www.digitaljournal.com/article/319564. One report attributes the number to the FAA itself. Shaun Waterman, *Drones over U.S. get OK from Congress*, The Washington Times (Feb. 7, 2012), http://www.washingtontimes.com/news/2012/feb/7/coming-to-a-sky-near-you/.
[13] *See* Jay Stanley and Catherine Crump, Protecting Privacy From Aerial Surveillance: Recommendations for Government Use of Drone Aircraft 4-6, 10-13 (American Civil Liberties Union 2011), *available at* http://www.aclu.org/files/assets/protectingprivacyfromaerialsurveillance.pdf.
[14] *US Army Unveils 1.8 Gigapixel Camera Helicopter Drone*, BBC News Technology (Dec. 29, 2011, 1:11 PM), http://www.bbc.co.uk/news/technology-16358851.
[15] *Id.*

that detect movement, and automated license plate readers.[16] In the near future these cameras may include facial recognition technology that would make it possible to remotely identify individuals in parks, schools, and at political gatherings.[17]

In addition, drones present a unique threat to privacy. Drones are designed to undertake constant, persistent surveillance to a degree that former methods of aerial surveillance were unable to achieve.[18] Also, "by virtue of their design, their size, and how high they can fly, [drones] can operate undetected in urban and rural environments."[19]

The increased use of drones poses an ongoing threat to every person residing within the United States.[20] Companies are developing "paparazzi drones" in order to follow and photograph celebrities.[21] Private detectives are starting to use drones to track their targets.[22] Google, inc. has deployed street-level drones in other countries to supplement the images of Street View.[23] Criminals and others may use drones for purposes of stalking and harassment.[24]

The consequences of increased government surveillance through the use of drones are even more troubling. The ability to link facial recognition capabilities on drone cameras to the FBI's Next Generation Identification database or DHS' IDENT

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[16] Customs and Border Protection Today, Unmanned Aerial Vehicles Support Border Security (July/Aug. 2004), *available at* http://www.cbp.gov/xp/CustomsToday/2004/Aug/other/aerial_vehicles.xml.

[17] Clay Dillow, *Army Developing Drones that Can Recognize Your Face From a Distance*, PopSci (Sept. 28, 2011, 4:01 PM), http://www.popsci.com/technology/article/2011-09/army-wants-drones-can-recognize-your-face-and-read-your-mind.

[18] *See* Noel McKeegan, *Raven UAV Demonstrates 30-hour Persistent Surveillance*, GizMag (Apr. 2, 2009, 6:35 AM), http://www.gizmag.com/raven-uav-demonstrates-30-hour-persistent-surveillance/11385/.

[19] Jennifer Lynch, *Are Drones Watching You*, Electronic Frontier Foundation (Jan. 10, 2012), *available at* https://www.eff.org/deeplinks/2012/01/drones-are-watching-you.

[20] *See* M. Ryan Calo, *The Drone as a Privacy Catalyst*, 64 Stan. L. Rev. Online 29 (2011), *available at* http://www.stanfordlawreview.org/online/drone-privacy-catalyst.

[21] Clay Dillow, *Plan for Celebrity-Stalking Paparazzi Drone Reveals New Roles for Unmanned Civilian Aircraft*, PopSci (Nov. 11, 2010, 12:01 PM), http://www.popsci.com/technology/article/2010-11/paparazzi-drone-reveals-emerging-roles-civilian-drone-aircraft.

[22] *See* Neal Ungerleider, *Unmanned Drones Go From Afghanistan to Hollywood*, FastCompany (Feb. 15, 2012), http://www.fastcompany.com/1816578/unmanned-drones-go-from-afghanistan-to-hollywood.

[23] *Micro Drones for Google?*, Google Blogoscoped (Aug. 7, 2010), http://blogoscoped.com/archive/2010-08-07-n43.html, citing to von Sebastian Matthes and Bernd Mertens, *Zivile Drohnen für Google*, Wirtschafts Woche (Aug. 7, 2010), http://www.wiwo.de/technologie/luftueberwachung-zivile-drohnen-fuer-google/5156046.html.

[24] W.J. Hennigan, *Idea of Civilians Using Drone Aircraft May Soon Fly with FAA*, Los Angeles Times (Nov. 27, 2011), http://articles.latimes.com/2011/nov/27/business/la-fi-drones-for-profit-20111127; *Plan for Celebrity-Stalking Paparazzi Drone Reveals New Roles for Unmanned Civilian Aircraft*, *supra* note 21.

database, two of the largest collections of biometric data in the world,[25] increases the First Amendment risks for would-be political dissidents. In addition, the use of drones implicates significant Fourth Amendment interests and well established common law privacy rights.[26] With special capabilities and enhanced equipment, drones are able to conduct far-more detailed surveillance, obtaining high-resolution picture and video, peering inside high-level windows, and through solid barriers, such as fences, trees, and even walls.

FAA Regulation of Drones

The FAA is required to "promote safe flight of civil aircraft."[27] The FAA Modernization and Reform Act requires the FAA to, within a certain amount of time, "develop a comprehensive plan" to implement drones into civil commerce.[28] The plan must "define the acceptable standards for operation" for civil drone use.[29] In addition, the FAA is required to "provide guidance on a public entity's responsibility when operating an unmanned aircraft."[30] Before May 14, 2012, the FAA must "simplify the process" by which government entities operate drones in the national airspace.[31] The FAA should also assess the privacy problems associated with the highly intrusive nature of drone aircraft, and the ability of operators to gain access to private areas and to track individuals over large distances.[32]

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[25] *See Next Generation Identification*, Federal Bureau of Investigation, http://www.fbi.gov/about-us/cjis/fingerprints_biometrics/ngi (last visited Feb. 17, 2012); Elizabeth Montalbano, *DHS Expands US-VISIT Biometric Capabilities*, Information Week (Dec. 22, 2011, 8:00 AM), http://www.informationweek.com/news/government/security/232200942.

[26] Many state governments have enacted legislation to protect individuals from the type of persistent surveillance that drones would facilitate. Sometimes called "Peeping Tom" laws, each state prohibits the intrusion upon a person's seclusion. *See Elements of an Intrusion Claim*, Citizen Media Law Project, http://www.citmedialaw.org/legal-guide/elements-intrusion-claim (last visited Feb. 21, 2012) *See also, e.g.* Cal. Civ. Code § 1708.8 (West 2011); Neb. Rev. Stat. § 20-203 (2011). Unlike trespass laws, intrusion does not require a physical trespass. *Id.* This is important since the United States has established that a person has no property rights in the airspace over their property. *See U.S. v. Causby*, 328 U.S. 256 (1946); *See also* 49 U.S.C. § 40103 (2011) ("The United States Government has exclusive sovereignty of airspace of the United States."). However, there is a possibility that certain drone operators may be guilty of common law trespass, particularly in regard to small-sized drones flying at low altitudes. *Id.* Many states have laws with even higher levels of privacy protection, such as California's regulation on the use of telephoto lenses to photograph private property. Cal. Civ. Code § 1708.8 (West 2011).

[27] 49 U.S.C. § 44701(a).

[28] FAA Modernization and Reform Act § 322(a)(1).

[29] FAA Modernization and Reform Act § 322 (a)(2)(B)(i).

[30] FAA Modernization and Reform Act § 324(a)(4).

[31] FAA Modernization and Reform Act § 324(c)(1).

[32] *See, e.g.*, Vehicle Safety Communications – Applications VSC-A 17 (National Highway Traffic Safety Administration 2011), *available at* http:// www.nhtsa.gov/DOT/NHTSA/NVS/.../2011/811466.pdf (Stating, "privacy of vehicle owners will need to be a primary component of DSRC-based vehicular communication." NHTSA is tasked with carrying out safety programs related to highways. *This is NHTSA: People Saving People*, National Highway Traffic Safety Administration, http://www.nhtsa.gov/About (last visited Feb. 22, 2012)); *See also* Caroline Broder, *Privacy Concerns Accompany Push for EMRs*, Healthcare IT News (Feb. 28, 2005), http://healthcareitnews.com/news/privacy-concerns-accompany-push-emrs ("Ensuring the privacy

Request for Agency Action

The privacy threat posed by the deployment of drone aircraft in the United States is great. The public should be given the opportunity to comment on this development. In light of the aforementioned considerations, the undersigned petition the FAA as follows:

1. The FAA should conduct a notice and comment rulemaking on the impact of privacy and civil liberties related to the use of drones in the United States. In order to adequately address all of the potential threats, the FAA should examine and report on the impact on privacy to individuals within the scope of their comprehensive plan to safely integrate civil drones into the national airspace, required under § 322(a) of the FAA Modernization and Reform Act.

2. The FAA should conduct a notice and comment rulemaking on the impact of privacy and civil liberties related to the use of drones by government operators pursuant to the agency actions required under § 324(c) of the FAA Modernization and Reform Act.

3. The notice and comment rulemakings should take into consideration the use and retention of data acquired by drone operators; the relation between drone operation and property rights; the ability of an individual to obtain a restraining order against a drone vehicle; and use limitations on drone vehicles and requirements for enforcement of those limitations. In relation to the government use of drones, the rulemakings should also consider the application of the Privacy Act of 1974 to the information gathered by drone operators.

Contact: Marc Rotenberg, EPIC Executive Director and Amie Stepanovich, EPIC National Security Counsel, EPIC, 1718 Connecticut Ave., NW, Suite 200, Washington, DC 20009. +1 202 483-1140.

Sincerely,

Organizations

American Civil Liberties Union
American Library Association
Bill of Rights Defense Committee
Center for Democracy and Technology
Center for Digital Democracy
Center for Financial Privacy and Human Rights

and security of electronic medical records could be one of the biggest challenges to public acceptance of EMRs.").

Center for National Security Studies
Center for the Study of Responsive Law
The Constitution Project
Consumer Watchdog
Council of American-Islamic Relations
Cyber Privacy Project
Defending Dissent Foundation
Demand Progress
Electronic Frontier Foundation
Electronic Privacy Information Center
Essential Information
Global Justice Clinic (New York University School of Law)
Government Accountability Project
Liberty Coalition
Muslim Public Affairs Council
National Association of Criminal Defense Lawyers
National Immigration Project at the National Lawyers Guild
OneAmerica
Patient Privacy Rights
Principled Action in Government
Privacy Activism
Privacy Camp
Privacy Rights Clearinghouse
Rights Working Group
Rutherford Institute
TakeBackWashington.org
U.S. Bill of Rights Foundation
World Privacy Forum

Members of the EPIC Advisory Board

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Signatures Added Subsequent to February 24, 2012

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South Asian Americans Leading Together (SAALT)

Cc: U.S. Department of Transportation
Docket Operations
West Building Ground Floor, Room W12-140
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regulations.gov
Your Voice in Federal Decision-Making

James Solomon

This is a Comment on the **Federal Aviation Administration** (FAA)
Other: **Electronic Privacy Information Center - Exemption/Rulemaking**

For related information, **Open Docket Folder**

Comment

I wish to submit my objections to the testing of unmanned aircraft (drones) in the southwest part of the state of Ohio. The FAA will get petitions from groups in southwest Ohio to allow for testing of unmanned aircraft.

The southwest part of Ohio is heavily populated and it would be extremely unwise to test unmanned aircraft where there is significant risk to people. There are much more safer areas to test unmanned aircraft in the US.

My main objection concerns privacy. Testing of drones would entail the testing of drone primary usage, namely surveillance. Manufacturers promises to regulate privacy themselves is not very reassuring. Furthermore, once approved for domestic flying who will be the watchdog for insuring privacy from private and government surveillance?

I therefore urge the FAA to limit unmanned aircraft testing to regions of the US with very low population density. Furthermore, any regulations regarding the use of unmanned aircraft, either by government or private entities, must safeguard constitutional rights.

Comment Period Closed

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Your Voice in Federal Decision-Making

Lewis Ellis

This is a Comment on the **Federal Aviation Administration** (FAA)
Other: **Electronic Privacy Information Center - Exemption/Rulemaking**

For related information, **Open Docket Folder**

Comment

As you consider regulations for drones please do not do the usual government knee jerk reaction and punish every professional person/company using them for their lively hood (and there are many of us). The vast majority of us respect privacy, the law, and the regulations currently in place.

There is a lot of buzz between us professionals and we are watching your progress on regulations. Punish those that are guilty of misuse and respect those that use it as it should be.

Thanks

Comment Period Closed

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U.S. Department
of Transportation
**Federal Aviation
Administration**

800 Independence Ave., S.W.
Washington, DC 20591

November 26, 2014

Mr. Marc Rotenburg
EPIC Executive Director
EPIC
1718 Connecticut Avenue, NW. Suite 200
Washington, DC 20009

Ms. Amie Stepanovich
EPIC National Security Counsel
EPIC
1718 Connecticut Avenue, NW. Suite 200
Washington, DC 20009

Dear Mr. Rotenburg and Ms. Stepanovich:

This is in response to your March 8, 2012 letter sent to the public docket (Docket No. FAA-2012-0306) petitioning the Federal Aviation Administration (FAA) to initiate rulemaking to address the threat of privacy and civil liberties that will result from the deployment of aerial drones within the United States.

In accordance with 14 CFR § 11.73, the FAA must use the following criteria when making a decision as to whether or not to amend current regulations based on a petition for rulemaking:

1) The immediacy of the safety or security concerns you raise;
2) The priority of other issues the FAA must deal with; and
3) The resources we have available to address these issues.

Each year, the FAA prioritizes its rulemaking projects based on issues that are crucial to the safety of the aviation community and the traveling public to ensure the FAA delivers the most value to the aviation system.

After reviewing your request, we have determined that the issue you have raised is not an immediate safety concern. Moreover, the FAA has begun a rulemaking addressing civil operation of small unmanned aircraft systems in the national airspace system. We will consider your comments and arguments as part of that project.

When the FAA does pursue rulemaking in this area in the future, you would be able to find out and track it through one of the two following websites:

- For significant rulemakings, you can find the status on the Department of Transportation's (DOT) website (http://www.dot.gov/regulations/report-on-significant-rulemakings).

- For non-significant rulemakings, you can find the status on the DOT's semi-annual regulatory agenda, through the Office of Management and Budget's (OMB) Office of Information and Regulatory Affair's (OIRA) Unified Agenda website (http://www.reginfo.gov/public/do/eAgendaMain).

For the reasons above, we are dismissing your petition for rulemaking in accordance with 14 CFR § 11.73.

Sincerely,

Lirio Liu
Director, Office of Rulemaking

FEDERAL REGISTER

Vol. 80 Monday,
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Part III

Department of Transportation

Federal Aviation Administration

14 CFR Parts 21, 43, 45, et al.
Operation and Certification of Small Unmanned Aircraft Systems; Proposed Rule

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Parts 21, 43, 45, 47, 61, 91, 101, 107, and 183

[Docket No.: FAA–2015–0150; Notice No. 15–01]

RIN 2120–AJ60

Operation and Certification of Small Unmanned Aircraft Systems

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: The FAA is proposing to amend its regulations to adopt specific rules to allow the operation of small unmanned aircraft systems in the National Airspace System. These changes would address the operation of unmanned aircraft systems, certification of their operators, registration, and display of registration markings. The proposed rule would also find that airworthiness certification is not required for small unmanned aircraft system operations that would be subject to this proposed rule. Lastly, the proposed rule would prohibit model aircraft from endangering the safety of the National Airspace System.

DATES: Send comments on or before April 24, 2015.

ADDRESSES: Send comments identified by docket number FAA–2015–0150 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 *www.regulations.gov,* as described in the system of records notice (DOT/ALL–14 FDMS), which can be reviewed at *www.dot.gov/privacy.*

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 the 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: For technical questions concerning this action, contact Lance Nuckolls, Office of Aviation Safety, Unmanned Aircraft Systems Integration Office, AFS–80, Federal Aviation Administration, 490 L'Enfant Plaza East, SW., Suite 3200, Washington, DC 20024; telephone (202) 267–8447; email *UAS-rule@faa.gov.*

For legal questions concerning this action, contact Alex Zektser, Office of Chief Counsel, International Law, Legislation, and Regulations Division, AGC–220, Federal Aviation Administration, 800 Independence Avenue SW., Washington, DC 20591; telephone (202) 267–3073; email *Alex.Zektser@faa.gov.*

SUPPLEMENTARY INFORMATION:

Authority for This Rulemaking

This rulemaking is promulgated under the authority described in the FAA Modernization and Reform Act of 2012 (Public Law 112–95). Section 333 of Public Law 112–95 directs the Secretary of Transportation [1] to determine whether ''certain unmanned aircraft systems may operate safely in the national airspace system.'' If the Secretary determines, pursuant to section 333, that certain unmanned aircraft systems may operate safely in the national airspace system, then the Secretary must ''establish requirements for the safe operation of such aircraft systems in the national airspace system.'' [2]

This rulemaking is also promulgated pursuant to 49 U.S.C. 40103(b)(1) and (2), which charge the FAA with issuing 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 prescribing regulations that the FAA finds necessary for safety in air commerce and national security.

Finally, the model-aircraft component of this rulemaking incorporates the statutory mandate in section 336(b) that preserves the FAA's authority, under 49 U.S.C. 40103(b) and 44701(a)(5), to pursue enforcement ''against persons operating model aircraft who endanger the safety of the national airspace system.''

List of Abbreviations and Acronyms Frequently Used in This Document

AC Advisory Circular
AGL Above Ground Level
ACR Airman Certification Representative
ARC Aviation Rulemaking Committee
ATC Air Traffic Control
CAFTA–DR Dominican Republic-Central America-United States Free Trade Agreement
CAR Civil Air Regulation
CFI Certified Flight Instructor
CFR Code of Federal Regulations
COA Certificate of Waiver or Authorization
DPE Designated Pilot Examiner
FR Federal Register
FSDO Flight Standards District Office
ICAO International Civil Aviation Organization
NAFTA North American Free Trade Agreement
NAS National Airspace System
NOTAM Notice to Airmen
NPRM Notice of Proposed Rulemaking
NTSB National Transportation Safety Board
PIC Pilot in Command
Pub. L. Public Law
PMA Parts Manufacturer Approval
TFR Temporary Flight Restriction
TSA Transportation Security Administration
TSO Technical Standard Order
UAS Unmanned Aircraft System
U.S.C. United States Code

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[1] The primary authority for this rulemaking is based on section 333 of Public Law 112–95 (Feb. 14, 2012). In addition, this rulemaking also relies on FAA statutory authorities. Thus, for the purposes of this rulemaking, the terms ''FAA,'' ''the agency,'' ''DOT,'' and ''the Secretary,'' are used synonymously throughout this document.

[2] Public Law 112–95, section 333(c). In addition, Public Law 112–95, section 332(b)(1) requires the Secretary to issue ''a final rule on small unmanned aircraft systems that will allow for civil operation of such systems in the national airspace system, to the extent the systems do not meet the requirements for expedited operational authorization under sections 333 of [Pub. L. 112–95].''

I. Executive Summary

A. Purpose of the Regulatory Action

This rulemaking proposes operating requirements to allow small unmanned aircraft systems (small UAS) to operate for non-hobby or non-recreational purposes. A small UAS consists of a small unmanned aircraft (which, as defined by statute, is an unmanned aircraft weighing less than 55 pounds [3]) and equipment necessary for the safe and efficient operation of that aircraft. The FAA has accommodated non-recreational small UAS use through various mechanisms, such as special airworthiness certificates, exemptions, and certificates of waiver or authorization (COA). This proposed rule would be the next phase of integrating small UAS into the NAS.

The following are examples of possible small UAS operations that could be conducted under this proposed framework:

- Crop monitoring/inspection;
- Research and development;
- Educational/academic uses;
- Power-line/pipeline inspection in hilly or mountainous terrain;
- Antenna inspections;
- Aiding certain rescue operations such as locating snow avalanche victims;
- Bridge inspections;
- Aerial photography; and
- Wildlife nesting area evaluations.

Because of the potential societally beneficial applications of small UAS, the FAA has been seeking to incorporate the operation of these systems into the national airspace system (NAS) since 2008. In April 2008, the FAA chartered the small UAS Aviation Rulemaking Committee (ARC). In April 2009, the ARC provided the FAA with recommendations on how small UAS could be safely integrated into the NAS. Since that time, the FAA has been working on a rulemaking to incorporate small UAS operations into the NAS.

In 2012, Congress passed the FAA Modernization and Reform Act of 2012 (Pub. L. 112–95). Section 333 of Public Law 112–95 directed the Secretary to determine whether UAS operations posing the least amount of public risk and no threat to national security could safely be operated in the NAS and if so, to establish requirements for the safe operation of these systems in the NAS, prior to completion of the UAS comprehensive plan and rulemakings required by section 332 of Public Law 112–95. As part of its ongoing efforts to integrate UAS operations in the NAS in accordance with section 332, and as authorized by section 333 of Public Law 112–95, the FAA is proposing to amend its regulations to adopt specific rules for the operation of small UAS in the NAS.

Based on our experience with the certification, exemption, and COA process, the FAA has developed the framework proposed in this rule to enable certain small UAS operations to commence upon adoption of the final rule and accommodate technologies as they evolve and mature. This proposed framework would allow small UAS operations for many different non-recreational purposes, such as the ones discussed previously, without requiring airworthiness certification, exemption, or a COA.

[3] Public Law 112–95, sec. 331(6).

B. Summary of the Major Provisions of the Regulatory Action

Specifically, the FAA is proposing to add a new part 107 to Title 14 Code of Federal Regulations (14 CFR) to allow for routine civil operation of small UAS in the NAS and to provide safety rules for those operations. Consistent with the statutory definition, the proposed rule defines small UAS as those UAS weighing less than 55 pounds. To mitigate risk, the proposed rule would limit small UAS to daylight-only operations, confined areas of operation, and visual-line-of-sight operations. This proposed rule also addresses aircraft registration and marking, NAS operations, operator certification, visual observer requirements, and operational limits in order to maintain the safety of the NAS and ensure that they do not pose a threat to national security. Below is a summary of the major provisions of the proposed rule.

SUMMARY OF MAJOR PROVISIONS OF PROPOSED PART 107

Operational Limitations	• Unmanned aircraft must weigh less than 55 lbs. (25 kg). • Visual line-of-sight (VLOS) only; the unmanned aircraft must remain within VLOS of the operator or visual observer. • At all times the small unmanned aircraft must remain close enough to the operator for the operator to be capable of seeing the aircraft with vision unaided by any device other than corrective lenses. • Small unmanned aircraft may not operate over any persons not directly involved in the operation. • Daylight-only operations (official sunrise to official sunset, local time). • Must yield right-of-way to other aircraft, manned or unmanned. • May use visual observer (VO) but not required. • First-person view camera cannot satisfy ''see-and-avoid'' requirement but can be used as long as requirement is satisfied in other ways. • Maximum airspeed of 100 mph (87 knots). • Maximum altitude of 500 feet above ground level. • Minimum weather visibility of 3 miles from control station. • No operations are allowed in Class A (18,000 feet & above) airspace. • Operations in Class B, C, D and E airspace are allowed with the required ATC permission. • Operations in Class G airspace are allowed without ATC permission • No person may act as an operator or VO for more than one unmanned aircraft operation at one time. • No operations from a moving vehicle or aircraft, except from a watercraft on the water. • No careless or reckless operations. • Requires preflight inspection by the operator. • A person may not operate a small unmanned aircraft if he or she knows or has reason to know of any physical or mental condition that would interfere with the safe operation of a small UAS. • Proposes a microUAS category that would allow operations in Class G airspace, over people not involved in the operation, and would require airman to self-certify that they are familiar with the aeronautical knowledge testing areas.
Operator Certification and Responsibilities	• Pilots of a small UAS would be considered ''operators''. • Operators would be required to: ○ Pass an initial aeronautical knowledge test at an FAA-approved knowledge testing center. ○ Be vetted by the Transportation Security Administration. ○ Obtain an unmanned aircraft operator certificate with a small UAS rating (like existing pilot airman certificates, never expires). ○ Pass a recurrent aeronautical knowledge test every 24 months. ○ Be at least 17 years old. ○ Make available to the FAA, upon request, the small UAS for inspection or testing, and any associated documents/records required to be kept under the proposed rule. ○ Report an accident to the FAA within 10 days of any operation that results in injury or property damage. ○ Conduct a preflight inspection, to include specific aircraft and control station systems checks, to ensure the small UAS is safe for operation.
Aircraft Requirements	• FAA airworthiness certification not required. However, operator must maintain a small UAS in condition for safe operation and prior to flight must inspect the UAS to ensure that it is in a condition for safe operation. Aircraft Registration required (same requirements that apply to all other aircraft). • Aircraft markings required (same requirements that apply to all other aircraft). If aircraft is too small to display markings in standard size, then the aircraft simply needs to display markings in the largest practicable manner.
Model Aircraft	• Proposed rule would not apply to model aircraft that satisfy all of the criteria specified in section 336 of Public Law 112–95. • The proposed rule would codify the FAA's enforcement authority in part 101 by prohibiting model aircraft operators from endangering the safety of the NAS.

Operator Certification: Under the proposed rule, the person who manipulates the flight controls of a small UAS would be defined as an ''operator.'' A small UAS operator would be required to pass an aeronautical knowledge test and obtain an unmanned aircraft operator certificate with a small UAS rating from the FAA before operating a small UAS. In order to maintain his or her operator certification, the operator would be

required to pass recurrent knowledge tests every 24 months subsequent to the initial knowledge test. These tests would be created by the FAA and administered by FAA-approved knowledge testing centers. Although a specific distant vision acuity standard is not being proposed, this proposed rule would require the operator to keep the small unmanned aircraft close enough to the control station to be capable of seeing that aircraft through his or her unaided (except for glasses or contact lenses) visual line of sight. The operator would also be required to actually maintain visual line of sight of the small unmanned aircraft if a visual observer is not used.

Visual Observer: Under the proposed rule, an operator would not be required to work with a visual observer, but a visual observer could be used to assist the operator with the proposed visual-line-of-sight and see-and-avoid requirements by maintaining constant visual contact with the small unmanned aircraft in place of the operator. While an operator would always be required to have the capability for visual line of sight of the small unmanned aircraft, this proposed rule would not require the operator to exercise this capability if he or she is augmented by at least one visual observer. No certification requirements are being proposed for visual observers. A small UAS operation would not be limited in the number of visual observers involved in the operation, but the operator and visual observer(s) must remain situated such that the operator and any visual observer(s) are all able to view the aircraft at any given time. The operator and visual observer(s) would be permitted to communicate by radio or other communication-assisting device, so they would not need to remain in close enough physical proximity to allow for unassisted oral communication.

Since the operator and any visual observers would be required to be in a position to maintain or achieve visual line of sight with the aircraft at all times, the proposed rule would effectively prohibit a relay or ''daisy-chain'' formation of multiple visual observers by requiring that the operator must always be capable of seeing the small unmanned aircraft. Such arrangements would potentially expand the area of a small UAS operation and pose an increased public risk if there is a loss of aircraft control.

Operational Scope: A small UAS operator would be required to see and avoid all other users of the NAS in the area in which the small UAS is operating. The proposed rule contains operating restrictions designed to help ensure that the operator is able to yield right-of-way to other aircraft at all times.

The proposed rule would limit the exposure of small unmanned aircraft to other users of the NAS by restricting small UAS operations in controlled airspace. Specifically, small UAS would be prohibited from operating in Class A airspace, and would require prior permission from Air Traffic Control to operate in Class B, C, or D airspace, or within the lateral boundaries of the surface area of Class E airspace designated for an airport. The risk of collision with other aircraft would be further reduced by limiting small UAS operations to a maximum airspeed of 87 knots (100 mph) and a maximum altitude of 500 feet above ground.

Further, in order to enable maximum visibility for small UAS operation, the proposed rule would restrict small UAS to daylight-only operations (sunrise to sunset), and impose a minimum weather-visibility of 3 statute miles (5 kilometers) from the small UAS control station.

Aircraft Maintenance: Under the proposed rule, the operator of a small UAS would be required to conduct a preflight inspection before each flight operation, and determine that the small UAS (aircraft, control station, launch and recovery equipment, etc.) is safe for operation.

Airworthiness: Pursuant to section 333(b)(2) of Public Law 112–95, the Secretary has determined that small UAS subject to this proposed rule would not require airworthiness certification because the safety concerns associated with small UAS operation would be mitigated by the other provisions of this proposed rule. Rather, this proposed rule would require the operator to ensure that the small UAS is in a condition for safe operation by conducting an inspection prior to each flight.

Registration and Marking: This proposed rule would apply to small unmanned aircraft the current registration requirements that apply to all aircraft. Once a small unmanned aircraft is registered, this proposed rule would require that aircraft to display its registration marking in a manner similar to what is currently required of all aircraft.

C. Costs and Benefits

This proposed rule reflects the fact that technological advances in small UAS have led to a developing commercial market for their uses by providing a safe operating environment for them and for other aircraft in the NAS. In time, the FAA anticipates that the proposed rule would provide an opportunity to substitute small UAS operations for some higher risk manned flights, such as inspecting towers, bridges, or other structures. The use of small unmanned aircraft would avert potential fatalities and injuries to those in the aircraft and on the ground. It would also lead to more efficient methods of performing certain commercial tasks that are currently performed by other methods. The FAA has not quantified the benefits for this proposed rulemaking because we lack sufficient data. The FAA invites commenters to provide data that could be used to quantify the benefits of this proposed rule.

For any commercial operation occurring because this rule is enacted, the operator/owner of that small UAS will have determined the expected revenue stream of the flights exceeds the cost of the flights operation. In each such case this rule helps enable new markets to develop.

The costs are shown in the table below.

TOTAL AND PRESENT VALUE COST SUMMARY BY PROVISION

[Thousands of current year dollars]

Type of cost	Total costs (000)	7% P.V. (000)
Applicant/small UAS operator:		
Travel Expense	$151.7	$125.9
Knowledge Test Fees	2,548.6	2,114.2
Positive Identification of the Applicant Fee	434.3	383.7
Owner:		
Small UAS Registration Fee	85.7	70.0
Time Resource Opportunity Costs:		

TOTAL AND PRESENT VALUE COST SUMMARY BY PROVISION—Continued

[Thousands of current year dollars]

Type of cost	Total costs (000)	7% P.V. (000)
Applicants Travel Time	296.1	245.3
Knowledge Test Application	108.9	90.2
Physical Capability Certification	20.0	17.7
Knowledge Test Time	1,307.1	1,082.9
Small UAS Registration Form	220.5	179.7
Change of Name or Address Form	14.9	12.3
Knowledge Test Report	154.9	128.5
Pre-flight Inspection	Not quantified	
Accident Reporting	Minimal cost	
Government Costs:		
TSA Security Vetting	1,026.5	906.9
FAA—sUAS Operating Certificate	39.6	35.0
FAA—Registration	394.3	321.8
Total Costs	6,803.1	5,714.0

* Details may not add to row or column totals due to rounding.

II. Background

This NPRM addresses the operation, airman certification, and registration of civil small UAS.

A small UAS consists of a small unmanned aircraft and associated elements that are necessary for the safe and efficient operation of that aircraft in the NAS. Associated elements that are necessary for the safe and efficient operation of the aircraft include the interface that is used to control the small unmanned aircraft (known as a control station) and communication links between the control station and the small unmanned aircraft. A small unmanned aircraft is defined by statute as ''an unmanned aircraft weighing less than 55 pounds.'' [4] Due to the size of a small unmanned aircraft, the FAA envisions considerable potential business and non-business applications, particularly in areas that are hard to reach for a manned aircraft.

The following are examples of possible small UAS operations that could be conducted under this proposed framework:

- Crop monitoring/inspection;
- Research and development;
- Educational/academic uses;
- Power-line/pipeline inspection in hilly or mountainous terrain;
- Antenna inspections;
- Aiding certain rescue operations such as locating snow avalanche victims;
- Bridge inspections;
- Aerial photography; and
- Wildlife nesting area evaluations.

The following sections discuss: (1) The public risk associated with small UAS operations; (2) the current legal framework governing small UAS operations; and (3) the FAA's ongoing efforts to incorporate small UAS operations into the NAS.

A. Analysis of Public Risk Posed by Small UAS Operations

Small UAS operations pose risk considerations that are different from the risk considerations associated with manned-aircraft operations. On one hand, certain operations of a small unmanned aircraft, discussed more fully in section III.D of this preamble, have the potential to pose significantly less risk to persons and property than comparable operations of a manned aircraft. The typical total takeoff weight of a general aviation aircraft is between 1,300 and 6,000 pounds. By contrast, the total takeoff weight of a small unmanned aircraft is less than 55 pounds. Consequently, because a small unmanned aircraft is significantly lighter than a manned aircraft, in the event of a mishap, the small unmanned aircraft would pose significantly less risk to persons and property on the ground. As such, a small UAS operation whose parameters are well defined so it does not pose a significant risk to other aircraft would also pose a smaller overall public risk or threat to national security than the operation of a manned aircraft.

However, even though small UAS operations have the potential to pose a lower level of public risk in certain types of operations, the unmanned nature of the small UAS operations raises two unique safety concerns that are not present in manned-aircraft operations. The first safety concern is whether the person operating the small unmanned aircraft, who would be physically separated from that aircraft during flight, would have the ability to see manned aircraft in the air in time to prevent a mid-air collision between the small unmanned aircraft and another aircraft. As discussed in more detail below, the FAA's regulations currently require each person operating an aircraft to maintain vigilance ''so as to see and avoid other aircraft.'' [5] This is one of the fundamental principles for collision avoidance in the NAS.

For manned-aircraft operations, ''see and avoid'' is the responsibility of persons on board an aircraft. By contrast, small unmanned aircraft operations have no human beings physically on the unmanned aircraft with the same visual perspective and the ability to see other aircraft in the manner of a manned-aircraft pilot. Thus, the challenge for small unmanned aircraft operations is to ensure that the person operating the small unmanned aircraft is able to see and avoid other aircraft.

In considering this issue, the FAA examined to what extent existing technology could provide a solution to this problem. The FAA notes that advances in technologies that use ground-based radar and aircraft sensors to detect the reply signals from aircraft ATC transponders have provided significant improvement in the ability to detect other aircraft in close proximity to each other. The Traffic Collision Avoidance System also has the ability to provide guidance to flight crews to maneuver appropriately to avoid a mid-air collision. Both of these technologies have done an excellent job in reducing the mid-air collision rate between manned aircraft. Unfortunately, the equipment required to utilize these widely available technologies is

[4] Sec. 331(6) of Public Law 112–95.

[5] 14 CFR 91.113(b).

currently too large and heavy to be used in small UAS operations. Until this equipment is miniaturized to the extent necessary to make it viable for use in small UAS operations, existing technology does not appear to provide a way to resolve the ''see and avoid'' problem with small UAS operations without maintaining human visual contact with the small unmanned aircraft during flight.

The second safety concern with small UAS operations is the possibility that, during flight, the person operating the small UAS may become unable to use the control interface to operate the small unmanned aircraft due to a failure of the control link between the aircraft and the operator's control station. This is known as a loss of positive control. This situation may result from a system failure or because the aircraft has been flown beyond the signal range or in an area where control link communication between the aircraft and the control station is interrupted. A small unmanned aircraft whose flight is unable to be directly controlled could pose a significant risk to persons, property, or other aircraft.

B. Current Statutory and Regulatory Structure Governing Small UAS

Due to the lack of an onboard pilot, small unmanned aircraft are unable to see and avoid other aircraft in the NAS. Therefore, small UAS operations conflict with the FAA's current operating regulations codified in 14 CFR part 91 that apply to general aviation. Specifically, at the heart of the part 91 operating regulations is § 91.113(b), which requires each person operating an aircraft to maintain vigilance ''so as to see and avoid other aircraft.''

The FAA created this requirement in a 1968 rulemaking that combined two previous aviation regulatory provisions, Civil Air Regulations (CAR) §§ 60.13(c) and 60.30.[6] Both of the provisions that were combined to create the ''see and avoid'' requirement of § 91.113(b) were intended to address aircraft collision-awareness problems by requiring that a pilot on board the aircraft look out of the aircraft during flight to observe whether other aircraft are on a collision path with his or her aircraft. Those provisions did not contemplate the use of technology to substitute for the human vision of a pilot on board the aircraft. Similarly, there is no evidence that those provisions contemplated a pilot fulfilling his or her ''see and avoid'' responsibilities from outside the aircraft. To the contrary, CAR section 60.13(c) stated that one of the problems it intended to address was ''preoccupation by the pilot with cockpit duties,'' which indicates that the regulation contemplated the presence of a pilot on board the aircraft.

Because the regulations that resulted in the see-and-avoid requirement of § 91.113(b) did not contemplate that this requirement could be complied with by a pilot who is outside the aircraft, § 91.113(b) currently requires an aircraft pilot to have the perspective of being inside the aircraft as that aircraft is moving in order to see and avoid other aircraft. Since the operator of a small UAS does not have this perspective, operation of a small UAS could not meet the see and avoid requirement of § 91.113(b) at this time.

In addition to currently being prohibited by § 91.113(b), there are also statutory considerations that apply to small UAS operations. Specifically, even though a small UAS is different from a manned aircraft, the operation of a small UAS still involves the operation of an aircraft. This is because the FAA's statute defines an ''aircraft'' as ''any contrivance invented, used, or designed to navigate or fly in the air.'' 49 U.S.C. 40102(a)(6). Since a small unmanned aircraft is a contrivance that is invented, used, and designed to fly in the air, a small unmanned aircraft is an aircraft for purposes of the FAA's statutes.[7]

Because a small UAS involves the operation of an ''aircraft,'' this triggers the FAA's registration and certification statutory requirements. Specifically, subject to certain exceptions, a person may not operate a civil aircraft that is not registered. 49 U.S.C. 44101(a). In addition, a person may not operate a civil aircraft in air commerce without an airworthiness certificate. 49 U.S.C. 44711(a)(1). Finally, a person may not serve in any capacity as an airman on a civil aircraft being operated in air commerce without an airman certificate. 49 U.S.C. 44711(a)(2)(A).[8]

The term ''air commerce,'' as used in the FAA's statutes, is defined broadly to include ''the operation of aircraft within the limits of a Federal airway, or the operation of aircraft that directly affects, or may endanger safety in foreign or interstate air commerce.'' 49 U.S.C. 40102(a)(3). Because of this broad definition, the National Transportation Safety Board (NTSB) has held that ''any use of an aircraft, for purpose of flight, constitutes air commerce.'' [9] Courts that have considered this issue have reached similar conclusions that ''air commerce,'' as defined in the FAA's statute, encompasses a broad range of commercial and non-commercial aircraft operations.[10]

Accordingly, because ''air commerce'' encompasses such a broad range of aircraft operations, a civil small unmanned aircraft cannot currently be operated, for purposes of flight, if: (1) It is not registered (49 U.S.C. 44101(a)); (2) it does not possess an airworthiness certificate (49 U.S.C. 44711(a)(1)); and (3) the airman operating the aircraft does not possess an airman certificate (49 U.S.C. 44711(a)(2)(A)). However, the FAA's current processes for issuing airworthiness and airman certificates were designed to be used for manned aircraft and do not take into account the considerations associated with civil small UAS.

Specifically, obtaining a type certificate and a standard airworthiness certificate, which permits the widest range of aircraft operation, currently takes about 3 to 5 years. Because the pertinent existing regulations do not differentiate between manned and unmanned aircraft, a small UAS is currently subject to the same airworthiness certification process as a manned aircraft. However, it is not practically feasible for many small UAS manufacturers to go through the certification process required of manned aircraft. This is because small UAS technology is rapidly evolving at this time, and consequently, if a small UAS manufacturer goes through a 3-to-5-year process to obtain a type certificate, which enables the issuance of a standard airworthiness certificate, the small UAS would be technologically outdated by the time it completed the certification process. For example, advances in lightweight battery technology may allow new lightweight transponders and power sources within the next 3 to 5 years that are currently unavailable for small UAS operations.

The FAA notes that there are several other certification options available to

[6] *Pilot Vigilance,* 33 FR 10505 (July 24, 1968).

[7] Public Law 112–95 reaffirmed that an unmanned aircraft is indeed an aircraft by defining an unmanned aircraft as ''an *aircraft* that is operated without the possibility of direct human intervention from within or on the aircraft.'' Sec. 331(8), Public Law 112–95 (emphasis added).

[8] The statutes also impose other requirements that are beyond the scope of this rulemaking. For example, 49 U.S.C. 44711(a)(4) prohibits a person from operating as an air carrier without an air-carrier operating certificate.

[9] *Administrator* v. *Barrows,* 7 N.T.S.B. 5, 8–9 (1990).

[10] *See, e.g., United States* v. *Healy,* 376 U.S. 75, 84–85 (1964) (holding that ''air commerce'' is not limited to commercial airplanes); *Hill* v. *NTSB,* 886 F.2d 1275, 1280 (10th Cir. 1989) (''[t]he statutory definition of ''air commerce'' is therefore clearly not restricted to interstate flights occurring in controlled or navigable airspace''); *United States* v. *Drumm,* 55 F. Supp. 151, 155 (D. Nev. 1944) (''any operation of any aircraft in the air space either directly affects or may endanger safety in, interstate, overseas, or foreign air commerce'').

small UAS manufacturers and operators who do not wish to go through the process of obtaining a type certificate and standard airworthiness certificate. However, because each of these options has significant limitations, these options do not provide flexibility for most routine small UAS operations. These certification options are as follows:

- A special airworthiness certificate in the experimental category may be issued to UAS pursuant to 14 CFR 21.191–21.195. This certificate is time-limited, and cannot be used for any activities other than research and development, market surveys, and crew training.
- A special flight permit may be issued pursuant to 14 CFR 21.197. At this time, however, a special flight permit for a UAS is limited to production flight testing of new production aircraft.[11]
- A special airworthiness certificate in the restricted category is issued pursuant to 14 CFR 21.25(a). There are two options for obtaining this certificate.

First, pursuant to § 21.25(a)(2), a certificate may be issued for aircraft accepted by an Armed Force of the United States and later modified for a special purpose.

Second, pursuant to § 21.25(a)(1), a certificate may be issued for aircraft used in special purpose operations, which consist of:

(1) agricultural operations;
(2) forest and wildlife conservation;
(3) aerial surveying;
(4) patrolling (pipelines, power lines, and canals);
(5) weather control;
(6) aerial advertising; and
(7) any other operation specified by the FAA.

As can be seen from the above list, the current certification options are limited to very specific purposes. Accordingly, they do not provide sufficient flexibility for most routine civil small UAS operations within the NAS.

In addition to obtaining an airworthiness certificate, any person serving as an airman in the operation of a small UAS must obtain an airman certificate. 49 U.S.C. 44711(a)(2)(A). The statute defines an ''airman'' to include an individual who is ''in command, or as pilot, mechanic, or member of the crew, who navigates aircraft when under way.'' 49 U.S.C. 40102(a)(8)(A). Because the person operating the small UAS is in command and is a member of the crew who navigates the aircraft, that person is an airman and must obtain an airman certificate.

Under current pilot certification regulations, depending on the type of operation, the operator of the small UAS currently must obtain either a private pilot certificate or a commercial pilot certificate. A private pilot certificate cannot be used to operate a small UAS for compensation or hire unless the flight is only incidental to the operator's business or employment.[12] Typically, to obtain a private pilot certificate, the small UAS operator currently has to: (1) Receive training in specific aeronautical knowledge areas; (2) receive training from an authorized instructor on specific areas of aircraft operation; (3) obtain a minimum of 40 hours of flight experience; and (4) obtain a third-class airman medical certificate.[13] Conversely, holding at least a commercial pilot certificate allows the small UAS to generally be used for compensation or hire, but is more difficult to obtain. In addition to the requirements necessary to obtain a private pilot certificate, applicants for a commercial pilot certificate currently need to also obtain 250 hours of flight time, satisfy extensive testing requirements, and obtain a second-class airman medical certificate.[14]

While these airman certification requirements are necessary for manned aircraft operations, they impose an unnecessary burden for many small UAS operations. This is because a person typically obtains a private or commercial pilot certificate by learning how to operate a manned aircraft. Much of that knowledge would not be applicable to small UAS operations because a small UAS is operated differently than a manned aircraft. In addition, the knowledge currently necessary to obtain a private or commercial pilot certificate would not equip the certificate holder with the tools necessary to safely operate a small UAS. Specifically, applicants for a private or commercial pilot certificate currently are not trained in how to deal with the ''see-and-avoid'' and loss-of-positive-control safety issues that are unique to small unmanned aircraft. Thus, requiring persons wishing to operate a small UAS to obtain a private or commercial pilot certificate imposes the cost of certification on those persons, but does not result in a significant safety benefit because the process of obtaining the certificate does not equip those persons with the tools necessary to mitigate the public risk posed by small UAS operations.

Recognizing the problem of applying the operating rules of part 91 to small UAS operations and the cost imposed on small UAS operations by existing certification processes, the FAA fashioned a temporary solution. Specifically, the FAA issued an advisory circular (AC) 91–57 and a policy statement elaborating on AC 91–57, which provide guidance for the safe operation of ''model aircraft.'' The policy statement defines a ''model aircraft'' as a UAS that is used for hobby or recreational purposes.[15] The policy statement explains that AC 91–57:

> [E]ncourages good judgment on the part of operators so that persons on the ground or other aircraft in flight will not be endangered. The AC contains among other things, guidance for site selection. Users are advised to avoid noise sensitive areas such as parks, schools, hospitals, and churches. Hobbyists are advised not to fly in the vicinity of spectators until they are confident that the model aircraft has been flight tested and proven airworthy. Model aircraft should be flown below 400 feet above the surface to avoid other aircraft in flight. The FAA expects that hobbyists will operate these recreational model aircraft within visual line-of-sight.[16]

Neither AC 91–57 nor the associated policy statement contains any registration or certification requirements.[17]

To date, the FAA has used its discretion[18] to not bring enforcement action against model-aircraft operations that comply with AC 91–57. However, the use of discretion to permit continuing violation of FAA statutes and regulations is not a viable long-term solution for incorporating UAS operations into the NAS. Additionally, because AC 91–57 and the associated policy statement are limited to model aircraft, they do not apply to non-recreational UAS operations. Thus, even with the use of enforcement discretion, because of the difficulty of obtaining the

[11] A special flight permit for production flight testing is not limited to small UAS and can be obtained for unmanned aircraft weighing more than 55 pounds. We emphasize, however, that a special flight permit is limited at this time to production flight testing and will include operational requirements and limitations.

[12] *See* 14 CFR 61.113.

[13] *See* 14 CFR part 61, Subpart E and § 61.23(a)(3)(i).

[14] *See* 14 CFR part 61, Subpart F and § 61.23(a)(2).

[15] *See Unmanned Aircraft Operations in the National Airspace System,* 72 FR 6689, 6690 (Feb. 13, 2007) (explaining how AC 91–57 functions).

[16] *Id.*

[17] The policy statement did, however, explain the COA process that is currently used to allow public aircraft operations with UAS. This process is discussed in detail in section III.C of this preamble. As discussed in that section, this proposed rule would allow public aircraft operations with UAS to voluntarily comply with proposed part 107, but would otherwise leave the existing public aircraft operations COA process unchanged.

[18] As used in this context, ''discretion'' refers to the FAA's power to decide whether to commence an enforcement action.

requisite certification for a small UAS and because operation of a small UAS would violate the see-and-avoid requirement of § 91.113(b), non-recreational civil small UAS operations are effectively prohibited at this time.

C. Integrating Small UAS Operations Into the NAS

To address the issues discussed above, the FAA chartered the small UAS Aviation Rulemaking Committee (ARC) on April 10, 2008. On April 1, 2009, the ARC provided the FAA with recommendations on how small UAS could be safely integrated into the NAS.[19] In 2013, the U.S. Department of Transportation issued a comprehensive plan and subsequently the FAA issued a roadmap of its efforts to achieve safe integration of UAS operations into the NAS.[20]

In 2012, Congress passed the FAA Modernization and Reform Act of 2012 (Pub. L. 112–95). In section 332(b) of Public Law 112–95, Congress directed the Secretary to issue a final rule on small unmanned aircraft systems that will allow for civil operations of such systems in the NAS.[21] In section 333 of Public Law 112–95, Congress also directed the Secretary to determine whether ''certain unmanned aircraft systems may operate safely in the national airspace system.'' To make a determination under section 333, we must assess ''which types of unmanned aircraft systems, if any, as a result of their size, weight, speed, operational capability, proximity to airports and populated areas, and operation within visual line of sight do not create a hazard to users of the national airspace system or the public or pose a threat to national security.'' Public Law 112–95, Sec. 333(b)(1). The Secretary must also determine whether a certificate of waiver or authorization, or airworthiness certification is necessary to mitigate the public risk posed by the unmanned aircraft systems that are under consideration. Public Law 112–95, Sec. 333(b)(2). If the Secretary determines that certain unmanned aircraft systems may operate safely in the NAS, then the Secretary must ''establish requirements for the safe operation of such aircraft systems in the national airspace system.'' Public Law 112–95, Sec. 333(c). The flexibility provided for in section 333 did not extend to airman certification and security vetting, aircraft marking, or registration requirements.

As noted above, section 333(b)(2) provided the Secretary of Transportation with discretionary power as to whether airworthiness certification should be required for certain small UAS.[22] As discussed previously, the FAA's statute normally requires an aircraft being flown outdoors to possess an airworthiness certificate.[23] However, subsection 333(b)(2) allows for the determination that airworthiness certification is not necessary for certain small UAS. The key determinations that must be made in order for UAS to operate under the authority of section 333 are: (1) The operation must not create a hazard to users of the national airspace system or the public; and (2) the operation must not pose a threat to national security.[24] In making these determinations, we must consider the following factors: Size, weight, speed, operational capability, proximity to airports and populated areas, and operation within visual line of sight. Of these factors, operation within visual line of sight is a primary factor for evaluation. At this point in time, we have determined that technology has not matured to the extent that would allow small UAS to be used safely in lieu of visual line of sight without creating a hazard to other users of the NAS or the public, or posing a threat to national security.

This construction of section 333 is a reasonable interpretation that is consistent with the statutory text and reflects Congressional intent in adopting the provision. We invite comments on whether there are well-defined circumstances and conditions under which operation beyond the line of sight would pose little or no additional risk to other users of the NAS, the public, or national security. Finally, we invite comments on the technologies and operational capabilities or procedures needed to allow UAS flights beyond visual line of sight, and how such technologies, capabilities and procedures could be accommodated under this rule or in a future rulemaking.

As a result of its ongoing integration efforts, the FAA seeks to change its regulations to take the first step in the process of integrating small UAS operations into the NAS. This proposal would utilize the airworthiness-certification flexibility provided by Congress in section 333 of Public Law 112–95, and allow some small UAS operations to commence in the NAS.[25]

In addition, to further facilitate the integration of UAS into the NAS, the FAA has selected six test sites to test UAS technology and operations. As of August 2014, all of the UAS test sites, which were selected based on geographic and climatic diversity, are operational and will remain in place for the next 5 years to help us gather operational data to foster further integration, as well as evaluate new technologies. In addition, the FAA is in the process of selecting a new UAS Center of Excellence which will also serve as another resource for these activities. The FAA invites comments on how it can improve or further leverage its test site program to encourage innovation, safe development and UAS integration into the NAS.

III. Discussion of the Proposal

As discussed in the previous section, in order to determine whether certain UAS may operate safely in the NAS pursuant to section 333, the Secretary must find that the operation of the UAS would not: (1) Create a hazard to users of the NAS or the public; or (2) pose a threat to national security. The Secretary must also determine whether small UAS operations subject to this proposed rule pose a safety risk sufficient to require airworthiness certification. The following preamble sections discuss the specific components of this proposed rule, and in section III.J below, we explain how these components work together and allow the Secretary to make the statutory findings required by section 333.

A. Incremental Approach and Privacy

The FAA began its small UAS rulemaking in 2005. In its initial approach to this rulemaking, which the FAA utilized from 2005 until November 2013, the FAA attempted to implement the ARC's recommendations and craft a rule that encompassed the widest possible range of small UAS operations. This approach utilized a regulatory structure similar to the one that the FAA uses for manned aircraft. Specifically, small UAS operations that pose a low risk to people, property, and other

[19] A copy of the small UAS ARC Report and Recommendations can be found in the docket for this rulemaking.

[20] *http://www.faa.gov/about/initiatives/uas/media/uas_roadmap_2013.pdf*

[21] As discussed in more detail further in the preamble, the FAA Modernization and Reform Act of 2012 also contained a provision prohibiting the FAA from issuing rules and regulations for model aircraft meeting certain criteria specified in section 336 of the Act.

[22] Public Law 112–95, sec. 333(b)(2).

[23] 49 U.S.C. 44711(a)(1).

[24] Public Law 112–95, sec. 333(b)(1).

[25] As discussed in section III.B.6 below, 14 CFR part 107 that would be created by this proposed rule would not apply to model aircraft that satisfy all of the statutory criteria specified in section 336 of Public Law 112–95. The FAA has recently published an interpretive rule for public comment explaining the statutory criteria of section 336. *See Interpretation of the Special Rule for Model* Aircraft, 79 FR 36172, 36175 (June 25, 2014).

aircraft would have been subject to less stringent regulation while small UAS operations posing a greater risk would have been subject to more stringent regulation in order to mitigate the greater risk.

In exploring this approach, the FAA found that, as discussed previously, there are two unique safety issues associated with UAS: (1) Extending ''see and avoid'' anti-collision principles to a pilot that is not physically present on the aircraft; and (2) loss of positive control of the unmanned aircraft. In addition, at the time that it was considering this approach, the FAA did not have the discretion necessary to exempt these aircraft from the statutory requirement for airworthiness certification, as the section 333 authority did not come into effect until February 14, 2012. As a result of these issues, the FAA's original broadly-scoped approach to the rulemaking effort took significantly longer than anticipated. Consequently, the FAA decided to proceed with multiple incremental UAS rules rather than a single omnibus rulemaking in order to utilize the flexibility with regard to airworthiness certification that Congress provided in section 333.

Accordingly, at this time, the FAA is proposing a rule that, pursuant to section 333 of Public Law 112–95, will integrate small UAS operations posing the least amount of risk. Because these operations pose the least amount of risk, this proposed rule would treat the entire spectrum of operations that would be subject to this rule in a similar manner by imposing less stringent regulatory burdens that would ensure that the safety and security of the NAS would not be reduced by operation of these UAS. In the meantime, the FAA will continue working on integrating UAS operations that pose greater amounts of risk, and will issue notices of proposed rulemaking for those operations once the pertinent issues have been addressed, consistent with the approach set forth in the UAS Comprehensive Plan for Integration and FAA roadmap for integration.[26] Once the entire integration process is complete, the FAA envisions the NAS populated with UAS that operate well beyond the operational limits proposed in this rule. Those UAS will be regulated differently than the UAS that would be integrated through this rule, and will be addressed in subsequent rulemakings. The FAA has selected this approach because it would allow lower-risk small UAS operations to be incorporated into the NAS immediately instead of waiting until the issues associated with higher-risk UAS operations are resolved.

The approach of this proposal is meant to address low risk operations; to the greatest extent possible, it takes a data-driven, risk-based approach to defining specific regulatory requirements for small UAS operations. It is well understood that regulations that are articulated in terms of the desired outcomes (*i.e.,* ''performance standards'') are generally preferable to those that specify the means to achieve the desired outcomes (*i.e.,* ''design'' standards). According to Office of Management and Budget Circular A–4 (''Regulatory Analysis''), performance standards ''give the regulated parties the flexibility to achieve the regulatory objectives in the most cost-effective way.'' [27]

Design standards have a tendency to lock in certain approaches that limit the incentives to innovate and may effectively prohibit new technologies altogether. The distinction between design and performance standards is particularly important where technology is evolving rapidly, as is the case with small UAS.

In this proposal, the regulatory objectives are to enable integration of small UAS into the NAS in a manner that does not impose unacceptable risk to other aircraft, people, or property. The FAA seeks comment on whether there are additional requirements that could be specified in ways that are more performance-oriented in order to minimize any disincentives to develop new technologies that achieve the regulatory objectives at lower cost.

Recently, the FAA, with the approval of the Secretary, has been issuing exemptions in accordance with 14 CFR part 11 and section 333 of Public Law 112–95 to accommodate an increasing number of small UAS operations that are not for hobby or recreational purposes. If adopted, this rule will eliminate the need for the vast majority of these exemptions. The exemption process will continue to be available for UAS operations that fall outside the parameters of this rule. Such operations may involve the use of more advanced technologies that are not yet mature at the time of this rulemaking.

The FAA also notes that, because UAS-associated technologies are rapidly evolving at this time, new technologies could come into existence after this rule is issued or existing technologies may evolve to the extent that they establish a level of reliability sufficient to allow those technologies to be relied on for risk mitigation. These technologies may alleviate some of the risk concerns that underlie the provisions of this rulemaking like the line of sight rule. Accordingly, the FAA invites comments as to whether the final rule should relax operating restrictions on small UAS equipped with technology that addresses the concerns underlying the operating limitations of this proposed rule, for instance through some type of deviation authority (such as a letter of authorization or a waiver).

The FAA also notes that privacy concerns have been raised about unmanned aircraft operations. Although these issues are beyond the scope of this rulemaking, recognizing the potential implications for privacy and civil rights and civil liberties from the use of this technology, and consistent with the direction set forth in the Presidential Memorandum, *Promoting Economic Competitiveness While Safeguarding Privacy, Civil Rights, and Civil Liberties in Domestic Use of Unmanned Aircraft Systems* (February 15, 2015), the Department and FAA will participate in the multi-stakeholder engagement process led by the National Telecommunications and Information Administration (NTIA) to assist in this process regarding privacy, accountability, and transparency issues concerning commercial and private UAS use in the NAS. We also note that state law and other legal protections for individual privacy may provide recourse for a person whose privacy may be affected through another person's use of a UAS.

The FAA conducted a privacy impact assessment (PIA) of this rule as required by 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 assessment considers any impacts of the proposed rule on the privacy of information in an identifiable form. The FAA has determined that this proposed rule would impact the FAA's handling of personally identifiable information (PII). As part of the PIA that the FAA conducted as part of this rulemaking, the FAA analyzed the effect this impact might have on collecting, storing, and

[26] Section 332(a) of Public Law 112–95 requires the Secretary of Transportation to develop a comprehensive plan to safely accelerate the integration of civil UAS into the NAS. This plan must be developed in consultation with representatives of the aviation industry, federal agencies that employ UAS technology in the NAS, and the UAS industry. Section 332(a) also requires the Secretary of Transportation to develop a 5-year roadmap for the introduction of civil UAS into the NAS. Both the comprehensive plan and the roadmap were published in November 2013.

[27] *http://www.whitehouse.gov/sites/default/files/omb/assets/regulatory_matters_pdf/a-4.pdf*

U.S. Department of Transportation

Federal Aviation Administration

Office of the Administrator

800 Independence Ave., S.W.
Washington, D.C. 20591

November 1, 2012

The Honorable Howard P. McKeon
House of Representatives
Washington, DC 20515

Dear Congressman McKeon:

Thank you for your August 1 letter, cosigned by your congressional colleagues, about the establishment of the six Unmanned Aircraft Systems (UAS) test sites as required by the FAA Modernization and Reform Act of 2012, as well as the Federal Aviation Administration's (FAA) coordination with other agencies as we work towards integrating UAS into the National Airspace System (NAS).

As you know, the FAA's primary mission is, and will continue to be, safety. This responsibility encompasses managing our current activities to keep the people, aircraft, and property in the world's most complex airspace system safe while ensuring that the introduction of UAS into this airspace system is thoughtfully planned and carefully managed.

The FAA is making progress in a number of areas related to UAS. For example, the Agency has streamlined the process for public agencies to safely fly UAS in the Nation's airspace, as required under the FAA Reauthorization. In addition, in March 2012, the Agency created a new UAS integration office, headed by a single executive that brings together specialists from the aviation safety and air traffic organizations. The office serves as the FAA's one-stop portal for all matters related to civil and public use of UAS in U.S. airspace.

The six UAS test sites are an important component of our research and development efforts. As such, we must ensure we understand the many operational challenges we may encounter before requesting proposals. Examples of such considerations include: training requirements, operational specifications, and technology concerns. These areas of research will support developing our regulatory approach for the integration of UAS operations into the NAS.

Once the FAA Reauthorization was enacted, we moved swiftly to establish the UAS Test Site Program. The program was established on March 9, well in advance of the August 12 deadline, when we published a Request for Comments (RFC) about the test sites. Since publishing the RFC, the FAA's UAS Integration Office has been working diligently to establish the framework for test site selection, including the development of the Screening Information Request (SIR).

The U.S. Department of Defense (DoD) has assisted the FAA in developing the SIR and will provide subject matter experts to assist throughout the process.

Our target was to have the six test sites named by the end of 2012. However, increasing the use of UAS in our airspace also raises privacy issues, and these issues will need to be addressed as unmanned aircraft are safely integrated. We are working to move forward with the proposals for the six test sites as we evaluate options with our interagency partners to appropriately address privacy concerns regarding the expanded use of UAS.

A key element of our integration efforts is working closely with DoD and the National Aeronautics and Space Administration (NASA) through the Joint Planning and Development Office (JPDO). One of the major activities in this area is development of the UAS Comprehensive Plan. This plan will integrate four key cross-agency components: the JPDO UAS National Goals, the FAA UAS Concept of Operations, the FAA UAS Integration Roadmap, and the JPDO UAS Research and Development Prioritization.

In addition to JPDO activities, we are also working with Agency partners through the UAS Executive Committee (ExCom). The mission of the multi-agency UAS ExCom is to enable increased and ultimately routine access of Federal UAS engaged in public aircraft operations in the NAS to support operational, training, developmental, and research requirements of the FAA, DoD, NASA, and the U.S. Department of Homeland Security.

The FAA will complete its statutory obligations to integrate UAS into the NAS as quickly and efficiently as possible. However, we must fulfill those obligations in a thoughtful, prudent manner that ensures safety, addresses privacy issues, and promotes economic growth.

We have sent an identical letter to each of the cosigners of your letter.

If I can be of further assistance, please contact me or Roderick D. Hall, Assistant Administrator for Government and Industry Affairs, at (202) 267-3277.

Sincerely,

Michael P. Huerta
Acting Administrator

U.S. Department of Transportation
Federal Aviation Administration

Integration of Civil Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS) Roadmap

First Edition – 2013

November 7, 2013

Dear Members of the Aviation Community:

I am pleased to present the Federal Aviation Administration's (FAA) Roadmap for *Integration of Civil Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS)*. The FAA and the UAS Aviation Rulemaking Committee (ARC) worked together for the past year to produce this roadmap. Unmanned aircraft offer new ways for commercial enterprises and public operators to increase operational efficiency, decrease costs, and enhance safety; and this roadmap will allow us to safely and efficiently integrate them into the NAS.

The FAA is committed to the safe and efficient integration of UAS into the NAS. However, as safety is our top priority, UAS integration must be accomplished without reducing existing capacity, decreasing safety, impacting current operators, or placing other airspace users or persons and property on the ground at increased risk. We have made great progress in accommodating public UAS operations, but challenges remain for the safe, long-term integration of both public and civil UAS in the NAS.

This roadmap outlines the actions and considerations needed to enable UAS integration into the NAS. The roadmap also aligns proposed FAA actions with Congressional mandates from the *FAA Modernization and Reform Act of 2012*. This plan also provides goals, metrics, and target dates for the FAA and its government and industry partners to use in planning key activities for UAS integration.

We will update the specific implementation details (goals, metrics, target dates) as we learn from our current UAS operations, leverage ongoing research, and incorporate the work of our government and industry partners in all related areas.

Thank you for your continued support and active participation in the safe and efficient integration of UAS in the NAS.

Michael P. Huerta
Administrator

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Executive Summary

Expanding Operations of Unmanned Aircraft Systems in the NAS

Since the early 1990s, unmanned aircraft systems (UAS) have operated on a limited basis in the National Airspace System (NAS). Until recently, UAS mainly supported public operations, such as military and border security operations. The list of potential uses is now rapidly expanding to encompass a broad range of other activities, including aerial photography, surveying land and crops, communications and broadcast, monitoring forest fires and environmental conditions, and protecting critical infrastructures. UAS provide new ways for commercial enterprises (civil operations) and public operators to enhance some of our nation's aviation operations through increased operational efficiency and decreased costs, while maintaining the safety of the NAS.

As stated in *Destination 2025* (2011):

> *"The Federal Aviation Administration's (FAA) mission is to provide the safest, most efficient aviation system in the world. What sets the United States apart is the size and complexity of our infrastructure, the diversity of our user groups, our commitment to safety and excellence, and a history of innovation and leadership in the world's aviation community. Now we are working to develop new systems and to enhance a culture that increases the safety, reliability, efficiency, capacity, and environmental performance of our aviation system."*

Ultimately, UAS must be integrated into the NAS without reducing existing capacity, decreasing safety, negatively impacting current operators, or increasing the risk to airspace users or persons and property on the ground any more than the integration of comparable new and novel technologies.

The FAA created the Unmanned Aircraft Systems Integration Office to facilitate integration of UAS safely and efficiently into the NAS. Toward that goal, the FAA is collaborating with a broad spectrum of stakeholders, which includes manufacturers, commercial vendors, industry trade associations, technical standards organizations, academic institutions, research and development centers, governmental agencies, and other regulators. Ultimately, UAS must be integrated into the NAS without reducing existing capacity, decreasing safety, negatively impacting current operators, or increasing the risk to airspace users or persons and property on the ground any more than the integration of comparable new and novel technologies. Significant progress has been made toward UAS-NAS integration, with many challenges and opportunities ahead.

A key activity of the FAA is to develop regulations, policy, procedures, guidance material, and training requirements to support safe and efficient UAS operations in the NAS, while coordinating with relevant departments and agencies to address related key policy areas of concern such as privacy and national security. Today, UAS are typically given access to airspace through the issuance of Certificates of Waiver or Authorization (COA) to public operators and special airworthiness certificates in the experimental category for civil applicants. Accommodating UAS operations by the use of COAs and special airworthiness certificates will transition to more routine integration processes when new or revised operating rules and procedures are in place and UAS are capable of complying with them. The FAA has a proven certification process in place for aircraft that includes establishing special conditions when new and unique technologies are involved. This process will be used to evaluate items unique to UAS. In those parts of the NAS that have demanding communications, navigation, and surveillance performance requirements, successful demonstration of UAS to meet these requirements will be necessary.

The process of developing regulations, policy, procedures, guidance material, and training requirements, is resource-intensive. This roadmap will illustrate the significant undertaking it is to build the basis for the NAS to transition from UAS *accommodation* to UAS *integration*. Government and industry stakeholders must work collaboratively and apply the necessary resources to bring this transition to fruition while supporting evolving UAS operations in the NAS.

The purpose of this roadmap is to outline, within a broad timeline, the tasks and considerations needed to enable UAS integration into the NAS for the planning purposes of the broader UAS community. The roadmap also aligns proposed Agency actions with the Congressional mandate in the *FAA Modernization and Reform Act of 2012,* Pub. L. 112-95. As this is the first publication of this annual document, the FAA will incorporate lessons learned and related findings in subsequent publications, which will include further refined goals, metrics, and target dates.

The FAA is committed to the safe and efficient integration of UAS into the NAS, thus enabling this emerging technology to safely achieve its full potential.

Purpose and Background of Civil UAS Roadmap

1 Purpose and Background of Civil UAS Roadmap

Unmanned aircraft systems (UAS) and operations have significantly increased in number, technical complexity, and sophistication during recent years without having the same history of compliance and oversight as manned aviation. Unlike the manned aircraft industry, the UAS community does not have a set of standardized design specifications for basic UAS design that ensures safe and reliable operation in typical civilian service applications. As a result, the UAS community often finds it difficult to apply existing FAA guidance. In some cases, interpretation of regulations and/or standards may be needed to address characteristics unique to UAS. Ultimately, the pace of integration will be determined by the ability of industry, the user community, and the FAA to overcome technical, regulatory, and operational challenges. The purpose of this roadmap is to outline, within a broad timeline, the tasks and considerations needed to enable UAS integration into the National Airspace System (NAS) for the planning purposes of the broader UAS community. The roadmap also aligns proposed Agency actions with the Congressional mandate in the *FAA Modernization and Reform Act of 2012,* Pub. L. 112-95.

To gain full access to the NAS, UAS need to be able to bridge the gap from existing systems requiring accommodations to future systems that are able to obtain a standard airworthiness certificate

This five-year roadmap, as required by the *FAA Modernization and Reform Act of 2012* (FMRA), is intended to guide aviation stakeholders in understanding operational goals and aviation safety and air traffic challenges when considering future investments. The roadmap is organized into three perspectives that highlight the multiple paths used to achieve the milestones outlined, while focusing on progressive accomplishments. These three perspectives — *Accommodation, Integration,* and *Evolution* — transcend specific timelines and examine the complex relationship of activities necessary to integrate UAS into the NAS. These three perspectives will be explored in more detail in Section 2.2.4.

Although the FMRA requires a five-year UAS roadmap, it is important to view UAS-NAS integration not only in terms of near-term activities and objectives, but also in the context of mid- and long-term timeframes. The timeframes used in this roadmap are defined in the President's National Aeronautics Research and Development Plan, which specifies less than 5 years as the near-term, 5-10 years as the mid-term, and greater than 10 years as the long-term. For this roadmap, the long-term is defined as

1

2022-2026, which is consistent with the Joint Planning and Development Office (JPDO) *National Airspace System Concept of Operations and Vision for the Future of Aviation and NextGen Air Transportation System Integrated Plan*.

Integration of UAS into the NAS will require: review of current policies, regulations, environmental impact, privacy considerations, standards, and procedures; identification of gaps in current UAS technologies and regulations, standards, policies, or procedures; development of new technologies and new or revised regulations, standards, policies, and procedures; and the associated development of guidance material, training, and certification of aircraft systems, propulsion systems, and airmen. The FAA will coordinate these integration activities with other United States Government agencies, as needed, through the Interagency Planning Committee (IPC).

1.1 History of UAS

Historically, unmanned aircraft have been known by many names including: "drones," "remotely piloted vehicles (RPV)," "unmanned aerial vehicles (UAV)," "models," and "radio control (R/C) aircraft." Today, the term UAS is used to emphasize the fact that separate system components are required to support airborne operations without a pilot onboard the aircraft. Early UAS operations received little attention from the FAA and its predecessor agencies due to the infrequency of operations, which were mostly conducted in remote locations or in special use airspace and were not deemed to impact the safety of the NAS. In the past two decades, the number of unmanned aircraft operations has been increasing dramatically, highlighting the need for a structured approach for safe and efficient integration.

1.2 Proposed Civil and Commercial Applications

The use of UAS in commercial applications is expected to expand in a number of areas (see Operational Services and Environment Definition (OSED) for Unmanned Aircraft Systems (UAS), RTCA DO-320, 2010). Some of the currently proposed civil and commercial applications of UAS include:

- Security awareness;
- Disaster response, including search and support to rescuers;
- Communications and broadcast, including news/sporting event coverage;
- Cargo transport;
- Spectral and thermal analysis;
- Critical infrastructure monitoring, including power facilities, ports, and pipelines;
- And commercial photography, aerial mapping and charting, and advertising.

1.3 Definitions

Several terms used in this document are defined below as a common point of reference:

Unmanned Aircraft (UA): A device used or intended to be used for flight in the air that has no onboard pilot. This device excludes missiles, weapons, or exploding warheads, but includes all classes of airplanes, helicopters, airships, and powered-lift aircraft without an onboard pilot. UA do not include traditional balloons (see 14 CFR Part 101), rockets, tethered aircraft and un-powered gliders.

Crewmember [UAS]: In addition to the crewmembers identified in 14 CFR Part 1, a UAS flightcrew member includes pilots, sensor/payload operators, and visual observers (VO), but may include other persons as appropriate or required to ensure safe operation of the aircraft.

Unmanned Aircraft System (UAS): An unmanned aircraft and its associated elements related to safe operations, which may include control stations (ground, ship, or air-based), control links, support equipment, payloads, flight termination systems, and launch/recovery equipment. As shown in Figure 1, it consists of three elements:

- Unmanned Aircraft;
- Control Station;
- And Data Link.

National Airspace System (NAS): The common network of U.S. airspace — air navigation facilities, equipment, and services; airports or landing areas; aeronautical charts, information and services; rules, regulations, and procedures; technical information; and manpower and material. (see Figure 2)

Next Generation Air Transportation System (NextGen): According to the FAA's *Destination 2025,* (2011):

> *"NextGen is a series of inter-linked programs, systems, and policies that implement advanced technologies and capabilities to dramatically change the way the current aviation system is operated. NextGen is satellite-based and relies on a network to share information and digital communications so all users of the system are aware of other users' precise locations."*

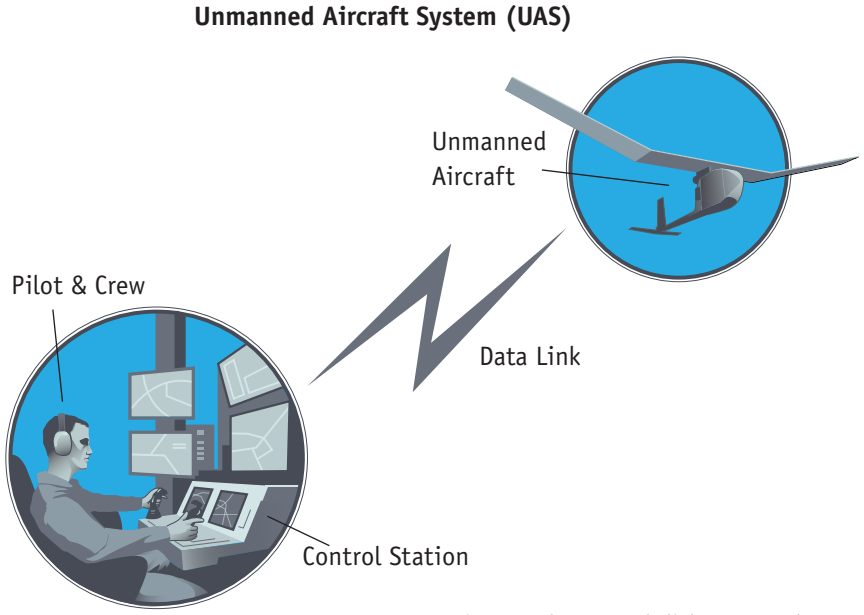

Figure 1: The UAS and Flightcrew Members

1.4 Policy

The FAA is responsible for developing plans and policy for the safe and efficient use of the United States' navigable airspace. This responsibility includes coordinating efforts with national security and privacy policies so that the integration of UAS into the NAS is done in a manner that supports and maintains the United States Government's ability to secure the airspace and addresses privacy concerns. Further, the FAA will harmonize, when appropriate, with the international community for the mutual development of civil aviation in a safe and orderly manner. Components of existing FAA and International Civil Aviation Organization (ICAO) policy are outlined below.

National Airspace System

Figure 2: The NAS

1.4.1 FAA UAS Policy Basis

Established FAA aviation policies support an acceptable level of safety for the NAS. At the core of these policies is the concept that each aircraft is flown by a pilot in accordance with required procedures and practices. This same policy applies to UAS.

Aviation policies and regulations focus on overall safety being addressed through three primary areas: equipment, personnel, and operations and procedures. Each of these areas has standards and minimum levels of safety that must be met, independent of each other. As a matter of regulation, for example, a new civil aircraft must be able to independently obtain an airworthiness certificate, regardless of the airspace class where it might be flown. However, as a result or part of this certification, new procedures may be required for flightcrew members and air traffic control (ATC) in order to maintain the minimum level of safety of the NAS while accommodating the new technology. Under special certifications and authorizations, limited operations may be authorized for equipment unable to meet current standards.

The application of these established aviation policies to UAS is summarized in the following key points excerpted from the FAA Notice of Policy: Unmanned Aircraft Operations in the National Airspace System (72 Fed. Reg. 6689 (Feb. 13, 2007)):

- Regulatory standards need to be developed to enable current technology for unmanned aircraft to comply with Title 14 Code of Federal Regulations;

- In order to ensure safety, the operator is required to establish the UAS airworthiness either from FAA certification, a Department of Defense (DoD) airworthiness statement, or by other approved means;
- Applicants also have to demonstrate that a collision with another aircraft or other airspace user is extremely improbable;
- And the pilot-in-command concept is essential to the safe operation of manned operations. The FAA's UAS guidance applies this pilot-in-command concept to unmanned aircraft and includes minimum qualification and currency requirements.

These policies have enabled the accommodation of UAS into the NAS on a limited basis on the foundation that operations are conducted safely, present an acceptable level of risk to the general public, and do no harm to, or adversely impact, other users. To gain full access to the NAS, UAS need to be able to bridge the gap from existing systems requiring accommodations to future systems that are able to obtain a standard airworthiness certificate. These UAS will also need to be flown by a certified pilot in accordance with existing, revised, or new regulations and required standards, policies, and procedures.

1.4.2 International Civil Aviation Organization (ICAO) Policy

ICAO, a special agency of the United Nations, promotes "the safe and orderly development of international civil aviation throughout the world. It sets standards and regulations necessary for aviation safety, security, efficiency, and regularity, as well as aviation environmental protection."

The goal of ICAO in addressing unmanned aviation is to provide the fundamental international regulatory framework to support routine operation of UAS throughout the world in a safe, harmonized, and seamless manner comparable to that of manned operations. Current ICAO guidance material for UAS is published in ICAO Circular 328, "Unmanned Aircraft Systems (UAS) Circular," which provides basic guidelines for Member States to introduce and integrate UAS into airspace in a consistent manner, to ensure global interoperability and regulatory compatibility, when possible. The document's guiding policy on UAS is:

> *"A number of Civil Aviation Authorities (CAA) have adopted the policy that UAS must meet the equivalent levels of safety as manned aircraft… In general, UAS should be operated in accordance with the rule governing the flight of manned aircraft and meet equipment requirements applicable to the class of airspace within which they intend to operate…To safely integrate UAS in non-segregated airspace, the UAS must act and respond as manned aircraft do. Air Traffic, Airspace and Airport standards should not be significantly changed. The UAS must be able to comply with existing provisions to the greatest extent possible."*

ICAO develops Standards and Recommended Practices (SARP), which are generally followed by national civil aviation authorities of the Member States. The United States is an ICAO Member State, and the FAA plans to harmonize with international efforts and adhere to ICAO SARPs when possible.

1.4.3 Industry Policy Recommendations

RTCA, Inc. is a private, not-for-profit corporation that develops consensus-based recommendations regarding communications, navigation, surveillance, and air traffic management system issues. RTCA functions as a Federal Advisory Committee, and the FAA considers RTCA recommendations when making policy, program, and regulatory decisions. RTCA Special Committee 203 (SC-203) was established in 2004 to help assure the safe, efficient, and compatible operation of UAS with other aircraft operating within the NAS. This Special Committee has developed and documented guiding principles for UAS integration, which are summarized below:

- UAS must operate safely, efficiently, and compatibly with service providers and other users of the NAS so that overall safety is not degraded;
- UAS will have access to the NAS, provided they have appropriate equipage and the ability to meet the requirements for flying in various classes of airspace;
- Routine UAS operations will not require the creation of new special use airspace, or modification of existing special use airspace;
- Except for some special cases, such as small UAS (sUAS) with very limited operational range, all UAS will require design and airworthiness certification to fly civil operations in the NAS;
- UAS pilots will require certification, though some of the requirements may differ from manned aviation;
- UAS will comply with ATC instructions, clearances, and procedures when receiving air traffic services;
- UAS pilots (the pilot-in-command) will always have responsibility for the unmanned aircraft while it is operating;
- And UAS commercial operations will need to apply the operational control concept as appropriate for the type of operation, but with different functions applicable to UAS operations.

Through an FAA-established UAS Aviation Rulemaking Committee (ARC), the FAA continues to collaborate with government and industry stakeholders for recommendations regarding the path toward integration of UAS into the NAS. This effort will harmonize with the work being done by international organizations working toward a universal goal of safe and efficient UAS airspace operations.

1.4.4 Privacy and Civil Liberties Considerations

The FAA's chief mission is to ensure the safety and efficiency of the entire aviation system. This includes manned and unmanned aircraft operations. While the expanded use of UAS presents great opportunities, it also raises questions as to how to accomplish UAS integration in a manner that is consistent with privacy and civil liberties considerations.

As required by the FMRA, the FAA is implementing a UAS test site program to help the FAA gain a better understanding of operational issues relating to UAS. Although the FAA's mission does not include developing or enforcing policies pertaining to privacy or civil liberties, experience with the UAS test sites will present an opportunity to inform the dialogue in the IPC and other interagency forums concerning the use of UAS technologies and the areas of privacy and civil liberties.

As part of the test site program, the FAA will authorize non-federal public entities to establish and operate six test sites in the United States. The FAA recognizes that there are privacy considerations regarding the use of UAS at the test sites. To ensure that these concerns are taken into consideration at the test sites, the FAA plans to require each test site operator to establish a privacy policy that will apply to operations at the test site. The test site's privacy

policy must be publicly available and informed by Fair Information Practice Principles. In addition, each site operator must establish a mechanism through which the operator can receive and consider comments on its privacy policy.

The privacy requirements proposed for the UAS test sites are specifically designed for the operation of the test sites and are not intended to predetermine the long-term policy and regulatory framework under which UAS would operate. However, the FAA anticipates that the privacy policies developed by the test site operators will help inform the dialogue among policymakers, privacy advocates, and the industry regarding broader questions concerning the use of UAS technologies in the NAS.

1.4.5 National Security Issues

Integrating public and civil UAS into the NAS carries certain national security implications, including security vetting for certification and training of UAS-related personnel, addressing cyber and communications vulnerabilities, and maintaining/enhancing air defense and air domain awareness capabilities in an increasingly complex and crowded airspace. In some cases, existing security frameworks applied to manned aircraft may be applicable. Other security concerns may require development of new frameworks altogether. The FAA will continue to work with relevant United States Government departments and agencies, and with stakeholders through coordinating bodies such as the IPC and JPDO, to proactively address these areas of concern.

UAS Operations in the NAS

This roadmap focuses on civil UAS access to the NAS. To this end, the FAA and the UAS community are working to address the myriad challenges associated with this effort.

2.1 FAA's Dual Role for UAS Integration

For UAS, as with all aircraft, the FAA acts in a dual role. As the regulator, the FAA ensures aviation safety of persons and property in the air and on the ground. As the service provider, the FAA is responsible for providing safe and efficient air traffic control services in the NAS and the other portions of global airspace delegated to the United States by ICAO.

As part of its regulator role, the Office of Aviation Safety (AVS) efforts are led by the UAS Integration Office. The main focus of the UAS Integration Office is to provide, within the existing AVS structure, subject matter expertise, research, and recommendations to develop policy, regulations, guidance, and procedures for UAS airworthiness and operations in support of safe integration of UAS into the NAS.

As the service provider, the Air Traffic Organization (ATO) efforts are led by the Air Traffic Emerging Technologies Group, which considers operational authorizations for UAS flights that are unable to meet current regulations and procedures. A Certificate of Waiver or Authorization (COA) is issued with limitations and provisions that mitigate the increased risks resulting from the use of uncertified technology. The ATO is responsible for the safe and efficient handling of aircraft and the development of the airspace rules, procedures, and air traffic controller training to support routine operations in the NAS.

2.2 UAS Challenges

A number of issues that impact the integration of UAS into the NAS are being considered across the regulatory and service provider roles of the FAA. To ensure the FAA meets the goals set forth in this roadmap, these offices will be addressing the challenges as outlined in the following subsections.

2.2.1 Policy, Guidance, and Regulatory Product Challenges

To ensure the FAA has the appropriate UAS framework, many policy, guidance, and regulatory products will need to be reviewed and revised to specifically address UAS integration into the NAS. UAS technology and operations will need to mature, and new products may be required in order to meet applicable regulations and standards. Figure 3 depicts policy, guidance, and regulatory product areas requiring research and development. This information is derived from the RTCA notional architecture and is primarily related to airmen and UAS certification.

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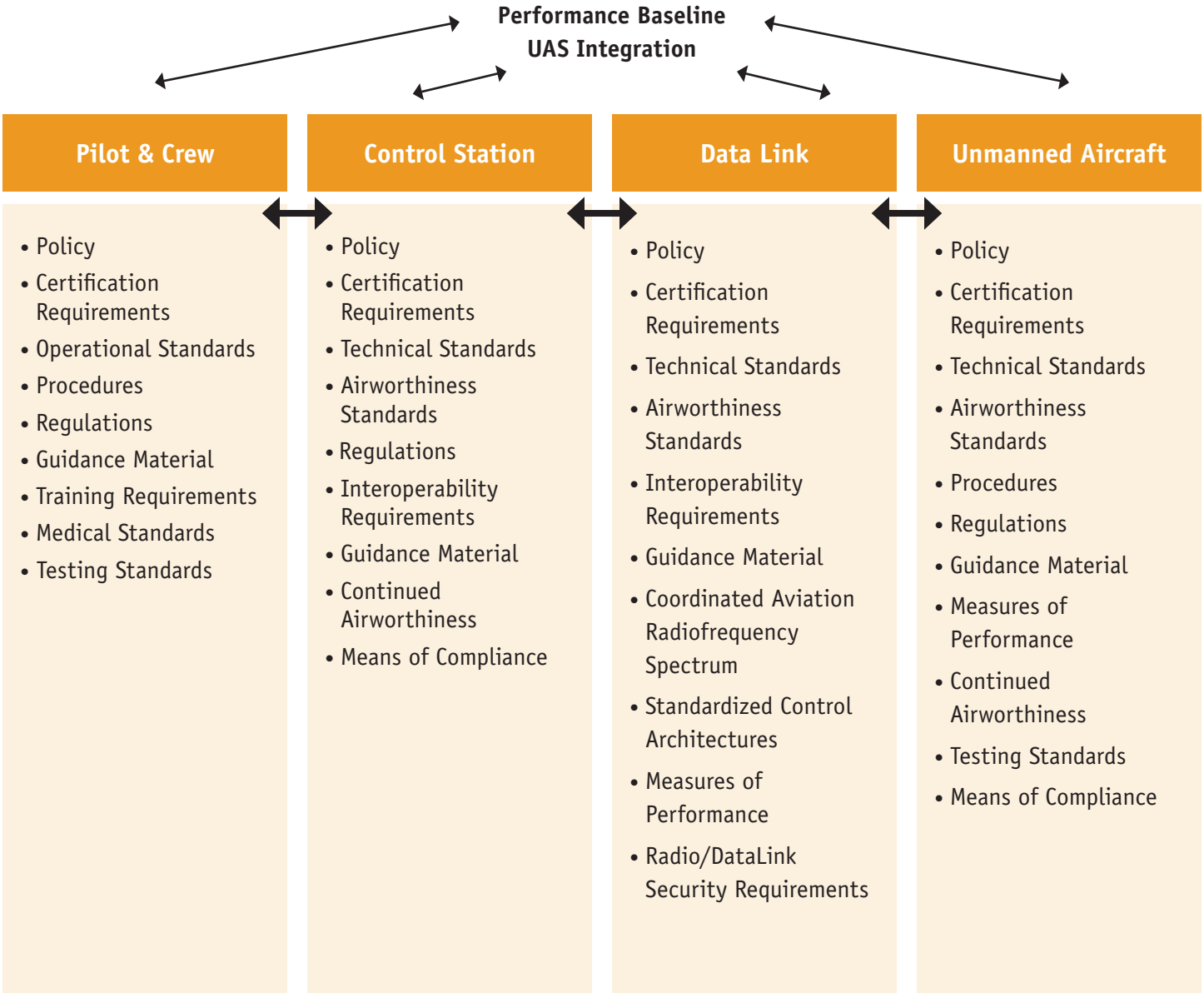

Figure 3: AVS Products to Regulate UAS Operations

The challenge is to identify and develop the UAS regulatory structure that encompasses areas listed in Figure 3. Other regulatory drivers include:

- Developing minimum standards for Sense and Avoid (SAA), Control and Communications (C2), and separation assurance to meet new or existing operational and regulatory requirements for specified airspace;
- Understanding the privacy, security, and environmental implications of UAS operations and working with relevant departments and agencies to proactively coordinate and align these considerations with the UAS regulatory structure;
- And developing acceptable UAS design standards that consider the aircraft size, performance, mode of control, intended operational environment, and mission criticality.

Although aviation regulations have been developed generically for all aircraft, until recently these efforts were not done with UAS specifically in mind. This presents certain challenges because the underlying assumptions that existed during the previous efforts may not now fully accommodate UAS operations. As an example, current regulations address security requirements for cockpit doors. However, these same regulations lack a legal definition for what a "cockpit" is or where it is located. This presents a challenge for UAS considering that the cockpit or "control station" may be located in an office building, in a vehicle, or outside with no physical boundaries. Applying current cockpit door security regulations to UAS may require new rulemaking, guidance, or a combination of both.

The regulatory process is designed to provide transparency to the public and an opportunity to understand and comment on proposed rules before being issued. Additional checks and balances are in place to ensure that final regulations are not unnecessarily burdensome to the public. Because of these requirements, and lacking any exceptions, an average regulatory effort might span a number of years. These timeframes may be longer for high visibility or complex regulations. FAA experience to date with the development of a Notice of Proposed Rulemaking (NPRM) for small UAS indicates that UAS rulemaking efforts may be more complex, receive greater scrutiny, and require longer development timeframes than the average regulatory effort.

2.2.2 Air Traffic Operational Challenges

Numerous Air Traffic products, policies, and procedures also need to be reviewed and refined or developed through supporting research to permit UAS operations in the NAS. The UAS Integration Office coordinates efforts with the ATO to complete these tasks.

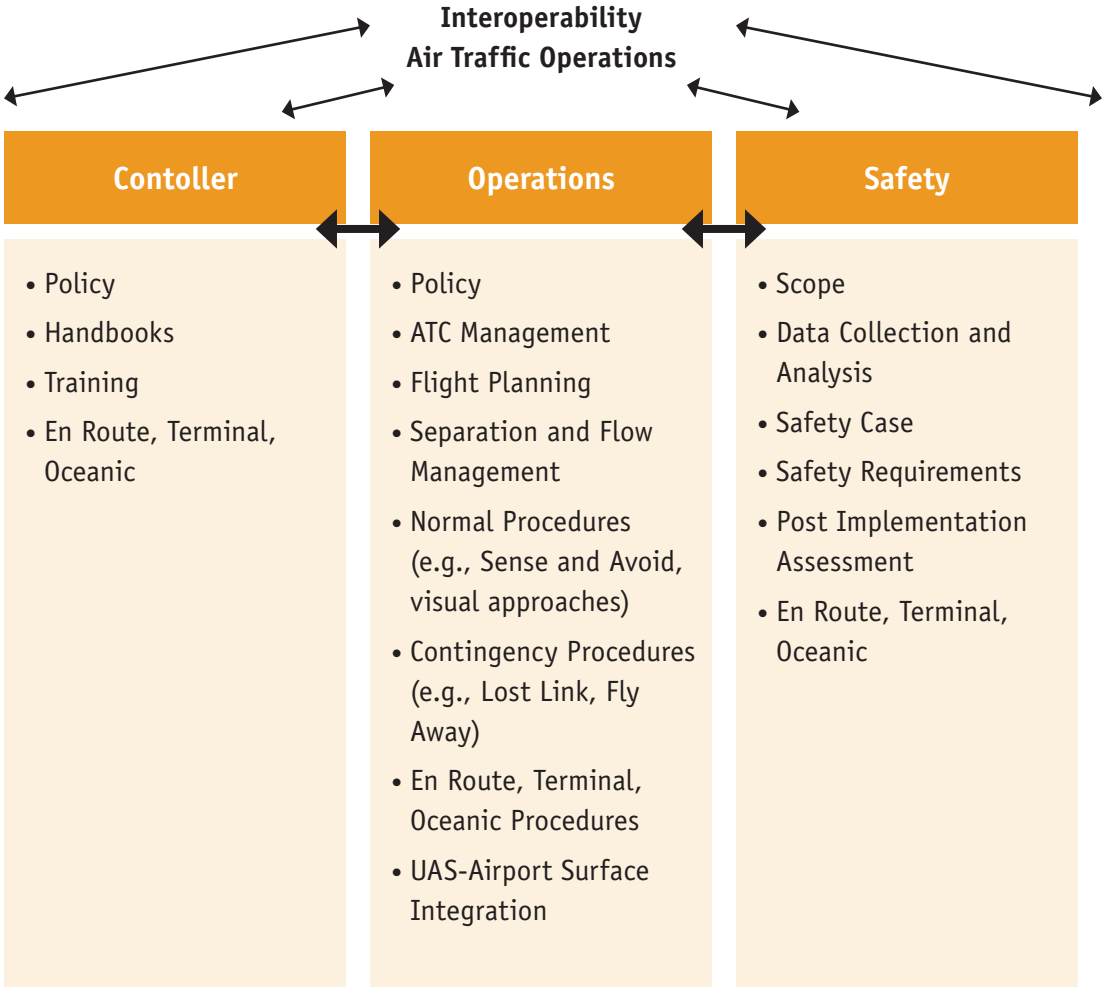

Figure 4: ATO UAS Operational Area

The goal of safely integrating UAS without segregating, delaying, or diverting other aircraft and other users of the system presents significant challenges in the areas outlined in Figure 4 above. For NAS integration, this also includes:

- Identifying policies and requirements for UAS to comply with ATC clearances and instructions commensurate with manned aircraft (specifically addressing the inability of UAS to comply directly with ATC visual clearances or to operate under visual flight rules);
- Establishing procedures and techniques for safe and secure exchange of voice and data communication between UAS pilots, air traffic controllers, and other NAS users;
- Establishing wake vortex and turbulence avoidance criteria needed for UAS with unique characteristics (e.g., size, performance, etc.);
- And reviewing environmental requirements (e.g., the National Environmental Policy Act).

2.2.3 Technological Challenges

The FAA recognizes that current UAS technologies were not developed to comply with existing airworthiness standards. Current civil airworthiness regulations may not consider many of the unique aspects of UAS operations. Materials properties, structural design standards, system reliability standards, and other minimum performance requirements for basic UAS design need to be evaluated against civil airworthiness standards for existing aircraft. Although significant technological advances have been made by the UAS community, critical research is needed to fully understand the impact of UAS operations in the NAS. There has also been little research to support the equipment design necessary for UAS airworthiness certification. In the near- to mid-term, UAS research will need to focus on technology deemed necessary for UAS access to the NAS.

As UAS are introduced, their expected range of performance will need to be evaluated for impact on the NAS. UAS operate with widely varying performance characteristics that do not necessarily align with manned aircraft performance. They vary in size, speed, and other flight capabilities. Similarly, the issue of performance gap between the pilot and the avionics will impact NAS operations. For example, a quantitative time standard for a pilot response to ATC directions (such as "turn left heading 270, maintain FL250") does not exist – there is an acceptable delay for the pilot's verbal response and physical action, but there is no documented required range of acceptable values. Avionics that perform the corresponding function cannot be designed and built without these performance requirements being established.

Existing standards ensure safe operation by pilots actually on board the aircraft. These standards may not translate well to UAS designs where pilots are remotely located off the aircraft. Removing the pilot from the aircraft creates a series of performance considerations between manned and unmanned aircraft that need to be fully researched and understood to determine acceptability and potential impact on safe operations in the NAS. These include the following considerations:

- The UAS pilot is not onboard the aircraft and does not have the same sensory and environmental cues as a manned aircraft pilot;
- The UAS pilot does not have the ability to directly comply with see-and-avoid responsibilities and UAS SAA systems do not meet current operational rules;
- The UAS pilot must depend on a data link for control of the aircraft. This affects the aircraft's response to revised ATC clearances, other ATC instructions, or unplanned contingencies (e.g., maneuvering aircraft);
- UAS cannot comply with certain air traffic control clearances, and alternate means may need to be considered (e.g., use of visual clearances);
- UAS present air traffic controllers with a different range of platform sizes and operational capabilities (such as size, speed, altitude, wake turbulence criteria, and combinations thereof);

Removing the pilot from the aircraft creates a series of performance considerations between manned and unmanned aircraft that need to be fully researched and understood to determine acceptability and potential impact on safe operations in the NAS.

- And some UAS launch and recovery methods differ from manned aircraft and require manual placement and removal from runways, a lead vehicle for taxi operations, or dedicated launch and recovery systems.

Therefore, it is necessary to develop new or revised regulations/ procedures and operational concepts, formulate standards, and promote technological development that will enable manned and unmanned aircraft to operate cohesively in the same airspace. Specific technology challenges include two critical functional areas:

- **"Sense and Avoid" (SAA) capability** must provide for self-separation and ultimately for collision avoidance protection between UAS and other aircraft analogous to the "see and avoid" operation of manned aircraft that meets an acceptable level of safety. SAA technology development is immature. In manned flight, see and avoid, radar, visual sighting, separation standards, proven technologies and procedures, and well-defined pilot behaviors combine to ensure safe operation. Unmanned flight will require new or revised operational rules to regulate the use of SAA systems as an alternate method to comply with "see and avoid" operational rules currently required of manned aircraft. SAA system standards must be developed to assure both self-separation and collision avoidance capability for UAS. Interoperability constraints must also be defined for safe and secure interactions between SAA-enabled UAS and other airborne and ground-based collision avoidance systems. While SAA may be an independent system, it must be designed to be compatible across other modes (e.g., ATC separation services). See Appendix C.3 and C.4 for specific goals and metrics.

Unmanned flight will require new or revised operational rules to regulate the use of SAA systems as an alternate method to comply with "see and avoid" operational rules currently required of manned aircraft.

- **Control and Communications (C2) system performance requirements** are needed and RTCA is developing consensus-based recommendations for the FAA to consider in C2 policy, program, and regulatory decisions. The resulting C2 requirements need to support the minimum performance required to achieve higher-level (UAS level) performance and safety requirements. Third-party communication service providers are common today (e.g., ARINC, Harris, etc.) and the FAA has experience with setting and monitoring performance of third parties. The use of third parties is dependent on the UAS architecture chosen, but these are still being evaluated in terms of feasibility from a performance, cost, and safety perspective. See Appendix C.5 for specific goals and metrics.

2.2.4 Managing the Challenges

To provide the UAS community insight into the FAA process for fostering UAS flight in the NAS, Figure 5 highlights the intended shift in focus over time from Accommodation to Integration, and then to Evolution. This method is consistent with the approach used for new technologies on manned aircraft introduced into the NAS.

Current design standards reflect the focus in the COA process on allowing existing designs, embodying some experimental design philosophies, to fly in the NAS. Progress toward standard airworthiness will also increase as design standards mature, but not before.

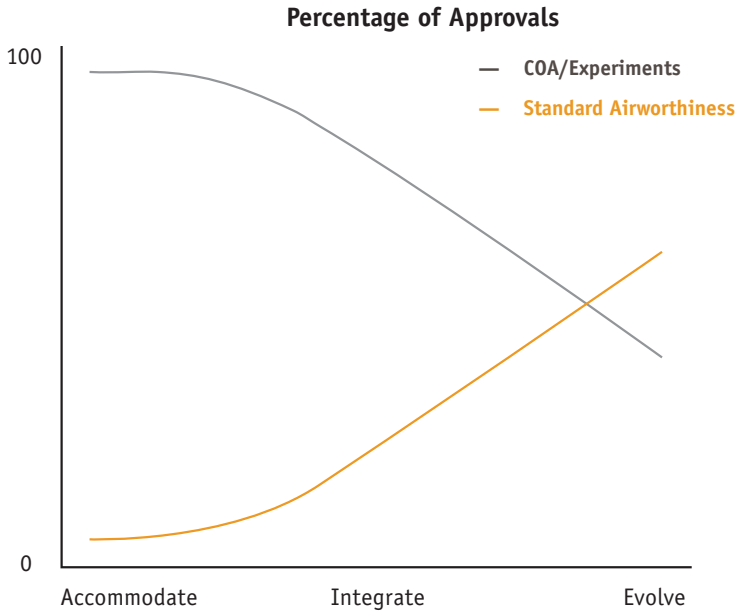

Figure 5: Transition from COA/Experimental to Standard Airworthiness Approvals

Recognizing the challenges and the complex coordination required for integration, the UAS roadmap addresses the efforts needed to move forward incrementally toward the goal of full NAS integration.

Timely progress on products, decisions, research, development, testing, and evaluation will be needed to successfully move from accommodation to integration in the evolving NAS.

The approach to managing the challenges discussed in this section focuses on the following interdependent topics:

- Standards;
- Rules and Regulations;
- Certification of the UAS;
- Procedures and Airspace;
- Training (Pilot, Flightcrew Member, Mechanic, and Controller);
- And Research and Development (R&D) and Technology.

The roadmap discusses the activities and transitions for the above interdependent topic areas from the vantage point of Accommodation, Integration, and Evolution, as summarized below and described in more detail in subsequent sections of this roadmap. These perspectives transcend the near-, mid-, and far-term timeframes and provide additional insight into the task of integrating UAS into the NAS.

Perspective 1: Accommodation. Take current UAS and apply special mitigations and procedures to safely facilitate limited access to the NAS. UAS operations in the NAS are considered on a case-by-case basis. Accommodation will predominate in the near-term, and while it will decline significantly as integration begins and expands in the mid-term, it will continue to be a viable means for NAS access with appropriate restrictions and constraints to mitigate any performance shortfalls. During the near-term, R&D will continue to identify challenges, validate advanced mitigation strategies, and explore opportunities to progress UAS integration into the NAS.

Perspective 2: Integration. Establishing threshold performance requirements for UAS that would increase access to the NAS is a primary objective of integration. During the mid- to far-term, the Agency will establish new or revised regulations, policies, procedures, guidance material, training, and understanding of systems and operations to support routine NAS operations. Integration is targeted to begin in the near- to mid-term with the implementation of the sUAS rule and will expand further over time (mid- and far-term) to consider wider integration of a broader field of UAS.

Perspective 3: Evolution. All required policy, regulations, procedures, guidance material, technologies, and training are in place and routinely updated to support UAS operations in the NAS operational environment as it evolves over time. It is important that the UAS community maintains the understanding that the NAS environment is not static, and that there are many improvements planned for the NAS over the next 13-15 years. To avoid obsolescence, UAS developers will need to maintain a dual focus: integration into today's NAS while maintaining cognizance of how the NAS is evolving.

Perspective 1: Accommodation

3.1 Overview

The FAA's near-term focus will be on safely allowing for the expanded operation of UAS through accommodation. Enhanced procedures and technology, over time, will increase access to the NAS through accommodation made possible by improvements to current mitigations and the introduction of advanced mitigations. The need to maintain this avenue for NAS access will continue. Research and development on current and advanced mitigations is necessary to maintain this avenue for access with appropriate restrictions and constraints to mitigate performance shortfalls and address privacy, security, and environmental concerns. The consideration and planning for integration of UAS into the NAS will continue simultaneously.

There has been a growing interest in a wide variety of civil uses for unmanned aircraft. A number of paths can be used to apply for airworthiness certification of UAS. One method that the UAS civil community is currently using to access the NAS is with a special airworthiness certificate in the experimental category, which requires specific, proven capabilities to enable operations at a constrained level. Each application is reviewed for approval on a case-by-case basis that allows a carefully defined level of access that is limited and dependent on risk mitigations that ensure safety and efficiency of the NAS is not diminished. The use of special airworthiness certificates for UAS is similar to their use for manned aircraft and they are normally issued to UAS applicants for the purposes of research and development, crew training or market surveys per 14 CFR 21.191(a), (c), and (f).

Through August 2012, the FAA had issued 114 special airworthiness certificates (i.e., 113 experimental certificates and one special flight permit) to 22 different models of civil aircraft. Of these 22 different models, 16 are unmanned aircraft and 6 are Optionally Piloted Aircraft (OPA). These experimental certificates have been useful for UAS research and development (R&D), and as R&D efforts subside, the use of experimental certificates may decrease. While the FAA continues to accommodate special access to the NAS, existing airworthiness standards are also an avenue for full-type certification. The FAA is working with the UAS ARC to gain feedback to potential changes to airworthiness standards for UAS, as necessary. In the long-term, UAS that are designed to a standard and built to conform to the design may be integrated into the NAS as fully certificated aircraft.

3

3.2 Standards

If UAS are to operate routinely in the NAS, they must conform to an agreed-upon set of standards. Requirements will vary depending on the nature and complexity of the operation, aircraft or component system limitations, pilot and other crewmember qualifications, and the operating environment.

A technical (or operational) standard is an established norm or requirement about a technical (or operational) system that documents uniform engineering or technical criteria, methods, processes, and practices. A standard may be developed privately or unilaterally, by a corporation, regulatory body, or the military. Standards can also be developed by organizations such as trade unions and associations. These organizations often have more diverse input and usually develop voluntary standards that may be adopted by the FAA as a means of regulatory compliance.

To operate an aircraft safely and efficiently in today's NAS, a means of complying with applicable parts of Title 14 of the Code of Federal Regulations must be developed. Aircraft certification standards govern the design, construction, manufacturing, and continued airworthiness of aircraft used in private and commercial operations. These standards were developed with an underlying assumption that a person would be onboard the aircraft and manipulating the controls. This has led to numerous requirements that make aircraft highly reliable and safe for their intended operations and flightcrew protection.

While UAS share many of the same design considerations as manned aircraft, such as structural integrity and performance, most unmanned aircraft and control stations have not been designed to comply with existing civil airworthiness or operational standards. Beyond the problem of meeting existing aircraft certification standards, other components of the UAS, such as the equipment and software associated with the data link (control and communications) and the launch and recovery mechanisms, are not currently addressed in civil airworthiness or operational standards.

Since 2004, the FAA has developed close working relationships with several standards development organizations. Most of these organizations plan to complete their UAS standards development efforts in the near- to mid-term timeframe. When accepted, these standards development products may provide a means of compliance for rules established in the mid-term. The FAA has also been either the lead or an important participant in cross-agency efforts that influence standards development and has coordinated and harmonized these activities with international efforts such as the ICAO UAS Study Group.

Standardization efforts have already produced a number of useful definitions, guidance documents, and considerations that provide common understanding and add insight and data to UAS integration efforts:

- RTCA/SC-203's Guidance Material (DO-304) and numerous position papers
- RTCA/SC-203's Operational Services and Environment Definition For Unmanned Aircraft Systems (OSED, DO-320), which documents definitions and operating scenarios for different UAS operations in the NAS
- RTCA Air Traffic Management Advisory Committee, Requirements and Planning Work Group Report "Airspace Considerations for UAS Integration in the National Airspace System," March 26, 2008
- SAA Workshop Reports that have documented SAA timelines and definitions

Standards development will continue with the goal of producing Minimum Aviation System Performance Standards (MASPS) by the end of the near-term. RTCA products will be taken under consideration by the FAA in the development of policy and guidance products such as Advisory Circulars. Minimum Operational Performance Standards (MOPS) may be used to define Technical Standard Orders (TSO) in the mid- to long-term timeframe.

Additional coordination and input from the stakeholder community (industry and trade associations, manufacturers, academia, research organizations, and public agencies) is being provided with the recent establishment of the UAS ARC.

Although the need to develop standards cannot be overstated, detailed policy, guidance, technical performance requirements, and operational procedures are also needed to enable manned and unmanned aircraft to fly safely and efficiently in the NAS. See Appendix C for specific goals and metrics.

3.3 Rules and Regulations

Unmanned aircraft operations have significantly increased in number, technical complexity, and sophistication during recent years without specific regulations to address their unique characteristics. For a person wishing to design, manufacture, market, or operate a UAS for a commercial mission and seeking FAA approval for that aircraft, its pilot and the operations, existing rules have not been fully tailored to the unique features of UAS.

The FAA has published a Notice which replaced the previous interim operational guidance material used to support UAS accommodation. Since accommodation is not envisioned to be eliminated entirely, this Notice will need to be updated periodically, even as progress continues simultaneously on development of UAS rules and regulations for integration.

The FAA is also developing an NPRM to allow sUAS to conduct operations. This rulemaking effort includes an associated industry effort to develop consensus standards needed for rule implementation. Assuming the sUAS NPRM effort proceeds to a final rule, associated guidance will also be completed to allow the FAA to approve operations and civil and public UAS operators to apply for and safely implement these sUAS operations. All sUAS rule development and implementation will be in accordance with the FMRA.

During this period, the appropriate regulations are also being reviewed for applicability to UAS operations by the FAA, industry groups, and the

The emphasis will be on the need for new or revised rules for UAS to operate under instrument flight rules (IFR), including rules to allow UAS operations analogous to manned aircraft using visual capabilities.

UAS ARC. The results of this review will determine any regulatory gaps that need to be addressed in the development of specific UAS guidance and rulemaking. The emphasis will be on the need for new or revised rules for UAS to operate under instrument flight rules (IFR), including rules to allow UAS operations analogous to manned aircraft using visual capabilities. Based on the findings of this review, a determination will be made regarding the need to modify, supplement, or create specific new regulations to support UAS beyond the near-term. UAS rulemaking will follow these steps.

3.4 Airworthiness Certification of the UAS

Airworthiness certification is a process that the FAA uses to ensure that an aircraft design complies with the appropriate safety standards in the applicable airworthiness regulations. FAA type design approval indicates the FAA has evaluated the safety of the unmanned aircraft design and all its systems, which is more rigorous than simply making a determination that the UAS is airworthy.

Airworthiness standards for existing aircraft are codified in Title 14 of the Code of Federal Regulations, with processes described for FAA type certification in FAA Order 8110.4 and airworthiness certification in FAA Order 8130.2. The FAA has the authority and regulations in place to tailor the design standards to specific UAS applications, and plans to use this authority until further experience is obtained in addressing the design issues that are unique to UAS.

Civil UAS are currently accommodated with experimental certificates under FAA Order 8130.34. The FAA and the UAS industry will need to work together to move away from the existing experimental or expendable design philosophy, toward a design philosophy more consistent with reliable and safe civilian operation over populated areas and in areas of manned aircraft operation.

Existing airworthiness standards have been developed from years of operational safety experience with manned aircraft and may be too restrictive for UAS in some areas and inadequate in others. For example, existing structural requirements that ensure safe operation in foreseeable weather conditions that are likely to be encountered represent an example of well-established design requirements that existing UAS designs will most likely need to consider. Structural failures have nearly been eliminated from manned aircraft operations and must be mitigated to a similar level of likelihood in UAS operations.

Detailed consideration of UAS in the certification process will be limited in number until such time as a broad and significant consideration is given to existing standards, regulations, and policy. This will be facilitated by UAS manufacturers making application for type design approval to the FAA. For type design approval, UAS designers must show they meet acceptable safety levels for the basic UAS design, and operators must employ certified systems that enable compliance with standardized air traffic operations and contingency/emergency procedures for UAS.

The FAA believes that the UAS community will be best served by the use of an incremental approach to gaining type-design and airworthiness approval. This incremental approach (see Figure 6) could involve the following steps:

- First, allowing existing UAS designs to operate with strict airworthiness and operational limitations to gain operational experience and determine their reliability in very controlled circumstances, as under the existing COA concept or through regulations specific to sUAS;
- Next, developing design standards tailored to a specific UAS application and proposed operating environment. This step would enable the development of useful unmanned aircraft and system design and operational standards for the UAS to facilitate safe operation, without addressing all potential UAS designs and applications. This would lead to type certificates (TC) and production certificates with appropriate limitations documented in the aircraft flight manual;

- And lastly, defining standards for repeatable and predictable FAA type certification of a UAS designed with the redundancy, reliability, and safety necessary to allow repeated safe access to the NAS, including seamless integration with existing air traffic.

Because the UAS community is well established under its current operational assumptions, it is unlikely the FAA or UAS industry will establish an entire set of design standards from scratch. As additional UAS airworthiness options are considered and UAS airworthiness design and operational standards are developed, type certification may be more efficiently and effectively achieved. The UAS industry will continue to build capabilities into the mid- and long-term timeframes. See Appendix C.1 for specific goals and metrics.

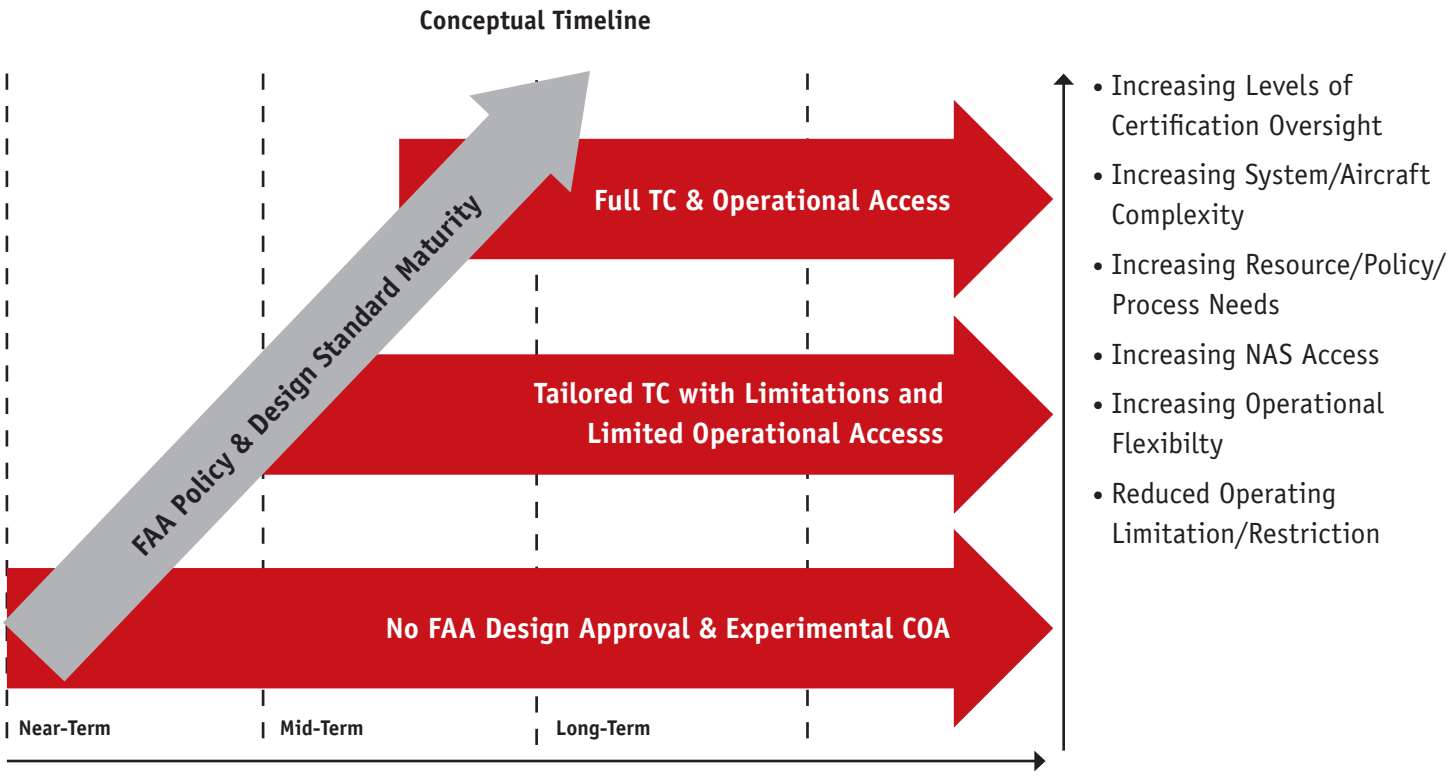

Figure 6: Potential Airworthiness Path for UAS Industry

3.5 Procedures and Airspace

A procedure is a series of actions or operations that have to be executed in the same manner to always obtain the same result under the same circumstances (for example, emergency procedures). The NAS depends on the structure of its airspace and the use of standard procedures to enable safe and efficient operations. ATO directives and other FAA policy and guidance define how UAS are permitted to operate in the NAS today:

- COAs for public access to the NAS – Notice 8900.207 has been released for these operations;
- Experimental Certificates for civil access to the NAS;
- AND AC 91-57 for modeler (recreation) access to the NAS (June 1981) and Section 336 (Special Rule for Model Aircraft) of FMRA.

Experimental certificates and COAs will always be viable methods for accessing the NAS, but typically come with constraints and limitations. Expanded, easier access to the NAS will occur after new or revised operational rules and UAS certification criteria are defined and the FAA develops specific methods for appropriately integrating UAS into NAS operations.

Another requirement is the baselining activity to assess the applicability of existing air traffic control regulations and orders to UAS operations. Any identified gaps will need to be analyzed, and decisions on accommodation or changes to UAS or regulations will be completed. Some sample differences that affect UAS interoperability with the air traffic system are:

- En Route—Current UAS are not able to meet requirements to fly in reduced vertical separation minimum (RVSM) airspace. They do not fly traditional trajectory-based flight paths and require non-traditional handling in emergency situations.
- Terminal—UAS cannot comply with ATC visual separation clearances and cannot execute published instrument approach procedures.
- Facilities—The introduction of UAS at existing airports represents a complex operational challenge. For the near-term, it is expected that UAS will require segregation from mainstream air traffic, possibly accommodated with UAS launch windows, special airports, or off-airport locations where UAS can easily launch and recover. Initial rulemaking for UAS may not address the requirements for UAS at airport facilities, since sUAS are not expected to routinely use airports for takeoff and landing. However, as civil UAS are developed that require airport access, airport integration requirements will need to be developed. These requirements will include environmental impact and/or assessments (when required) concerning noise, emissions, and any unique fuels and other associated concerns. The current Airport Cooperative Research Project (ACRP 03-30) will address the impacts of commercial UAS on airports. The results of the study will be a publication to help airports and communities gain an understanding of UAS, including a description of how various areas of the aviation system, particularly airports, could be affected. The results should be helpful in addressing the airport integration requirement.

ICAO has issued guidance requiring Member States to implement Safety Management System (SMS) programs. These programs are essential to manage risk in the aviation system. The FAA supports this and is a leader in the design and implementation of SMS. Technical challenges abound, including the ability to analyze massive amounts of data to provide useful information for oversight and assessment of risk.

A key input to a Safety Management methodology is the use of safety data. Valuable data collection is underway, but development of a safety-reporting database is currently limited to reporting requirements from existing COAs and experimental certificate holders. Data collection will expand when additional agreements are finalized for sharing public UAS data and new rules and associated safety data reporting requirements are implemented for sUAS. The strategy will use UAS incident, accident, and operational data from public, experimental, and sUAS operations to iteratively support the basis for and define appropriate UAS operating requirements. The availability and quality of this data may directly determine how fast or slow UAS are integrated into the NAS.

3.6 Training (Pilot, Flightcrew Member, Mechanic, and Air Traffic Controller)

UAS training standards will mirror manned aircraft training standards to the maximum extent possible, including appropriate security and vetting requirements, and will account for all roles involved in UAS operation. This may include the pilot, required crew members such as visual observers or launch and recovery specialists, instructors, inspectors, maintenance personnel, and air traffic controllers. See Appendix C.2 and C.8 for specific goals and metrics.

Accident investigation policies, processes, procedures, and training will be developed near-term, and will be provided to Flight Standards District Offices (FSDO) for implementation. Existing manned procedures will be leveraged as much as possible, though differences will need to be highlighted and resolved (e.g., when an unmanned aircraft accident occurs, there may be a need to impound the control station as well as the aircraft).

3.7 Research and Development (R&D) / Technology

Research in the areas of gaps in current technology and new UAS technologies and operations will support and enable the development of airworthiness and operational guidance required to address new and novel aspects of UAS and associated flight operations. The FAA will continue to establish requirements for flight in the NAS so R&D efforts are not duplicative. Additionally, the FAA's research needs are considered within the JPDO NextGen Research Development and Demonstration Roadmap to prevent overlap and provide opportunities for research collaboration.

R&D efforts with industry support the establishment of acceptable performance limits in the NAS and enable the development of performance parameters for today's NAS, while evaluating future concepts, technologies, and procedures for NextGen. The UAS Technical Community Representative Group (TCRG) is sponsoring broad-based UAS research (SAA, C2, and control station studies) aimed at integration with NextGen and validation of concepts. Near-term expected progress is described here:

Sense and Avoid:
Significant research into SAA methods is underway by both government and industry through a variety of approaches and sensor modes. Specifically the FAA is researching:

- Establishment of Sense and Avoid system definitions and performance levels;
- Assessment of Sense and Avoid system multi-sensor use and other technologies;
- And Minimum Sense and Avoid information set required for collision avoidance maneuvering.

Some public agencies and commercial companies are seeking to develop advanced mitigations, such as Ground Based Sense and Avoid (GBSAA) systems, as a strategy for increased access. Concept-of-use demonstrations are underway at several locations to use GBSAA as a mitigation to see-and-avoid requirements for public UAS COA operators in limited operational areas. GBSAA research and the test evaluations will help develop the sensor, link, and algorithm

requirements that could allow GBSAA to function as a partial solution set for meeting the SAA requirement and will help build the overall SAA requirements in the long-term. Additionally, as GBSAA technology matures, GBSAA could be used to provide localized UAS NAS integration in addition to being used as an advanced accommodation tool. See Appendix C.3 for specific goals and metrics.

Research is underway on Airborne Sense and Avoid (ABSAA) concepts. Due to complexity, significant progress in ABSAA is not expected until the mid-term. Research goals for the near-term include a flight demonstration of various sensor modes (electro-optic/infrared, radar, Traffic Alert and Collision Avoidance System (TCAS) and Automatic Dependent Surveillance-Broadcast (ADS-B)). Actual fielding of a standardized ABSAA system is a long-term objective. See Appendix C.4 for specific goals and metrics.

Control and Communications:

A primary goal of C2 research is the development of an appropriate C2 link between the unmanned aircraft and the control station to support the required performance of the unmanned aircraft in the NAS and to ensure that the pilot always maintains a threshold level of control of the aircraft. Research will be conducted for UAS control data link communications to determine values for latency, availability, integrity, continuity, and other performance measures.

UAS contingency and emergency scenarios also require research (e.g., how will a UAS in the NAS respond when the command link is lost either through equipment malfunction or malicious jamming, etc.). This research will drive standards that are being established through:

- Development and validation of UAS control link prototype
- Vulnerability analysis of UAS safety critical communications
- Completion of large-scale simulations and flight testing of initial performance requirements

Spectrum and civil radio frequency (RF) identification requires global coordination. The International Telecommunication Union (ITU) through the 2015 World Radiocommunication Conference (WRC-2015) will consider spectrum for UAS beyond-line-of-sight (BLOS) applications. Within the United States, the Federal Communications Commission (FCC) manages and authorizes all non-federal use of the radio frequency spectrum, including state and local government as well as public safety. The National Telecommunications and Information Administration (NTIA) manages and authorizes all federal use of the radio frequency spectrum. UAS spectrum operations within the United States need either the approval of the FCC or NTIA and shall not transmit without being properly authorized. Government agencies and industry need to investigate link security requirements, such as protection against intended and unintended jamming, RF interference, unauthorized link takeover, and spoofing. See Appendix C.5 for specific goals and metrics.

Modeling and Simulation:

The FAA is working with other government agencies and industry to develop a collaborative UAS modeling and simulation environment to explore key challenges to UAS integration. The near-term modeling goals are to:

- Validate current mitigation proposals;
- Establish a baseline of end-to-end UAS performance measures;
- Establish thresholds for safe and efficient introduction of UAS into the NAS;
- And develop NextGen concepts, including 4-dimensional trajectory utilizing UAS technology.

These modeling and simulation efforts will address NAS integration topics for UAS, such as latency in executing ATC clearances, inability to accept ATC visual clearances or comply with visual flight rules, priority and equity of NAS access, lost link, and flyaway scenarios.

Human Factors:
With the pilot controlling the aircraft from beyond the aircraft, several human factors issues emerge related to both the pilot and ATC, and how they will interact to safely operate unmanned aircraft in the NAS. Human factors issues in manned aviation are well known, but there needs to be further analyses regarding integration of UAS into the NAS. In the near-term, data will be collected to permit analysis of how pilots fly UAS, how controllers provide service involving a mix of manned aircraft and UAS, and how pilots and controllers interact with each other, with the goal of developing pilot, ATC, and automation roles and responsibilities concepts. The JPDO, in collaboration with government, academia, and industry researchers, identified several interrelated research challenges:

- Effective human-automation interaction (level; trust; and mode awareness);
- Pilot-centric ground control station design (displays; sensory deficit and remediation; and sterile cockpit);
- Display of traffic/airspace information (separation assurance interface);
- Predictability and contingency management (lost link status; lost ATC communication; and ATC workload);
- Definition of roles and responsibilities (communication flow among crew, ATC, and flight dispatcher);
- System-level issues (NAS-wide human performance requirements);
- And airspace users' and providers' qualification and training (crew/ATC skill set, training, certification, and currency).

Other research in this phase includes activities to support safety case validation and the associated mitigations. This includes case-by-case assessments to determine the likelihood that a system/operation can achieve an acceptable safety level. The research will consider UAS operational and technical risks including:

- Inability to avoid a collision;
- Inability to maintain positive control;
- Inability to meet the operational environment's expected behavior (e.g., self-separate);
- And Inability to safeguard the public.

Summary of "Accommodation" Priorities
Accommodation of UAS in the NAS through evaluation and improvement of safety mitigations
Work with industry and the ARC to review the operational, pilot, and airworthiness regulations
Development of required standards to support technological solutions to identified operational gaps (MOPS)
Safety case validation for UAS operations in NAS—collect/analyze operational and safety data
Robust research, modeling, and simulation for UAS Sense and Avoid, C2, and human factors

Perspective 2: Integration

4.1 Overview

In the mid-term, emphasis will shift significantly from accommodation to integration. For the residual accommodation requirements, it is expected that operational lessons learned and technological advances will lead to more sophisticated mitigations with increased safety margins. Thus, COAs and experimental certificates will remain avenues for accessing the NAS with appropriate restrictions and constraints. Emphasis will shift toward integration of UAS through the implementation of civil standards for unmanned aircraft pilots and new or revised operational rules, together with necessary policy guidance and operational procedures.

Integration efforts will focus on sequentially developing and implementing the UAS system requirements established by the FAA as a result of R&D and test range outputs:

- Finalize the integrated set of FAA rulemaking, policy, operational guidance, procedures, and standards;
- Define continued airworthiness methodologies;
- Complete training and certification standardization;
- Continue the research and technology development and assessment work that underpins the ability of UAS to operate safely and efficiently in the NAS;
- And address the privacy, security, and environmental implications of UAS operations.

To receive civil certification under existing or adapted/expanded regulations, guidance, and standards, research is needed that will assist in defining the certification basis for unique UAS features. While current regulations, guidance, and standards ensure safe operation of aircraft with pilots in the cockpit, these current regulations may not represent the necessary and sufficient basis for the design criteria and operation of UAS.

Integration efforts will provide a foundation for creating and modifying FAA policies and procedures to permit more routine forms of UAS access and bridge the gap to the long-term goal of developing the policy, guidance, and operational procedures required to enable manned and

Integration efforts will focus on sequentially developing and implementing the UAS system requirements established by the FAA as a result of R&D and test range outputs.

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unmanned aircraft to fly together in an environment that meets or exceeds today's level of safety and efficiency. As new UAS evolve, more specific training will be developed for UAS pilots, crew members, and certified flight instructors. See Appendix C.2 for specific goals and metrics.

UAS operations comingled at airports with manned aircraft is one of the more significant challenges to NAS integration. The UAS must be able to operate within airport parameters and comply with the existing provisions for aircraft. As with airspace operational requirements, the airport standards are not expected to change with the introduction of UAS, and their operation must be harmonized in the provision of air traffic services.

The following general requirements and assumptions will pertain to all UAS operations that are integrated into the NAS (with the exception of sUAS operating exclusively within visual line-of-sight (LOS) of the flight crew):

1. UAS operators comply with existing, adapted, and/or new operating rules or procedures as a prerequisite for NAS integration.
2. Civil UAS operating in the NAS obtain an appropriate airworthiness certificate while public users retain their responsibility to determine airworthiness.
3. All UAS must file and fly an IFR flight plan.
4. All UAS are equipped with ADS-B (Out) and transponder with altitude-encoding capability. This requirement is independent of the FAA's rule-making for ADS-B (Out).
5. UAS meet performance and equipage requirements for the environment in which they are operating and adhere to the relevant procedures.
6. Each UAS has a flight crew appropriate to fulfill the operators' responsibilities, and includes a pilot-in-command (PIC). Each PIC controls only one UA.*
7. Autonomous operations are not permitted.** The PIC has full control, or override authority to assume control at all times during normal UAS operations.
8. Communications spectrum is available to support UAS operations.
9. No new classes or types of airspace are designated or created specifically for UAS operations.
10. FAA policy, guidelines, and automation support air traffic decision-makers on assigning priority for individual flights (or flight segments) and providing equitable access to airspace and air traffic services.

11. Air traffic separation minima in controlled airspace apply to UA.
12. ATC is responsible for separation services as required by airspace class and type of flight plan for both manned and unmanned aircraft.
13. The UAS PIC complies with all ATC instructions and uses standard phraseology per FAA Order (JO) 7110.65 and the Aeronautical Information Manual (AIM).
14. ATC has no direct link to the UA for flight control purposes.

* This restriction does not preclude the possibility of a formation of UA (with multiple pilots) or a "swarm" (one pilot controlling a group of UA) from transiting the NAS to/from restricted airspace, provided the formation or swarm is operating under a COA.

** Autonomous operations refer to any system design that precludes any person from affecting the normal operations of the aircraft.

4.2 Standards

After MASPS are completed, the emphasis of standards activities will be geared toward the development of MOPS, which will contribute to the basis for regulatory changes and the equipment standards for UAS-specific systems and equipment. The development of MOPS may provide requirements the FAA may invoke as TSO to support airworthiness approval on certificated unmanned aircraft and may lead to the development of improved systems, potentially applicable to all civil aircraft. See Appendix C for specific goals and metrics.

4.3 Rules and Regulations

Recognizing that the UAS community might be better served by specific rules, the FAA is initially proposing to amend its regulations to adopt specific rules for the operation of sUAS in the NAS. These changes will address the classification of sUAS, certification of sUAS pilots, registration of sUAS, approval of sUAS operations, and sUAS operational limits.

Operations of sUAS under new regulations may have operational, airspace, and performance constraints, but will provide experience for pilots and additional data to inform subsequent rulemaking, standards, and training development for safe and efficient integration of other UAS in the NAS.

When the final rule is published and in effect, it will reduce the need for sUAS operators to conduct operations under either a COA or the constraints of an experimental certificate. This will allow operators and the FAA to shift the focus of resources to solutions that will better enable UAS integration. See Appendix C.6 for specific goals and metrics.

As integration continues, new or revised operational rules and associated standards and policies will allow compliant UAS to access additional airspace throughout the NAS.

4.4 Airworthiness Certification of the UAS

The FAA will work with the UAS community in defining policy and standards that facilitate agreement on an acceptable UAS certification basis for each applicant. This may involve the development of new policy, guidance, rulemaking, special conditions, and methods of compliance. See Section 3.4 for a more detailed discussion and Appendix C.1 for specific goals and metrics.

4.5 Procedures and Airspace

There will be incremental increases in NAS access based on rigorous safety mitigations of current UAS that were previously developed and built without approved industry or governmental standards. As integration begins, there will be approved airspace and procedures for sUAS, which will provide a basis for developing plans for increased NAS access as UAS are certified. As integration continues, new or revised operational rules and procedures, and associated standards and policies, will allow compliant UAS to access additional airspace throughout the NAS. The ATO will use procedures with these UAS similar to those used for manned aircraft, but may also delegate separation responsibility to UAS for some operations. To support this, ATO goals will be:

- Standardize air traffic operations and contingency/emergency procedures for UAS operators to ensure certified aircraft systems are interoperable with air traffic procedures and airspace requirements;
- Develop airport facility integration plans. This will require research and the development of procedures that address critical issues such as low visibility, taxi spacing, light gun signals, and compatibility with NextGen operations;
- Establish UAS operating requirements with associated ATC procedures for airport conditions;
- And coordinate with the Department of Defense (DoD) and all other appropriate departments and agencies on the development of any new parallel procedures and requirements for air domain awareness and defense.

See Appendix C.8 for specific goals and metrics.

4.6 Training (Pilot, Flightcrew Member, Mechanic, and Air Traffic Controller)

The FAA's role in training is to establish policy, guidance, and standards. Airmen training standards are under development and will be synchronized with the regulatory guidance. Civil operators normally develop a training regimen that allows pilots and flight support to meet regulatory standards. For any UAS operation, training regimens analogous to those that exist for manned aircraft will need to be considered, including relevant areas such as written tests, practical examinations, and currency and proficiency requirements.

Standards for airmen will proceed following the sUAS regulation. The FAA will issue UAS airman certificates and support activities to enable UAS operations to include:

- Development of practical test standards (PTS) and UAS airmen knowledge test question banks;
- Development of a UAS handbook for airmen;
- Training of aviation safety inspectors (ASI) at the FSDO level to provide practical test oversight;
- Identification of designated pilot examiners (DPE) to assist the FSDOs;
- Development of a UAS handbook for pilot and instructors;
- Development of PTS and UAS pilot knowledge test question banks;
- Development of UAS mechanic training and certificate process;
- And development of flight crew security requirements by the relevant United States Government agencies.

Pilot endorsements may be developed for specific UAS makes and models to permit commercial operations. Pilot qualifications by make and model will be built into training and will be expanded based on pilot experience.

Training standards development will be more complex for UAS with unique operating parameters and will continue into the long-term as these UAS are certified.

Regardless of the UAS platform, similar types of training regimens are expected, consisting of a written knowledge test, practical test standards, and a flight evaluation. There will be a requirement for currency and proficiency; qualified ASIs will be fielded to regional offices across the country.

With the introduction of UAS into the NAS, additional training requirements specific to different types of UAS characteristics will probably be required for ATC personnel, including UAS performance, behavior, communications, unique flight profiles, ATC standardized procedures, lost link/fly away profiles, operating limitations, and emergency procedures. Controller training will include differences in interoperability between manned and UAS flights, with a focus on specific handling issues of the aircraft. This training must be administered to ATC facilities throughout the NAS. It is expected that controllers will handle UAS the same as manned aircraft; therefore, no special ATC certification would be required. See Appendix C.2 and C.8 for specific goals and metrics.

4.7 Research and Development (R&D) /Technology

Sense and Avoid:

Research on SAA sensor performance, data communication, and algorithms must provide solutions for safe separation for integration of UAS into the NAS. Research to develop separation algorithms will be accomplished with the JPDO R&D plan goals of:

- Flight demonstration of self-separation and collision avoidance algorithms, with multiple sensors and intruders;
- Assessment of the performance of various self-separation concepts as a function of surveillance data configurations, and evaluation of risk-based self-separation algorithms and policy issues;
- Assessment of the performance of various separation assurance concepts, and flight demonstration of separation assurance algorithms, with criteria-based separation;
- And assessment of UAS performance for delegated spacing applications (e.g., defined interval clearances).

Although research will continue, fully certified UA-based collision avoidance solutions may not be feasible until the long-term and are deemed to be a necessary component for full UAS NAS integration. This will include research on safe and efficient terminal airspace and ground operations, followed by ground demonstrations of autonomous airfield navigation and ATC interaction. See Appendix C.4 and C.8 for specific goals and metrics.

Control and Communications:

Advanced research is required in data link management, spectrum analysis, and frequency management. Efforts will focus on completing development of C2 link assurance and mitigation technologies and methods for incorporating them into the development of certification of the UAS. This will include:

- Identification of satellite communication spectrum from the ITU through its WRC;
- Verification and validation of control communication final performance requirements;
- Establishment of UAS control link national/international standards;
- And development and validation of technologies to mitigate vulnerabilities.

Complete characterization of the capacity, performance, and security impacts of UAS on ATC communication systems will be completed. See Appendix C.5 and C.8 for specific goals and metrics.

Human Factors:
Human factors research will continue in the areas of human-machine interface (both control station displays and ATC displays), automation, and migration of control. Human factors data collected in the near-term and mid-term will be analyzed to determine the safest technologies and best procedures for pilots and ATC controllers to interact with each other and with the aircraft; these results will influence technology and operations research. For separation and collision avoidance capability, the contribution of human decision making versus automation must be identified. See Appendix C.8 for specific goals and metrics.

4.8 Test Ranges

Per the FMRA, the FAA will establish six test ranges. The test ranges will take into consideration climate and geographic diversity, the location of ground infrastructure and research needs. See Appendix C.7 for specific goals and metrics.

The test range program will address and account for:

- Manned-unmanned operations,
- Certification standards and air traffic requirements,
- Coordination and leveraging of National Aeronautics and Space Administration (NASA) and DoD resources,
- Civil and public unmanned aircraft systems,
- And coordination with NextGen.

The test ranges will help provide a verification mechanism for safe operations before unmanned aircraft are integrated into the NAS.

The FAA anticipates test range operator privacy practices, as discussed in their privacy policies, will help inform the dialogue among policymakers, privacy advocates, and the industry regarding broader questions concerning the use of UAS technologies. Transparency of privacy policies associated with UAS test range operations will engage all stakeholders in discussions about which privacy issues are raised by UAS operations and how law, public policy, and the industry practices should respond to those issues in the long run.

Summary of "Integration" Priorities
New operational rules and associated standards, policies, and procedures established for small UAS
New operational rules and associated standards, policies, and procedures established for other UAS
C2 link standards defined for integrity, latency, and continuity
FAA acceptance of MASPS to enable development of detailed MOPS
Published FAA policy and operational guidance to define acceptable methods to comply with operational rules in accordance with an acceptable UAS certification basis for each applicant
Published FAA flightcrew training and certification standards

Perspective 3: Evolution

5.1 Overview

Overlaying the integration of UAS is the need to remain aware of the changing characteristics and requirements of the evolving NAS. The long-term focus for UAS operations is the refinement and updating of regulation, policy, and standards. The end-state is to implement streamlined processes for the continued integration of UAS into the NAS.

These efforts will include:

- Policy, operational guidance, and standards for civil aircraft airworthiness and NAS operations and with consideration for privacy and security concerns and frameworks;
- Continued airworthiness methodologies;
- Training and certification standardization;
- And certification of key technologies to enable continued operations of UAS in the NAS.

5.2 Standards

Unique UAS certification requirements will have been determined. MASPS, MOPS, and TSOs will support the regulations and certification of key systems for each UAS. Additionally, all standards will be evaluated and modified, as needed. See Appendix C.1 for specific goals and metrics.

5.3 Rules and Regulations

Lessons learned from previous rulemaking efforts may be applicable to the development of new UAS regulations. The process should become more efficient as UAS experience is gained and data analysis proves safety cases more quickly. UAS rulemaking activities will be more likely to involve revisions to existing rules, as needed, rather than the creation of new rules.

5.4 Airworthiness Certification of the UAS

Certification of UAS will evolve as future technologies evolve and will be consistent with all other aircraft airworthiness and operational approval processes, adding more capability to the UAS through data analyses and trending, which will identify areas for change and improvement in operations, human factors, communication links, and maintenance. See Section 3.4 for a more detailed discussion and Appendix C.1 for specific goals and metrics.

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5.5 Procedures and Airspace

Certified pilots and UAS will be permitted access into the NAS under seamless operating procedures. The need to accommodate special NAS access will be dramatically reduced, and will be limited to research and development or test operations.

UAS operations will continue to evolve based on NextGen requirements. See Appendix C.8 for specific goals and metrics.

5.6 Training (Pilot, Flightcrew Member, Mechanic, and Air Traffic Controller)

As new UAS evolve, more specific training will be developed for UAS pilots, crew members, and certified flight instructors based on lessons learned and data collection. See Appendix C.2 and C.8 for specific goals and metrics.

5.7 Research and Development (R&D) / Technology

Identified limitations and gaps will be closed via research and development of required technologies that meet standards established by the FAA. Planned activities include:

- Sense and Avoid research that focuses on algorithm development and compatibility with current and future manned aircraft collision avoidance systems such as TCAS II/ACAS X and surveillance systems (e.g., ADS-B), as well as compatibility with ATC separation management procedures and tools;
- Research on UAS system safety and levels of automation for the improvement of UAS into the future;
- Examination of potential concepts for the widespread integration of UAS into the future NextGen environment;
- AND research on new tools and techniques to support avionics and control software development and certification, to ensure their safety and reliability.

Organized studies will continue to investigate the evolution of UAS operations into the NextGen environment. Detailed research on SAA flight operations, using certified sensor systems, could allow aircraft to maintain safe distances from other aircraft during flight conditions that would not be appropriate for visual flight in a manned aircraft. This capability would rely heavily on network-enabled information, precision navigation, and cooperative surveillance, and would require the development and integration of NextGen-representative technologies for traffic, weather, and terrain avoidance. This conceptual model will be enlarged with sensors that expand the ability to maintain separation from other aircraft past the current visual spectrum and flight conditions restrictions. See Appendix C.8 for specific goals and metrics.

Summary of "Evolution" Priorities
Seamless operations of certified UAS and crew members in the evolving NAS
Published FAA TSOs based on system level MOPS
Certified Sense and Avoid algorithms for collision avoidance and self-separation that are interoperable with evolving NextGen ATC systems and manned collision avoidance systems

Conclusions

6.1 Summary

The safe integration of unmanned aircraft into the NAS is a significant challenge. The FAA is dedicated to developing the technical and regulatory standards, policy guidance, and operational procedures on which successful UAS integration depends.

The application of financial and human resources by academia and industry to support critical FAA initiatives will shorten the time required to develop technical and regulatory standards. Together, all stakeholders can overcome the challenge of integrating UAS into the NAS and leverage UAS and associated technologies for the greater benefit of society.

6.2 Outlook

Based on FAA policy and the challenges that need to be addressed, this roadmap has focused on the activities required to achieve integration of UAS into the evolving NAS. Throughout the process, the key messages below reflect the basis for the FAA's consideration of requirements to integrate civil UAS into the NAS:

1) **Government-industry collaboration is paramount to success and must focus on process, quality, and timely results.**
   The FAA expects to gain experience in applying the existing airworthiness regulations during the type certification process with early UAS adopters. We also expect input from industry and the ARC. Taking into account industry and ARC inputs, and future experience with UAS type certification projects, the FAA will review and revise as necessary the existing airworthiness regulations to ensure UAS safety.

2) **The FAA must remain committed to the development of technical and regulatory standards, policy guidance, and operations procedures on which successful UAS integration depends.**
   With this roadmap, the FAA has outlined initiatives that must be accomplished. Because unmanned aircraft are considered aircraft that are flown by pilots, existing regulations and procedures are largely applicable. However, the complete integration of UAS at airports and in the various airspace classes may necessitate the development of new or revised regulations and supplemental procedures. These will be developed and implemented in coordination with relevant agencies to address related security and privacy implications.

3) **Global standards encourage harmonization and yield cost-effective development.**
   The FAA is not bound by international policies and standards. However, harmonizing efforts with the international aviation community will allow for more seamless operations of UAS across national boundaries. Synchronizing

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efforts within the aviation community will also permit better use of limited human and fiscal resources, thereby reducing the time required to produce regulatory guidance, policy, and standards.

4) **The FAA is focused on increased access for UAS without impacting the safety or efficiency of the NAS, while managing environmental impacts.**
The FAA has placed a high priority on the development of rules for small UAS that will increase access to the NAS and provide an initial opportunity for commercial operations. In the long-term, the principal objective of the aviation regulatory framework is to achieve and maintain the highest possible uniform level of safety while maintaining or increasing the efficiency and the environmental performance of the NAS. In the case of UAS, this means ensuring the safety of all airspace users as well as the safety of persons and property on the ground.

5) **Progress must be made on the development of technology to enable NAS access.**
Because of many distinct differences between UAS and manned aircraft, there are required technologies that must be matured to enable the safe and seamless integration of UAS in the NAS. Research will be focused in the areas of sense and avoid, control and communications, and human factors.

THE SECRETARY OF TRANSPORTATION
WASHINGTON, D.C. 20590

November 6, 2013

The Honorable John D. Rockefeller IV
Chairman
Committee on Commerce, Science
and Transportation
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

As required by Section 332(a) of the FAA Modernization and Reform Act of 2012, I am pleased to provide you with the U.S. Department of Transportation's Unmanned Aircraft Systems (UAS) Comprehensive Plan. The Federal Aviation Administration's Joint Planning and Development Office developed this comprehensive plan under the guidance of the Next Generation Air Transportation System (NextGen) Senior Policy Committee, and in coordination with NextGen partner representatives. The Plan outlines the safe acceleration of the integration of civil UAS into the National Airspace System (NAS).

The UAS Comprehensive Plan includes UAS National Goals and Objectives that reflect the NextGen partner agencies' UAS mission needs. The work accomplished by the multi-agency teams in Fiscal Year 2012 provides the foundation for embarking on the path towards safe integration of UAS in the NAS. The completed work provides a common framework for evolving interagency coordination and planning and is a testament to the collaboration among representatives from the partner agencies and the UAS community.

A similar letter has been sent to the Chairman of the House Committee on Transportation and Infrastructure and the Ranking Members of the Senate Committee on Commerce, Science and Transportation and the House Committee on Transportation and Infrastructure.

Sincerely,

Anthony R. Foxx

Enclosure

THE SECRETARY OF TRANSPORTATION
WASHINGTON, D.C. 20590

November 6, 2013

The Honorable John Thune
Ranking Member
Committee on Commerce, Science
and Transportation
United States Senate
Washington, DC 20510

Dear Senator Thune:

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A similar letter has been sent to the Chairmen of the Senate Committee on Commerce, Science and Transportation and the House Committee on Transportation and Infrastructure and the Ranking Member of the House Committee on Transportation and Infrastructure.

Sincerely,

Anthony R. Foxx

Enclosure

THE SECRETARY OF TRANSPORTATION
WASHINGTON, D.C. 20590

November 6, 2013

The Honorable Bill Shuster
Chairman
Committee on Transportation
and Infrastructure
U.S. House of Representatives
Washington, DC 20515

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Sincerely,

Anthony R. Foxx

Enclosure

THE SECRETARY OF TRANSPORTATION
WASHINGTON, D.C. 20590

November 6, 2013

The Honorable Nick J. Rahall, II
Ranking Member
Committee on Transportation
and Infrastructure
U.S. House of Representatives
Washington, DC 20515

Dear Congressman Rahall:

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Sincerely,

Anthony R. Foxx

Enclosure

Unmanned Aircraft Systems (UAS) Comprehensive Plan

A Report on the Nation's UAS Path Forward

September 2013

PREPARED BY THE JOINT PLANNING AND DEVELOPMENT OFFICE (JPDO)

EXECUTIVE SUMMARY

The *Unmanned Aircraft Systems (UAS) Comprehensive Plan* details work that has been accomplished, along with future efforts needed to achieve safe integration of UAS into the National Airspace System (NAS). Throughout Fiscal Year 2012 (FY12), work was conducted to develop elements required to create a more complete picture of achieving safe UAS integration. The perspectives and information available from these individual activities create a framework and reveal an evolving capability for the integration of UAS into the NAS.

Representatives from the Next Generation Air Transportation System (NextGen) partner agencies – the Departments of Transportation (DOT), Defense (DoD), Commerce (DOC), and Homeland Security (DHS), the National Aeronautics and Space Administration (NASA), and the Federal Aviation Administration (FAA) – as well as industry representatives, provided through the FAA's UAS Aviation Rulemaking Committee (ARC), have actively participated in constructing this Plan. The completed work is a testament to the collaboration among representatives from the partner agencies and the UAS community.

The continued safe integration of UAS in the NAS and increased NAS access for UAS will be driven by incremental advances in: research and development (R&D) (including test ranges); rulemaking (including operational approval and airworthiness standards); and development of UAS-related technologies. Safe integration will lead us from today's need for accommodation of UAS through individual approvals to a time when standardized/routine integration into the NextGen environment is well defined.

Six high-level strategic goals that are specific, measureable, attainable, realistic, and timely were developed to reflect the principal objective of safe UAS integration into the NAS. These high-level goals – summarized below – were derived from existing goals provided by the partner agencies and should therefore resonate with the wide range of UAS stakeholders.

The overarching approach for the Goals is to allow public integration to lay the framework for civil integration. The first two Goals apply to small UAS (under 55 pounds) within visual line-of-sight (VLOS), assuming the public realm would be accomplished first and civil would follow; the third and fourth Goals apply to the other UAS, with the same process: public would occur first and civil would follow. Goal 5 was established to plan and manage growing automation capabilities through research, and Goal 6 provides the opportunity for the U.S. to remain leaders in the international forum. The sum of these Goals shows a phased-in approach for UAS integration in the NAS.

The *UAS Comprehensive Plan* sets the overarching, interagency goals, objectives, and approach to integrating UAS into the NAS. Each partner agency will work to achieve these national goals, and may develop agency-specific plans that are aligned to the national goals and objectives. The FAA's *Integration of Civil UAS in the NAS Roadmap* is an example of one such plan. It outlines, for planning purposes and within a broad timeline, the tasks, assumptions, dependencies, and considerations needed to enable UAS integration in the NAS within the wider UAS community. It will remain consistent with the *UAS Comprehensive Plan*. The FAA's UAS Concept of Operations (ConOps) reflects their desired end-state, and lays out the pathway for achieving this end-state, anticipating the technological and procedural enhancements required to make

integration happen. In addition, it begins the engineering process of incorporating UAS-specific changes into the *NextGen Implementation Plan*.

Understanding and prioritizing the R&D needs associated with each of the UAS National Goals is key to achieving robust integration of UAS in the NAS. The need for new capabilities, mitigations, and verification and validation methods to enable safe and secure operations will require the development, integration, and implementation of emerging and new technologies. Each agency presents varying needs and possesses a significant body of expertise resulting from historical investments in UAS operations. R&D-related activities undertaken in FY12 have initiated a process by which the partner agencies can share information and coordinate their research to support the UAS National Goals, maximize the return on investment dollars, and ensure that research products address the FAA's needs beyond 2015.

Two additional activities that are critical to the integration of UAS include the small UAS Rule and the test range program. First, the FAA is drafting a Notice of Proposed Rulemaking (NPRM), targeted for release in calendar year 2014 that is intended to lead to requirements and parameters for how small UAS will be integrated into the NAS. Second, a Screening Information Request (SIR) for the test site selection process was published by the FAA on February 14, 2013. The selection of the six test ranges is anticipated to be completed by the end of calendar year 2013.

The work accomplished in FY12 provides the foundation for safe integration of UAS in the NAS. Valuable relationships have been established and a commitment among the NextGen partners is reflected in the UAS National Goals. Details required for UAS integration implementation are laid out in the FAA's *Integration of Civil UAS in the NAS Roadmap* which will be updated annually. These annual updates will track and report progress. The FAA's UAS ConOps begins the process of including UAS-related changes in the FAA's *NextGen Implementation Plan*. A process has been initiated for how research that enables emerging technology can be identified, prioritized, and integrated into the *NextGen Implementation Plan*. Finally, a small UAS rulemaking project has been initiated, and the test range selection process is underway.

Important non-safety related issues, such as privacy and national security, need to be taken into consideration as UAS are integrated into the NAS. The privacy requirements proposed for the UAS test sites are specifically designed for the operation of the test sites and are not intended to pre-determine the long-term policy and regulatory framework under which UAS would operate. However, the FAA anticipates that the privacy policies developed by the test site operators will help inform the dialogue among policymakers, privacy advocates, and the industry regarding broader questions concerning the use of UAS technologies in the NAS.

Collectively, the efforts described in this document represent the framework of the *UAS Comprehensive Plan*. They will continue to be refined as needed, in FY13 and beyond, until safe integration of UAS in the NAS is accomplished for both public and civil UAS users.

1. INTRODUCTION

Over the last 50 years, rapid advances in aviation technology have transformed the nation's skies. Our National Airspace System (NAS) has evolved to include a wide variety of fixed wing and rotary aircraft of various sizes, weights, and speeds, operating across the country from populated complex metropolitan areas to remote airfields supporting small communities. They operate in a range of airspace, from low-altitude to the stratosphere. Some are dependent on thermals and wind, such as gliders and balloons, and others fly faster than the speed of sound, such as supersonic planes and spacecraft. As aircraft technology expands, so do the challenges associated with maintaining a safe and integrated NAS. And, with the recent advent of and growing interest in remotely piloted aircraft – commonly known as Unmanned Aircraft Systems (UAS) – addressing these challenges in a complex, multi-layered system has never been more critical. UAS are to be integrated in an already shaped and automated NAS and Air Traffic Control (ATC) environment that was originally developed for manned aircraft.

The use of UAS has increased significantly in the United States. From agricultural monitoring and border surveillance to local crime scene investigations, search and rescue missions, disaster response (e.g., wildfires and floods), and military training, UAS provide a wide variety of operational, societal, and economic benefits to its diverse group of users. For example, according to the Teal Group, the market for government and commercial use of UAS is expected to grow, with small UAS having the greatest growth potential.[1] Teal forecasts that the worldwide expenditures on UAS and related research could be potentially as much as $89.1 billion in aggregate over the next decade, with the United States playing a leading role. However, as the demand for UAS increases, concerns regarding how UAS will impact existing aviation grow stronger, especially in terms of safety, privacy, frequency crowding, and airspace congestion.

In 2008, the Government Accountability Office (GAO) reported[2] that the U.S. must develop a clear and common understanding of what is required to safely and routinely operate UAS in the NAS. Additionally, Congress underscored the significance of UAS integration when it enacted the FAA Modernization and Reform Act of 2012. Through this legislation, Congress set forth a number of specific requirements[3] for achieving UAS integration – namely, a Comprehensive Plan and a five-year Roadmap.

This *UAS Comprehensive Plan* is expected to address the following elements:

- FAA rulemaking projects being conducted under Section 332, sub-section (b).
- Methods to enhance technologies and subsystems necessary for safe and routine operation of civil UAS.
- Phased-in approach to civil UAS integration into the NAS.
- Timeline for phased-in integration.

[1] Teal Group Corporation, *World Unmanned Aerial Vehicle Systems* (Fairfax, VA: 2012).
[2] U.S. Government Accountability Office. (2008, May) *Unmanned Aircraft Systems: Federal Actions Needed to Ensure Safety and Expand Their Potential Uses within the National Airspace System*, GAO-08-511. http://www.gao.gov/assets/280/275328.pdf
[3] See Appendix A: FAA Modernization and Reform Act of 2012 - UAS Requirements.

- Airspace designation of manned and UAS operations in a cooperative NAS environment.
- Establishment of a process to inform FAA rulemaking projects related to certification, flight standards, and air traffic requirements for civil UAS, and the process for gathering informational data from designated test ranges.
- Methods to ensure simultaneous safe operations of civil and public UAS within the NAS.
- Incorporation of the Plan into the annual *Next Generation Air Transportation System (NextGen) Implementation Plan.*

Ultimately, cost-effective and safe implementation will require multi-agency coordination to develop a national-level plan that guides routine UAS operations in the NAS.

In April 2012, under the guidance of the NextGen Senior Policy Committee (SPC), the Joint Planning and Development Office (JPDO) answered this challenge, assembling executive- and working-level teams comprised of individuals from the NextGen partner agencies – the Departments of Transportation (DOT), Defense (DoD), Commerce (DOC), and Homeland Security (DHS) as well as the National Aeronautics and Space Administration (NASA), and the Federal Aviation Administration (FAA). These individuals began the work required to develop a UAS plan. The initial objective of the collective team was to create and coordinate approval of UAS National Goals and Objectives that are reflective of the NextGen partner agencies' UAS mission needs, and predicated on data and information from existing documentation aggregated by the JPDO.[4] Ultimately, the UAS National Goals and Objectives represent the framework and foundation of the *UAS Comprehensive Plan* – an endeavor the JPDO is leading in collaboration with the NextGen partners, which is further described in detail within this document.

The *UAS Comprehensive Plan* sets the overarching, interagency goals, objectives and approach to integrating UAS into the NAS. Each partner agency will work to achieve these national goals, and may develop agency-specific plans that are aligned to the national goals and objectives. The FAA's *Integration of Civil UAS in the NAS Roadmap* is an example of one such plan. It outlines, for planning purposes and within a broad timeline, the tasks, assumptions, dependencies, and considerations needed to enable UAS integration in the NAS within the wider UAS community. It will remain consistent with the *UAS Comprehensive Plan*. The FAA's UAS Concept of Operations (ConOps) reflects their desired end-state, and lays out the pathway for achieving this end-state, anticipating the technological and procedural enhancements required to make integration happen. In addition, it begins the engineering process of incorporating UAS-specific changes into the NextGen Implementation Plan.

Additionally, this Comprehensive Plan supports the coordination and integration of research and development (R&D) necessary to achieve the UAS National Goals and the FAA's Integration Roadmap goals. Development of a *NextGen UAS Research, Development and Demonstration (RD&D) Roadmap*, prioritization methodology, and prioritization database in Fiscal Year 2012 (FY12) established initial information and a process for the JPDO and partner agencies to

[4] See Appendix B: UAS National Goals and Objectives Source Documents.

collaborate in their efforts to identify and address R&D needs for UAS capabilities beyond 2015. Assessment of R&D needs and prioritizing the activities is an essential element of the Comprehensive Plan.

The FAA's chief mission is to ensure the safety and efficiency of the NAS. This includes manned and unmanned aircraft operations. While the expanded use of UAS presents great opportunities, it also presents significant challenges as unmanned aircraft systems are inherently different from manned aircraft.

Safety, Privacy, Civil Rights, Civil Liberties & Security

Members of the NextGen SPC agree on the need to address privacy concerns of the public at large while safely integrating UAS in the NAS. As use of UAS by civil agencies and private industry grows, preserving the privacy, civil rights, and civil liberties of individuals becomes increasingly important. In October 2012, the SPC committed to working together on this issue and suggested that answers to privacy policy questions could be accomplished in stages.

The FAA also recognizes the importance of non-safety related issues, such as privacy and civil liberties, physical security, and potential economic opportunities, which all Federal agencies and stakeholders participating in the development of UAS policy will need to take into consideration as UAS are integrated into the NAS. Specific to privacy concerns, the FAA has proposed and is requesting public input on a privacy approach for the UAS test site program that attempts to prudently address privacy concerns by emphasizing transparency, public engagement, and compliance with existing law.

The UAS test sites authorized by Congress can provide an opportunity for development and demonstration by the test site operators and users of policies and operating approaches that would address both UAS operator mission needs and related individual privacy concerns. The lessons learned and best practices established at the test sites may be applied more generally to protect privacy in UAS operations throughout the NAS. This incremental approach will provide an example to both private and public sectors on a safe and secure way to employ UAS that is consistent with the need for privacy.

Federal agencies are mindful that national defense and homeland security measures are to be designed and performed without diminishing the privacy, civil rights, and civil liberties of individuals. There are specific laws applicable to public agencies that ensure that those agencies follow privacy principles. In addition, many agencies have their own internal privacy policies providing guidance to their employees about the importance of privacy, civil rights, and civil liberties. Robust privacy policies, privacy impact assessments, and privacy compliance reviews or audits are just some of the tools that Federal agencies may use as mechanisms to protect individual rights and liberties.

Although there is no Federal law that specifically addresses privacy concerns with respect to civil UAS operations, many states have laws that protect individuals from invasions of privacy which could be applied to intrusions committed by using a UAS.

Integrating public and civil UAS into the NAS carries certain national security implications, including cyber and communications security, domestic framework for US government operations, national airspace and defense, airman vetting/general aviation, and privacy concerns. In coordination with the National Security Staff at the White House, the FAA is working in conjunction with relevant agency partners on an Interagency Policy Committee to address these issues.

The sections that follow highlight the results of the FY12 activities and explain how these pieces are a part of or may influence the Comprehensive Plan for UAS integration in the NAS.

2. APPROACH

Several initiatives have advanced in parallel to plan for the integration of UAS in the NAS. They address the need for a common set of goals, a common understanding of how UAS will operate in the NAS, a timeline for accomplishing the activities required to allow for safe integration of UAS, and a way to evaluate research needs that enable prompt technology improvements to support the successful execution of that timeline. The highlights of these activities are included here.

2.1 UAS NATIONAL GOALS, OBJECTIVES, AND TARGETS

The JPDO developed the UAS National Goals, Objectives, and Targets in coordination with executive- and working-level representatives provided by the NextGen partner agencies. The interagency team emphasized that the UAS National Goals must represent the achievable UAS capabilities, considering user and stakeholder mission needs, type of operations, and operational boundaries.

The initial framing of the UAS National Goals and Objectives leveraged 12 key source documents,[5] including UAS roadmaps, plans, and integration efforts from various agencies. Key goals, objectives, requirements, supporting activities, and dates from applicable reference documents provided insight into agency-specific UAS initiatives. The common goals and themes reflected in the extracted data served as the basis for the development of six UAS National Goals and eight Objectives. These UAS National Goals and Objectives are not directly linked on a one-for-one basis, but rather, a specific objective could support a range of Goals.

The following assumptions frame the formulation of the UAS National Goals, Objectives, and Targets:

- Routine operations for UAS should not require exceptions or unique authorizations.
- Targets reflect the earliest start dates mandated by the FAA Modernization and Reform Act of 2012[6] for achieving initial capability in support of the UAS National Goals.
- The UAS National Goals and Objectives must align with – and not supersede – government United States Code (U.S.C.) title authorities and responsibilities (see below for further elaboration).
- Partner agency documents constitute a baseline reflecting current plans and efforts toward safe UAS integration in the NAS.[7]

[5] Ibid.

[6] The FAA Modernization and Reform Act of 2012 specifies the following UAS target dates for safe UAS integration into the NAS:

- August 14, 2014 – Publish a final rule on small UAS. Required by Section 332 (b)(1).
- September 30, 2015 – "No later than date" for safe integration of civil UAS into the NAS. Required by Section 332(a)(3).

The final set of UAS National Goals and Objectives represents the result of several iterations of refinement and review by partner agencies and approval by the UAS National Plan Partner Agency Senior-Level Executives designated by the JPDO Board.

The Comprehensive Plan does not supersede government U.S.C. title authorities and responsibilities. The UAS National Goals and Objectives provide a framework for interagency coordination and planning. Government agencies will comply with their own processes, policies, and standards regarding airworthiness, pilot, aircrew and maintenance personnel certification and recurrent training. The authority to safely conduct public aircraft operations in the NAS is derived from Title 49, United States Code (49 U.S.C. §§ 40102(a) (41) and 40125). If no government UAS processes, policies, or standards exist, it is recommended that the agency apply specific provisions of 14 Code of Federal Regulations (CFR) applicable to civil UAS operations when they are published. The appropriate public or civil authority will be responsible for establishing the requirements called out in the UAS National Objectives.

2.1.1 UAS NATIONAL GOALS

1. Routine Public Small UAS Visual Line-of-Sight (VLOS) Operations Conducted in the NAS (without special authorization; i.e., Certificate of Authorization) (2015)[8]

- Initial Capability[9]: Operations outside of Class B/C airspace and not over populated areas.
- Full Capability[10]: Operations in all applicable domestic airspace classes subject to airspace requirements.

2. Routine Civil Small UAS VLOS Operations Conducted in the NAS (without special authorization; i.e., Special Airworthiness Certificate) (2015)

- Initial Capability: Operations outside of Class B/C airspace and not over populated areas.
- Full Capability: Operations in all applicable domestic airspace classes subject to airspace requirements.

3. Routine Public UAS Operations in the NAS (2015)

- Initial Capability: Using mitigation for UAS limitations to comply with 14 CFR Part 91 requirements.
- Full Capability: UAS compliance with revised operating requirements addressing unique UAS attributes.

4. Routine Civil UAS Operations in the NAS (2020)

- Initial Capability: Using mitigation for UAS limitations to comply with 14 CFR Part 91 requirements.

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[7] See Appendix B: UAS National Goals and Objectives Source Documents.

[8] Dates assigned to the UAS National Goals indicate when the Initial Capability will be available.

[9] Initial Capability: An initial implementation available for operations that supports the planned UAS National Goal.

[10] Full Capability: A final implementation available for operations that completes the planned UAS National Goal.

- Full Capability: UAS compliance with revised operating requirements addressing unique UAS attributes.

5. Define, Determine, and Establish Acceptable Levels of Automation for UAS in the NAS (TBD)[11]

6. Foster U.S. International Leadership in UAS Capabilities and in Standards Development (Ongoing)

- Initial Capability: UAS operations in airspace where the U.S. has the responsibility for the provision of Air Traffic Services (ATS).
- Full Capability: Harmonized UAS operations in accordance with International UAS Standards and Recommended Practices (SARPs).

2.1.2 UAS NATIONAL OBJECTIVES

1. Establish Applicable Certification and Training Requirements for Pilots/Crew Members, Other UAS Operational Personnel, and Appropriate Air Navigation Service Provider (ANSP) Personnel

1.1. Determine the roles and responsibilities of applicable pilots/crew members, other UAS operational personnel, and appropriate ANSP personnel for safe UAS integration.
1.2. Develop and propose regulatory changes, as required, to define licensing (certification) and training requirements for pilots/crew members, other UAS operational personnel, and appropriate ANSP personnel (address in 14 CFR Part 61, 63, 65, and 141-147).
1.3. Publish, if required, final rule requirements for applicable pilots/crew members, other UAS operational personnel, and appropriate ANSP personnel.
1.4. Begin training and certification initiatives for pilots/crew members, other UAS operational personnel, and appropriate ANSP personnel.

2. Approve Applicable Medical Requirements and Standards (e.g., address 14 CFR Part 67)

2.1. Develop and propose regulatory changes, as required, to define draft medical requirements and standards.
2.2. Publish, if required, a final rule establishing medical requirements and standards.

3. Establish Applicable Airworthiness Certification Requirements

3.1. Facilitate the initiation of applicable classification and basis of airworthiness certification.
3.2. Facilitate the development of draft airworthiness design standards.
3.3. Develop applicable draft airworthiness certification advisory circulars.
3.4. Approve and publish final system airworthiness certification advisory circulars.
3.5. Ensure that a robust and integrated test environment is available to develop, test, and evaluate UAS.
3.6. Administer certification, including Advisory Circular (AC) guidance and oversight.

[11] A roadmap will be developed in 2015 which will help determine when this goal will be accomplished.

4. Implement Small UAS Rules

4.1. Develop and publish small UAS Rules for operations within VLOS of the pilot or observer.

4.2. Issue permits to operate as applicable to small UAS (FAA).

5. Approve the Use of Ground Based Sense and Avoid (GBSAA) for UAS Operations

5.1. Define GBSAA performance requirements for access to all applicable domestic airspace classes subject to airspace requirements and classes of aircraft.

5.2. Define GBSAA equipment and operating requirements for access to all applicable domestic airspace classes subject to airspace requirements and classes of aircraft.

5.3. Test GBSAA equipment and procedures.

5.4. Approve GBSAA operations for routine use.

6. Approve the Use of Airborne Sense and Avoid (ABSAA) for UAS Operations

6.1. Define ABSAA performance requirements for access to all applicable domestic airspace classes subject to airspace requirements and classes of aircraft.

6.2. Define ABSAA equipment and operating requirements for access to all applicable domestic airspace classes subject to airspace requirements and classes of aircraft.

6.3. Test ABSAA equipment and procedures.

6.4. Amend 14 CFR 91.113 (Right-of-way-rules) to allow ABSAA

6.5. Approve ABSAA operations for routine use.

7. Develop and Integrate UAS Enabling Technologies within the NAS Infrastructure to Support Appropriate Levels of Automation

7.1. Coordinate, develop, and refine existing and/or emerging ontologies for automation. Baseline the ontology(ies) in order to provide standard terminology, roles, responsibilities, modes, and levels for usage in: requirements analysis, standards development, modeling and simulations assessments, systems development, procedures development, testing, certification processes, training documentation, and research specifications. Maintain consistency and interoperability with other automation systems to enable future systems of systems integration.

7.2. Develop a UAS Automation Roadmap (UAR) that evaluates the use of increasing levels of automation within the context of FAA NextGen infrastructure and stakeholder R&D capabilities. Continue to coordinate and update the UAR along with the NextGen UAS RD&D Roadmap.

7.3. Determine the requirements and develop, certify, and field UAS enabling technologies to support enhanced automation capabilities.

8. Approve Integrated Operations for Manned Aircraft and UAS in the NAS

8.1. Develop UAS agency-specific Integration Transition Plans.

8.2. Develop Airspace Integration Safety Case/Assessment.

8.3. Develop and publish operational standards, procedures, and guidance for UAS airspace operations (Regulations, Policy Documents, Advisory Circulars, Orders, Notices, Handbooks, and Manuals).

8.4. Develop and publish operational standards, procedures, and guidance relative to airport facilities and UAS surface operations (Regulations, Policy Documents, Advisory Circulars, Orders, Notices, Handbooks and Manuals).

2.2 INTEGRATION OF CIVIL UAS IN THE NAS ROADMAP (FAA'S INTEGRATION ROADMAP)

The FAA's Integration Roadmap contains FAA-developed goals, metrics (activities), and target dates (or date ranges), and incorporates many related UAS Aviation Rulemaking Committee (ARC) recommendations. The FAA's Integration Roadmap is a five-year plan, and target dates are generally limited to this horizon. The FAA will reflect necessary changes to the existing set of goals, metrics, and target dates in yearly updates to the FAA's Integration Roadmap. These annual updates enable tracking and progress reporting as recommended by the GAO.

The goals are, for the most part, intended to be addressed concurrently. The metrics help establish and maintain common government and industry expectations, and enable objective assessments of the progress made toward accomplishing each goal. The goals and metrics collectively reflect the incremental approach to UAS certification and integration, and establish a set of strategic objectives that can guide the definition of lower-level activities, schedules, and resource requirements.

Goals and metrics were developed for each of the following UAS focus areas:

(1) Certification Requirements (Airworthiness)
(2) Certification Requirements (Pilot/Crew)
(3) Ground Based Sense and Avoid (GBSAA)
(4) Airborne Sense and Avoid (ABSAA)
(5) Control and Communications (C2)
(6) Small UAS and Other Rules
(7) Test Ranges
(8) Air Traffic Interoperability
(9) Miscellaneous

These focus areas represent the elements that should be addressed to enable UAS integration in the NAS. Figure 1 is an example of the information contained in the FAA's Integration Roadmap.

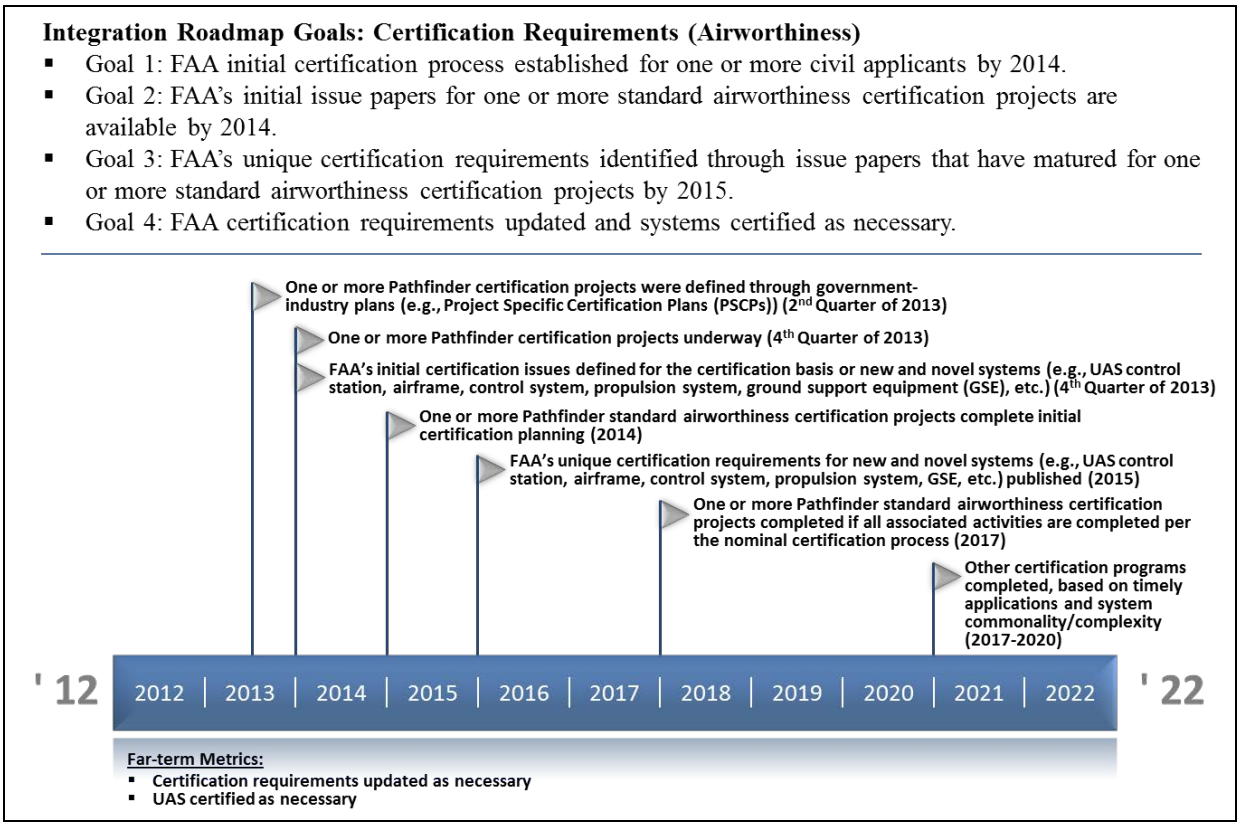


Figure 1 – Example: Airworthiness Certification Requirements Activities (Metrics)

2.3 UAS RESEARCH AND DEVELOPMENT (R&D) PRIORITIZATION

The FAA has established R&D priorities to successfully achieve UAS capabilities envisioned in 2015. However, the UAS National Goals to be achieved after initial integration in 2015 require technology solutions that are not fully available today. Understanding and prioritizing R&D needs associated with each of the UAS National Goals is critical to achieving robust integration of UAS in the NAS. Each partner agency brings unique needs and possesses a significant body of expertise resulting from historical investments in UAS operations. As a result, R&D-related activities undertaken in FY12 have established a process by which the partner agencies can share information and coordinate their research to support the UAS National Goals, maximize the return on investment dollars, and ensure that research products address the FAA's needs beyond 2015.

The FY12 UAS R&D efforts, focused on establishing a basis for identifying and prioritizing R&D needs, include the following:

- Developing and issuing a *NextGen UAS RD&D Roadmap*, which provided a catalog of R&D efforts.
- Establishing JPDO and multi-agency teams to facilitate coordination of R&D-related efforts.
- Developing an approach for prioritizing R&D topics based on the UAS National Goals.

The prioritization of R&D topics began with the *NextGen UAS RD&D Roadmap*.[12] Developed in 2011 and signed in 2012, the Roadmap is a catalog of ongoing and planned R&D efforts being conducted by the NextGen partners to support the integration of UAS operations in the NAS. Additionally, the process established a means for partner agencies to exchange information and coordinate with the FAA. Subject matter experts from the partner agencies – FAA, NASA, DoD, DHS, and DOC – contributed to the *NextGen UAS RD&D Roadmap*, identifying planned and ongoing work and critical R&D challenges in their areas of expertise. The *NextGen UAS RD&D Roadmap* defined 23 challenges within the four technical tracks of Communications, Airspace Operations, Unmanned Aircraft, and Human Systems Integration.

The FY12 R&D effort used the *NextGen UAS RD&D Roadmap* and other studies to establish a prioritization approach linked to the UAS National Goals. This activity established prospective R&D topics, prioritization categories, a UAS R&D database, and an initial list of proposed high-priority R&D needs to achieve the UAS National Goals. Representatives from partner agencies participated in developing and reviewing the methodology and the preliminary results.

The methodology incorporates four steps:

- Use the UAS National Goals to represent the requirements driving R&D needs.
- Develop a detailed list of prospective R&D topics (the FY12 effort identified 244 topics addressing 52 aspects of UAS integration in the NAS).
- Assign a priority category (Safety Critical, Necessary, Enhances, Not Applicable) to each of the R&D topics with respect to each of the UAS National Goals beyond initial integration in 2015.
- Summarize the prioritized topics associated with each of the 23 R&D challenges identified in the *NextGen UAS RD&D Roadmap*.

One of the major outcomes of the FY12 effort includes development of an initial UAS R&D prioritization database created by a team of subject matter experts working with partner agency representatives. The database documents the relationships among identified R&D needs, R&D challenges, UAS National Goals, and relative priorities. It will be used as a basis for more extensive FY13 UAS R&D prioritization work.

2.3.1 INTERAGENCY RESEARCH COLLABORATION

In addition to the JPDO-led research collaboration, the FAA has been increasing its research collaboration with the NextGen partner agencies. Details of those efforts are listed in the paragraphs below.

The FAA is providing subject matter experts to support NASA's "UAS Integration in the NAS" project to review research objectives and assumptions. The FAA and NASA have shared UAS research project plans and analysis results, and have identified the need to minimize duplicative

[12] Joint Planning and Development Office, (2012, March)
http://www.jpdo.gov/library/20120315_UAS%20RDandD%20Roadmap.pdf

efforts and determine how UAS research, expertise, and assets can be leveraged between them. There is an umbrella interagency agreement for UAS research between the FAA and NASA, which will allow the FAA to centralize and focus its collaboration with NASA while capitalizing on expertise across all NASA research centers. Specific focus with NASA is in the areas of Human Systems Integration, Communications, Certification, Separation Assurance/Sense and Avoid Interoperability, and Integrated Test and Evaluation.

The FAA and DoD have collaborated on the Defense Department's UAS – Airspace Integration (UAS-AI) Quick Reaction Test. The FAA is also collaborating with DoD/USNORTHCOM on the follow-on Joint Test, which commenced at the end of calendar year 2012. In addition, the FAA conducted an evaluation of the DoD Joint ConOps for UAS-AI, which focuses on near-term advanced accommodation of UAS in the NAS. The suite of proposed flight profile tests will potentially serve as an incremental step to inform the FAA's Integration Roadmap.

The FAA and DHS collaborated on the FAA's Demo 4. Demo 4's high-level research objectives were to assess the ability for an independent Ground-Based Voice Communication System to restore communication between the UAS pilot and ATC in the event of a lost link/lost communication scenario. The objectives also tested the viability of providing an independent Cockpit Display of Traffic Information system to aid a UAS pilot in tracking own-ship information in the event of a lost link/lost communication scenario. The UAS Demonstration Team successfully completed Demo 4 by observing a Customs and Border Protection operational flight in October 2012.

2.4 TEST RANGES

During FY12, the FAA initiated a program for test ranges in accordance with the FAA Modernization and Reform Act of 2012. This effort successfully generated a Screening Information Request (SIR) after a public comment period and public webinars, with almost 800 registrants, to address questions on the test ranges. All comments were adjudicated and the final SIR soliciting applications was published on February 14, 2013. The deadline for submitting applications was May 6, 2013. The FAA is currently evaluating the applications and anticipates that the test sites will be selected by the end of calendar year 2013. As part of the test range agreements, the FAA will be collecting information that will help inform future rulemaking activities and other policy decisions related to safety, privacy, and economic growth. In addition, NextGen partner agencies will leverage their individual and networked laboratory facilities and test infrastructure, as appropriate, to advance the goals and objectives of this plan.

2.5 SMALL UAS RULE

A Notice of Proposed Rulemaking (NPRM) on small UAS is under development with the intent to provide safe small UAS access to the NAS. The NPRM for small UAS is being drafted and is targeted for release in 2014.

3. INTEGRATED APPROACH AND THE PATH FORWARD

As described in the previous section, many parallel activities have been conducted to support the generation of this Comprehensive Plan. Each of these pieces plays a critical role in ultimately achieving the safe integration of UAS in the NAS.

Achieving approval of the UAS National Goals and Objectives by the NextGen partners was a key accomplishment, since this allowed the stakeholders to work in unison.[13] With six approved National Goals and eight Objectives, there is a common framework and timeline to begin the UAS integration work. The overarching approach for the Goals is to allow public integration to lay the framework for civil integration. The first two Goals apply to small UAS (under 55 pounds) within VLOS, assuming the public realm would be accomplished first and civil would follow; the third and fourth Goals apply to the other UAS, with the same process: public would occur first and civil would follow. Goal 5 was established to plan and manage growing automation capabilities through research, and Goal 6 provides the opportunity for the U.S. to remain leaders in the international forum. The sum of these Goals shows a phased-in approach for UAS integration in the NAS.

The FAA's UAS ConOps provides the mechanism to enable integration of UAS needs into the FAA's *NextGen Implementation Plan*. Assessment of R&D needs to support the UAS ConOps and prioritizing the activities is an essential element of the Comprehensive Plan. Since the FAA has already defined critical research to support what is required for 2015, the FY13 R&D prioritization effort addresses R&D efforts in support of UAS integration beyond 2015. The FY13 R&D prioritization activity will develop these needs and identify ongoing research efforts in close coordination with the partner agencies.

The need for new capabilities, mitigations, and verification and validation methods to enable safe operations will require the development, integration, and implementation of emerging and new technologies. Advanced planning is essential, since lead times for developing technology for full implementation of UAS National Goals beyond 2020 can span many years. The scope of issues involved in UAS integration in the NAS dictates that R&D activities must be well understood within an integrated framework in terms of relevance, timeliness, and relationships among related research activities. Using the draft methodology generated in FY12 as guidance, the JPDO will lead a more extensive UAS research prioritization activity in FY13. The NextGen *UAS RD&D Roadmap* and prioritization of R&D needs to represent significant steps toward planning and coordinating the R&D required to achieve the UAS National Goals. The JPDO and its partners plan to continue this activity with the following next steps:

- Refine the prioritization methodology.
- Update and refine the UAS R&D prioritization database, including incorporation of R&D needs associated with policy decisions and mitigation of identified risks.
- Update the UAS R&D inventory established in the *NextGen UAS RD&D Roadmap*.
- Conduct a gap analysis comparing the inventory in an updated *NextGen UAS RD&D Roadmap* to validated R&D needs identified by the R&D prioritization activity.
- Work with the partner agencies to establish R&D Community of Interest that addresses integration of UAS in the NAS.

[13] Partner agency approval is in final coordination.

- Identify further steps to fill the gaps and plan, coordinate, and assess progress of R&D associated with the UAS National Goals.

The FAA's Integration Roadmap lays out a rolling five-year plan for implementing UAS integration in the NAS. It supports the UAS National Goals and Objectives and anticipates the technology and procedural enhancements required to make integration happen. In general, it provides a timeline for phased-in integration of UAS in the NAS. The FAA's Integration Roadmap was shaped by industry recommendations received through the FAA's UAS ARC and implementation details will be added through FY13.

In addition to the activities listed above, two other activities are underway that are critical to the successful integration of UAS in the NAS. The small UAS Rule is under development, and is expected to begin to address the first two UAS National Goals. Also, the test range program has been defined and initiated. The FAA anticipates the selection will be announced by the end of calendar year 2013. The small UAS Rule and the test range program activities are included in the FAA's Integration Roadmap.

4. CONCLUSION

UAS play a unique role in the safety and security of many U.S. military and civil missions. Due to the diverse utility that UAS offer, their use is expected to increase exponentially once safe and efficient integration in the NAS is accomplished. As a result, developing a safe and efficient way for UAS to operate in the NAS with manned aircraft has become a critical issue – particularly in the planning and implementation of NextGen.

In 2008, the GAO reported that the U.S. must develop a clear and common understanding of what is required to safely and routinely operate UAS in the NAS. Congress then enacted the FAA *Modernization and Reform Act of 2012*, which laid out a number of requirements for achieving UAS integration, namely, a Comprehensive Plan and a five-year Roadmap. In early 2012, the JPDO addressed this challenge by assembling executive- and working-level teams comprised of individuals from the NextGen partner agencies. Ultimately, the work accomplished by these multi-agency teams in FY12 provided the foundation for embarking on the path towards safe integration of UAS in the NAS. The JPDO will continue to convene partner agency teams to address such issues as security, privacy, civil rights, and civil liberties as the opportunity is presented, enabling integration across several key policy areas of interest.

Specifically, valuable relationships have been established and the commitment shared by the NextGen partners is reflected in the UAS National Goals. Details required for UAS integration implementation are described in the FAA's Integration Roadmap, which will be updated annually. Also, the overarching process has been defined for how research priorities to enable emerging technology will be identified and integrated into the FAA's *NextGen Implementation Plan*. The test ranges will be positioned to provide data to assist with engineering activities that will support integration.

Collectively, the efforts described in this document represent the framework of the *UAS Comprehensive Plan*. They will continue in FY13 and beyond, as needed, until safe integration of UAS in the NAS is accomplished for both public and civil UAS users.

APPENDIX A – FAA MODERNIZATION AND REFORM ACT OF 2012: UAS REQUIREMENTS

To amend title 49, United States Code, to authorize appropriations for the Federal Aviation Administration for fiscal years 2011 through 2014, to streamline programs, create efficiencies, reduce waste, and improve aviation safety and capacity, to provide stable funding for the national aviation system, and for other purposes.

TITLE III—SAFETY
Subtitle B—Unmanned Aircraft Systems

SEC. 332. INTEGRATION OF CIVIL UNMANNED AIRCRAFT SYSTEMS INTO NATIONAL AIRSPACE SYSTEM

(a) REQUIRED PLANNING FOR INTEGRATION.—

(1) COMPREHENSIVE PLAN.—Not later than 270 days after the date of enactment of this Act, the Secretary of Transportation, in consultation with representatives of the aviation industry, Federal agencies that employ unmanned aircraft systems technology in the national airspace system, and the unmanned aircraft systems industry, shall develop a comprehensive plan to safely accelerate the integration of civil unmanned aircraft systems into the national airspace system.

(2) CONTENTS OF PLAN.—The plan required under paragraph (1) shall contain, at a minimum, recommendations or projections on—

(A) the rulemaking to be conducted under subsection (b), with specific recommendations on how the rulemaking will—

(i) define the acceptable standards for operation and certification of civil unmanned aircraft systems;

(ii) ensure that any civil unmanned aircraft system includes a sense and avoid capability; and

(iii) establish standards and requirements for the operator and pilot of a civil unmanned aircraft system, including standards and requirements for registration and licensing;

(B) the best methods to enhance the technologies and subsystems necessary to achieve the safe and routine operation of civil unmanned aircraft systems in the national airspace system;

(C) a phased-in approach to the integration of civil unmanned aircraft systems into the national airspace system;

(D) a timeline for the phased-in approach described under subparagraph (C);

(E) creation of a safe[14]

(F) airspace designation for cooperative manned and unmanned flight operations in the national airspace system;

(G) establishment of a process to develop certification, flight standards, and air traffic requirements for civil unmanned aircraft systems at test ranges where such systems are subject to testing;

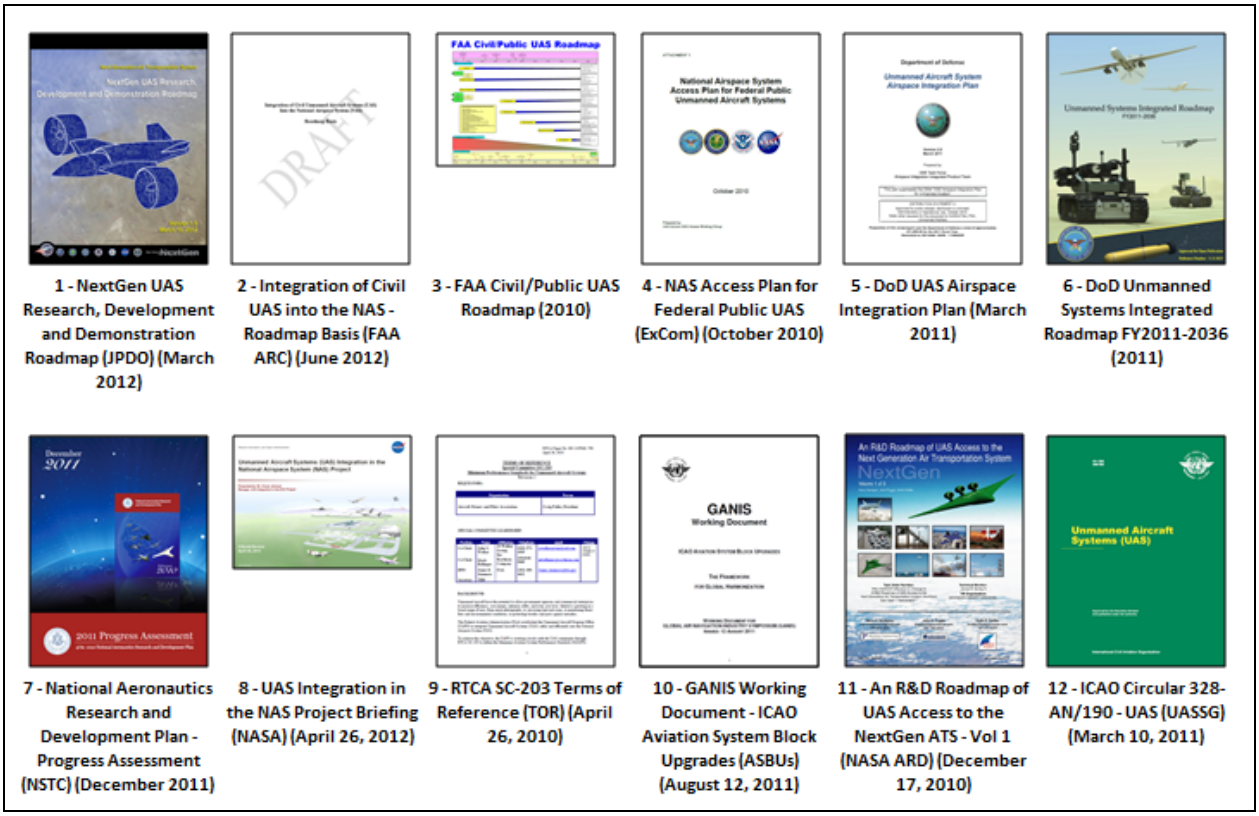
[14] Additional wording for this requirement may have been inadvertently omitted from this Bill (H.R.658).

(H) the best methods to ensure the safe operation of civil unmanned aircraft systems and public unmanned aircraft systems simultaneously in the national airspace system;
(I) incorporation of the plan into the annual NextGen Implementation Plan document (or any successor document) of the Federal Aviation Administration.

(3) DEADLINE.—The plan required under paragraph (1) shall provide for the safe integration of civil unmanned aircraft systems into the national airspace system as soon as practicable, but not later than September 30, 2015.
(4) REPORT TO CONGRESS.—Not later than 1 year after the date of enactment of this Act, the Secretary shall submit to Congress a copy of the plan required under paragraph (1).
(5) ROADMAP.—Not later than 1 year after the date of enactment of this Act, the Secretary shall approve and make available in print and on the Administration's Internet Web site a five-year roadmap for the introduction of civil unmanned aircraft systems into the national airspace system, as coordinated by the Unmanned Aircraft Program Office of the Administration. The Secretary shall update the roadmap annually.

APPENDIX B – UAS NATIONAL GOALS AND OBJECTIVES SOURCE DOCUMENTS

The documents that were used to extract UAS National Goals and Objectives pertaining to safe UAS integration in the NAS are depicted below.



1. NextGen UAS Research, Development and Demonstration Roadmap (JPDO) (March 2012)
2. Integration of Civil UAS into the NAS – Roadmap Basis (FAA UAS ARC) (June 2012)
3. FAA Civil/Public UAS Roadmap (2010)
4. NAS Access Plan for Federal Public UAS (ExCom) (October 2010)
5. DoD UAS Airspace Integration Plan (March 2011)
6. DoD Unmanned Systems Integrated Roadmap FY2011-2036 (2011)
7. National Aeronautics Research and Development Plan - Progress Assessment (NSTC) (December 2011)
8. UAS Integration into the NAS Project Briefing (NASA) (April 26, 2012)
9. RTCA SC-203 Terms of Reference (TOR) (April 26, 2010)

10. GANIS Working Document - ICAO Aviation System Block Upgrades (ASBUs) (August 12, 2011)

11. An R&D Roadmap of UAS Access to the NextGen ATS - Vol 1 (NASA ARD) (December 17, 2010)

12. ICAO Circular 328-AN/190 - UAS (UASSG) (March 10, 2011)

APPENDIX C – UAS COMPREHENSIVE PLAN DEFINITIONS

Term	Definition
Civil Aviation	Civil aviation includes two major categories:[15] (1) Air transport, including all passenger and cargo flights operating on regularly scheduled routes, as well as on demand flights. (2) General aviation (GA), including all other civil flights, private or commercial. All air transport is commercial, but general aviation can be either commercial or private. Normally, the pilot, aircraft, and operator must all be authorized to perform commercial operations through separate commercial licensing, registration, and operation certificates.
Class A Airspace	Generally, that airspace from 18,000 feet MSL up to and including FL 600, including the airspace overlying the waters within 12 nautical miles of the coast of the 48 contiguous States and Alaska. Unless otherwise authorized, all persons must operate their aircraft under IFR.
Class B Airspace	Generally, that airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports in terms of airport operations or passenger enplanements. The configuration of each Class B airspace area is individually tailored and consists of a surface area and two or more layers (some Class B airspaces areas resemble upside-down wedding cakes), and is designed to contain all published instrument procedures once an aircraft enters the airspace. An ATC clearance is required for all aircraft to operate in the area, and all aircraft that are so cleared receive separation services within the airspace. The cloud clearance requirement for VFR operations is "clear of clouds."
Class C Airspace	Generally, that airspace from the surface to 4,000 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower, are serviced by a radar approach control, and that have a certain number of IFR operations or passenger enplanements. Although the configuration of each Class C area is individually tailored, the airspace usually consists of a surface area with a five nautical mile (NM) radius, a circle with a 10NM radius that extends no lower than 1,200 feet up to 4,000 feet above the airport elevation, and an outer area that is not charted. Each person must establish two-way radio communications with the ATC facility providing air traffic services prior to entering the airspace and thereafter maintain those communications while within the airspace. VFR aircraft are only separated from IFR aircraft within the airspace.
Class D Airspace	Generally, that airspace from the surface to 2,500 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower. The configuration of each Class D airspace area is individually tailored and when instrument procedures are published, the airspace will normally be designed to contain the procedures. Arrival

[15] Federal Aviation Regulations FAR Part 91, 110, 121, 125, 135.

	extensions for instrument approach procedures may be Class D or Class E airspace. Unless otherwise authorized, each person must establish two-way radio communications with the ATC facility providing air traffic services prior to entering the airspace and thereafter maintain those communications while in the airspace. No separation services are provided to VFR aircraft.
Class E Airspace	Generally, if the airspace is not Class A, Class B, Class C, or Class D, and it is controlled airspace, it is Class E airspace. Class E airspace extends upward from either the surface or a designated altitude to the overlying or adjacent controlled airspace. When designated as a surface area, the airspace will be configured to contain all instrument procedures. Also in this class are Federal airways, airspace beginning at either 700 or 1,200 feet AGL used to transition to/from the terminal or en route environment, en route domestic, and offshore airspace areas designated below 18,000 feet MSL. Unless designated at a lower altitude, Class E airspace begins at 14,500 MSL over the United States, including that airspace overlying the waters within 12 nautical miles of the coast of the 48 contiguous States and Alaska, up to, but not including 18,000 feet MSL, and the airspace above FL 600.
Class G Airspace	That airspace not designated as Class A, B, C, D or E.
Full Capability	A final implementation available for operations that completes the planned UAS National Goal.
Goal	Statement of an end result or outcome desired by stakeholders.
Initial Capability	An initial implementation available for operations that supports the planned UAS National Goal.
Milestone	A significant point in time or event for achieving a specific result.
National Airspace System (NAS)	The common network of U.S. airspace; air navigation facilities, equipment and services, airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures, technical information, and manpower and material. Included are system components shared jointly with the military.[16]
National Goal	A statement of an end result or outcome desired by stakeholders that enables the accomplishment of the overarching mission. It is a top-level, strategic outcome that one wishes to achieve.
Objective	Statement of necessary achievement to meet the goal.
Public Aviation	Public Aircraft Operation (PAO) is limited by the statute to certain government operations within U.S. airspace. Although these operations must comply with certain general operating rules (including those applicable to all aircraft in the NAS), other civil certification and safety oversight regulations do not apply. Whether an operation may be considered public is determined on a flight-by-flight basis, under the terms of the statute (49 U.S.C. 40102 and 49 U.S.C. 40125) and depends on

[16] FAA Order 7110.65, Air Traffic Control, Pilot/Controller Glossary, Change 2.

	factors such as aircraft ownership, operator, the purpose of the flight and the persons on board the aircraft.[17]
Stakeholders	Individuals or organizations that stand to gain from the success or failure of a system/initiative.
Strategic	A perspective that is mission-oriented rather than tactical or operational.
Strategy	Overall plan of action to achieve an objective. Ties together objectives, approaches, and actions.
Unmanned Aircraft System (UAS)	An unmanned aircraft and its associated elements related to safe operations, which may include control stations (ground, ship, or air-based), control links, support equipment, payloads, flight termination systems, and launch/recovery equipment.

[17] FAA Order 8900.1, Flight Standards Information Management System.

APPENDIX D – UAS COMPREHENSIVE PLAN ACRONYMS

Term	Definition
4D	Four-Dimensional
ABSAA	Airborne Sense and Avoid
AC	Advisory Circular
ADS-B	Automatic Dependent Surveillance-Broadcast
AIM	Aeronautical Information Manual
ANSP	Air Navigation Service Provider
ATC	Air Traffic Control
ATS	Air Traffic Services
BLOS	Beyond Line-of-Sight
C2	Control and Communications
CDTI	Cockpit Display of Traffic Information
COA	Certificate of Waiver or Authorization
CFR	Code of Federal Regulations
ConOps	Concept of Operations
DHS	Department of Homeland Security
DOC	Department of Commerce
DoD	Department of Defense
DOJ	Department of Justice
DOT	Department of Transportation
ExCom	UAS Executive Committee
FAA	Federal Aviation Administration
FAA ARC	FAA Aviation Rulemaking Committee
FAR	Federal Aviation Regulations
FPV	First Person View
FY	Fiscal Year
GA	General Aviation
GAO	Government Accountability Office
GBSAA	Ground Based Sense and Avoid
ICAO	International Civil Aviation Organization
ICAO ASBUs	ICAO Aviation System Block Upgrades
ICAO UASSG	ICAO Unmanned Aircraft Systems Study Group
IFR	Instrument Flight Rules
JPDO	Joint Planning and Development Office
LOS	Line-of-Sight
MASPS	Minimum Aviation System Performance Standards

Term	Definition
MOPS	Minimum Operational Performance Standards
NAS	National Airspace System
NASA	National Aeronautics and Space Administration
NASA ARD	NASA Aeronautics Research Mission Directorate
NextGen	Next Generation Air Transportation System
NOAA	National Oceanic and Atmospheric Administration
NSTC	National Science and Technology Council
NPRM	Notice of Proposed Rulemaking
PIC	Pilot-in-Command
QRT	Quick Reaction Test
R&D	Research and Development
RD&D	Research, Development and Demonstration
RF	Radio Frequency
SAA	Sense and Avoid
SARPs	Standards and Recommended Practices
SFAR	Special Federal Aviation Regulation
SPC	Senior Policy Committee
TOR	Terms of Reference
U.S.C.	United States Code
UA	Unmanned Aircraft
UAR	UAS Automation Roadmap
UAS	Unmanned Aircraft System
UAS-AI	Unmanned Aircraft Systems – Airspace Integration
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
VLOS	Visual Line-of-Sight

(or their delegated agent). You are required to assure the product is airworthy before it is returned to service.

(i) Related Information

(1) Refer to Mandatory Continuing Airworthiness Information (MCAI) Brazilian Airworthiness Directives 2012–03–03 and 2012–03–04, dated April 13, 2012; and the service information specified in paragraphs (i)(1)(i), (i)(1)(ii), and (i)(1)(iii) of this AD; for related information.

(i) Embraer Service Bulletin 170–53–0093, Revision 01, dated March 16, 2012.

(ii) Embraer Service Bulletin 190–53–0054, Revision 01, dated March 16, 2012.

(iii) Embraer Service Bulletin 190LIN–53–0059, Revision 01, dated March 16, 2012.

(2) For service information identified in this AD, contact Embraer S.A., Technical Publications Section (PC 060), Av. Brigadeiro Faria Lima, 2170—Putim—12227–901 São Jose dos Campos—SP—BRASIL; telephone +55 12 3927–5852 or +55 12 3309–0732; fax +55 12 3927–7546; email *distrib@embraer.com.br;* Internet *http://www.flyembraer.com.* You may review copies of the referenced service information at the FAA, Transport Airplane Directorate, 1601 Lind Avenue SW., Renton, WA. For information on the availability of this material at the FAA, call 425–227–1221.

Issued in Renton, Washington, on February 11, 2013.

Ali Bahrami,

Manager, Transport Airplane Directorate, Aircraft Certification Service.

[FR Doc. 2013–04045 Filed 2–21–13; 8:45 am]

BILLING CODE 4910–13–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 91

[Docket No.: FAA–2013–0061]

Unmanned Aircraft System Test Site Program

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of availability; request for comments

SUMMARY: On February 14, 2012, Congress mandated that the FAA, coordinating with the National Aeronautics and Space Administration and the Department of Defense, develop a test site program for the integration of unmanned aircraft systems in to the National Airspace System. The overall purpose of this test site program is to develop a body of data and operational experiences to inform integration and the safe operation of these aircraft in the National Airspace System. This proposed rule announces the process by which the FAA will select the test sites for the program and also solicits comments on the FAA's proposed approach for addressing the privacy questions raised by the public and Congress with regard to the operation of unmanned aircraft systems within the test site program.

DATES: The FAA values the input of the public and requests comment regarding the privacy approach discussed in this Notice. Please send your comments on or before April 23, 2013.

Once the public has had a chance to review the proposed privacy policy requirements to be levied on the Unmanned Aircraft Systems Test Site operators, but prior to the close of the comment period, the FAA will participate in a webinar to solicit comments from the public and interested stakeholders regarding the proposed privacy approach for the unmanned aircraft systems test site program. The FAA will publish a notice providing details (including the date and time) for the engagement session sufficiently in advance of the meeting to facilitate broad participation.

ADDRESSES: You may send comments identified by Docket No: FAA–2013–0061 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: The FAA will post all comments it receives, without change, to *http://www.regulations.gov,* including any personal information the commenter provides. Using the search function of the docket web site, anyone can find and read the electronic form of all comments received into any FAA docket, including the name of the individual sending the comment (or signing the comment for an association, business, labor union, etc.). DOT's complete Privacy Act Statement can be found in the **Federal Register** published on April 11, 2000 (65 FR 19477–19478), as well as at *http://DocketsInfo.dot.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 the 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: For technical questions concerning the test site program, contact Elizabeth Soltys, Unmanned Aircraft Systems Integration Office, Federal Aviation Administration, 800 Independence Avenue SW., Washington, DC 20591; email: *9-ACT-UASTSS@faa.gov.*

For questions concerning the FAA's proposed approach for addressing potential UAS privacy concerns, as set out herein, contact Gregory C. Carter, Office of the Chief Counsel, Federal Aviation Administration, 800 Independence Ave. SW., Washington, DC 20591; email: *9-AGC-UASPrivacy@faa.gov.*

Background

On February 14, 2012, the President signed the FAA Modernization and Reform Act, Public Law 112–95 (FMRA) into law. The statute contains a number of provisions pertaining to integration of unmanned aircraft systems (UAS) into the National Airspace System (NAS). To assist the agency in integrating UAS, section 332(c) of FMRA directs the FAA, in coordination with the National Aeronautics and Space Administration (NASA) and the Department of Defense (DoD), to develop a UAS test site program for purposes of gathering safety and technical information relevant to the safe and efficient integration of UAS into the NAS. Under the test site program, the FAA will select six test ranges, taking into consideration factors such as geographic and climatic diversity, as well as the location of necessary ground infrastructure to support the sites, and research needs.

The FAA has developed the UAS test site program with the input of the public. The FAA began an outreach effort to gather input on the criteria and processes the FAA should use to select the test sites. In March 2012, the FAA posted a Request for Comments (RFC) in the **Federal Register** [Docket No. FAA–2012–0252] and in April 2012, the FAA hosted two public webinars to interact directly with the public. This outreach effort informed the agency in developing its plan for designating the sites.

Based on the feedback received through this outreach effort, the FAA is using its Acquisition Management System (AMS) to solicit applications from entities interested in operating a

UAS test site. This system is the common process the FAA uses to obtain information, evaluate interested parties, and select successful providers for procurement matters. Although no federal funds will be distributed to the selected test site operators for the operation of these test sites (and selection of sites is not a procurement action), the FAA has determined that using this well-established system and process will ensure fair consideration of all applications and rigorous oversight of the selection process.

For individuals interested in submitting an application to operate a UAS test site, the FAA has published a Screening Information Request (SIR), which is also known as a Request for Proposals, or RFP, in other federal agencies. The SIR (and amendments, if any) is available on the FAA Contracting Opportunities Web site (*http://faaco.faa.gov*). Additional information about this SIR process and criteria for selecting the six test sites is contained within the SIR document itself. In order to be considered for selection, completed responses must be submitted via the FAA Contracting Opportunities Web site by the dates set out in the SIR.

Once the FAA has conducted and completed its consideration of the submissions, and the Administrator has issued an Order designating each successful applicant as a test site operator, each operator will be required to enter into an Other Transaction Agreement (OTA) with the FAA. Each OTA will set out the legally binding terms and conditions under which the entity will operate the UAS Test Site. The draft OTA is available for review via the FAA Contracting Opportunities Web site listed above. Before OTA parameters and reporting requirements are finalized, FAA will consider comments submitted as a result of this **Federal Register** Notice.

While the expanded use of UAS presents great opportunities, it also presents significant challenges as UAS are inherently different from manned aircraft. The UAS test site program will help the FAA gain a better understanding of operational issues, such as training requirements, operational specifications, and technology considerations, which are primary areas of concern with regard to our chief mission, which is ensuring the safety and efficiency of the entire aviation system. The FAA also acknowledges that the integration of UAS in domestic airspace raises privacy issues, which the FAA intends to address through engagement and collaboration with the public. To address privacy concerns relating to the operation of the test site program, the FAA intends to include in each final OTA privacy requirements applicable to all operations at a test site. This notice is specifically requesting comments on those potential privacy considerations, associated reporting requirements, and how the FAA can help ensure privacy considerations are addressed through mechanisms put in place as a result of the OTAs.

The proposed privacy requirements set forth in Article three of the DRAFT OTA are as follows:

(1) The Site Operator must ensure that there are privacy policies governing all activities conducted under the OTA, including the operation and relevant activities of the UASs authorized by the Site Operator. Such privacy policies must be available publically, and the Site Operator must have a mechanism to receive and consider comments on its privacy policies. In addition, these policies should be informed by Fair Information Practice Principles. The privacy policies should be updated as necessary to remain operationally current and effective. The Site Operator must ensure the requirements of this paragraph are applied to all operations conducted under the OTA.

(2) The Site Operator and its team members are required to operate in accordance with Federal, state, and other laws regarding the protection of an individual's right to privacy. Should criminal or civil charges be filed by the U.S. Department of Justice or a state's law enforcement authority over a potential violation of such laws, the FAA may take appropriate action, including suspending or modifying the relevant operational authority (e.g., Certificate of Operation, or OTA), until the proceedings are completed. If the proceedings demonstrate the operation was in violation of the law, the FAA may terminate the relevant operational authority.

(3) If over the lifetime of this Agreement, any legislation or regulation, which may have an impact on UAS or to the privacy interests of entities affected by any operation of any UAS operating at the Test Site, is enacted or otherwise effectuated, such legislation or regulation will be applicable to the OTA and the FAA may update or amend the OTA to reflect these changes.

(4) Transmission of data from the Site Operator to the FAA or its designee must only include those data listed in Appendix B to the OTA. (Appendix B to the OTA is available as part of the SIR at *http://faaco.faa.gov.*)

The FAA anticipates that test site operator privacy practices as discussed in their privacy policies will help inform the dialogue among policymakers, privacy advocates, and the industry regarding broader questions concerning the use of UAS technologies. The privacy requirements proposed here are specifically designed for the operation of the UAS Test Sites. They are not intended to pre-determine the long-term policy and regulatory framework under which commercial UASs would operate. Rather, they aim to assure maximum transparency of privacy policies associated with UAS test site operations in order to engage all stakeholders in discussion about which privacy issues are raised by UAS operations and how law, public policy, and the industry practices should respond to those issues in the long run.

Issued in Washington, DC on February 14, 2013.

Kathryn B. Thomson,

Chief Counsel, Federal Aviation Administration.

[FR Doc. 2013–03897 Filed 2–21–13; 8:45 am]

BILLING CODE 4910–13–P

DEPARTMENT OF HOMELAND SECURITY

Coast Guard

33 CFR Part 165

[Docket No. USCG–2012–0876]

RIN 1625–AA11

Regulated Navigation Area—Weymouth Fore River, Fore River Bridge Construction, Weymouth and Quincy, MA

AGENCY: Coast Guard, DHS.

ACTION: Notice of proposed rulemaking.

SUMMARY: The Coast Guard is proposing to establish a regulated navigation area (RNA) on the navigable waters of Weymouth Fore River under and surrounding the Fore River Bridge (Mile 3.5) between Weymouth and Quincy, MA until December 31, 2017. This proposed rule would allow the Coast Guard to enforce speed and wake restrictions and prohibit all vessel traffic through the RNA during bridge replacement operations, both planned and unforeseen, that could pose an imminent hazard to persons and vessels operating in the area. This rule is necessary to provide for the safety of life in the regulated area during the construction of the Fore River Bridge.

DATES: Comments and related material must be received by the Coast Guard on or before April 23, 2013.

epic.org

ELECTRONIC PRIVACY INFORMATION CENTER

COMMENTS OF THE ELECTRONIC PRIVACY INFORMATION CENTER

to

THE FEDERAL AVIATION ADMINISTRATION of the

DEPARTMENT OF TRANSPORTATION

[Docket No. FAA—2013—0061]

Unmanned Aircraft System Test Site Program

April 23, 2013

By notice published on February 22, 2013, the Federal Aviation Administration ("FAA") of the Department of Transportation ("DOT) has requested comments on unmanned aircraft systems ("UAS") test sites.[1] Pursuant to Congressional mandates under the FAA Modernization and Reform Act of 2012 ("FMRA") and the National Defense Authorization Act ("NDAA"), the FAA must "identify six test ranges/sites to integrate unmanned aircraft systems ("UAS") into the National Airspace Systems ("NAS")."[2] To carry out these Congressional mandates, the FAA has requested comments in order to "develop a body of data and operational experiences to inform the integration and the safe operation of [drones] in the National Airspace System."[3]

[1] Request for comments, Unmanned Aircraft System Test Sites, 78 Fed. Reg. 12259 (proposed Feb. 22, 2013), *available at* http://www.gpo.gov/fdsys/pkg/FR-2013-02-22/pdf/2013-03897.pdf [hereinafter "RFC/SIR"].
[2] FAA Modernization and Reform Act, Pub. L. 112-95 (2012) [hereinafter "FMRA"].
[3] RFC/SIR, *supra* n. 1 at 12259.

These comments are submitted by the Electronic Privacy Information Center ("EPIC"). EPIC is a public interest research center in Washington, D.C., established in 1994 to focus public attention on emerging civil liberties issues and to protect privacy, the First Amendment, and constitutional values. EPIC has a particular interest in preserving privacy safeguards against expansive surveillance systems.[4]

The use of drones implicates significant Fourth Amendment interests and well established common law privacy rights.[5] With special capabilities and enhanced equipment, drones are able to conduct detailed surveillance, obtaining high-resolution picture and video, peering inside high-level windows, and through solid barriers, such as fences, trees, and even walls.

In *U.S. v. Jones*, the Supreme Court upheld Fourth Amendment privacy rights implicated by pervasive government surveillance. In *Jones*, the Supreme Court held that attachment of a GPS tracking device to a vehicle, and subsequent use of the device to monitor the vehicle's movements along public streets, constituted a search within the

[4] *See, e.g.*, EPIC: Unmanned Aerial Vehicles (UAVs) and Drones, http://epic.org/privacy/drones/; EPIC: Video Surveillance, http://epic.org/privacy/surveillance/; EPIC Statement on CCTV, D.C. Council Bill 17-438 (Mar. 11, 2008), *available at* http://epic.org/privacy/surveillance/epic_dc17-438_031108.pdf; Comments of the Electronic Privacy Information Center on the Expansion of CCTV Pilot Program (June 29, 2006), *available at* http://epic.org/privacy/surveillance/cctvcom062906.pdf; Brief of *Amicus Curiae* Electronic Privacy Information Center (EPIC), *Federal Aviation Administration, et al., v. Stanmore Cawthon Cooper* (2011)(No. 10-1024), *available at* http://epic.org/amicus/cooper/Cooper-EPIC-Brief.pdf.

[5] Many state governments have enacted legislation to protect individuals from the type of persistent surveillance that drones would facilitate. Sometimes called "Peeping Tom" laws, each state prohibits the intrusion upon a person's seclusion. *See Elements of an Intrusion Claim, Citizen Media Law Project*, http://www.citmedialaw.org/legal-guide/elements-intrusion-claim (last visited Feb. 21, 2012). *See also, e.g.* Cal. Civ. Code § 1708.8 (West 2011); Neb. Rev. Stat. § 20-203 (2011). Unlike trespass laws, intrusion does not require a physical trespass. *Id.* This is important since the United States has established that a person has no property rights in the airspace over their property. *See U.S. v. Causby*, 328 U.S. 256 (1946); *See also* 49 U.S.C. § 40103 (2011) ("The United States Government has exclusive sovereignty of airspace of the United States."). However, there is a possibility that certain drone operators may be guilty of common law trespass, particularly in regard to small-sized drones flying at low altitudes. *Id*. Many states have laws with even higher level of privacy protection, such as California's regulation on the use of telephoto lenses to photograph private property. Cal. Civ. Code § 1708 (West 2011).

Fourth Amendment's purview.[6] Therefore, law enforcement officials were required to obtain a warrant before performing the search. In a concurring opinion, Justice Sotomayor stated, "GPS monitoring generates a precise, comprehensive record of a person's public movements that reflects a wealth of detail about her familial, political, professional, religious, and sexual associations."[7] The same can be said for drone surveillance because, like GPS tracking, drone surveillance persistently monitors individual behavior and generates a comprehensive personal record.

The privacy concerns arising from the use of drones in domestic airspace is underscored when the technical specifications of the devices are examined. Recent documents obtained by EPIC under the Freedom of Information Act demonstrate that the U.S. Bureau of Customs and Border Protection ("CBP") acquisitioned Predator B model drones with technology to intercept electronic communications and identify human targets.[8] EPIC responded by petitioning the Agency, joined by thirty organizations and over one thousand individuals.[9] The petition requested that CBP suspend their border drone program pending the establishment of concrete privacy regulations.[10]

Accordingly, EPIC recommends that the FAA (1) clarify the roles of NASA and the Department of Defense, (2) mandate compliance with Fair Information Practices, (3) list all drone operators in an easily accessible, public database, (4) require drone

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[6] *United States v. Jones*, 132 S. Ct. 945 (2012).
[7] *Id*. at 955.
[8] *See* Declan McCullagh, *DHS Built Domestic Surveillance Tech into Predator Drones*, CNET (Mar. 2, 2013), http://news.cnet.com/8301-13578_3-57572207-38/dhs-built-domestic-surveillance-tech-into-predator-drones/.
[9] *See* Ernie Smith, *Drone Privacy Concerns Have Some Associations on Defensive*, Associations Now (Apr. 1, 2013), http://associationsnow.com/2013/04/drone-privacy-concerns-have-some-associations-on-defensive/.
[10] Petition from EPIC, *et al.*, to David V. Aguilar, Deputy Commissioner, U.S. Customs and Border Protection (May 22, 2013), *available at* http://epic.org/drones_petition/.

operators to disclose data collection and minimization practices, and (5) establish a process of independent auditing for drone operators.

EPIC Has Led Drone Privacy Efforts to the FAA

On February 24, 2012, EPIC, joined by over 100 organizations, experts, and members of the public, submitted a petition to the FAA requesting a notice and comment rulemaking under the Administrative Procedure Act on the privacy impact of drones in the United States.[11] EPIC's Petition noted that many federal agencies and law enforcement units are acquiring drones for deployment in US airspace.[12] The Petition further noted that drones have the technical capabilities to greatly increase surveillance of individuals in the United States:

> Gigapixel cameras used to outfit drones are among the highest definition cameras available, and can 'provide real-time video streams at a rate of 10 frames a second.' On some drones, operators can track up to 65 different targets across a distance of 65 square miles. Drones may also carry infrared cameras, heat sensors, GPS, sensors that detect movement, and automated license plate readers. In the near future these cameras may include facial recognition technology that would make it possible to remotely identify individuals in parks, schools, and at political gatherings.[13]

Finally, EPIC's Petition observed that drones are designed with certain innate qualities that allow them to undertake constant surveillance to a degree that former methods of aerial surveillance were unable to achieve.[14] The Petition pointed out that the FAA Modernization and Reform Act of 2012 (signed on February 14, 2012) provides an opportunity for the Agency to address the privacy questions raised by drone usage.[15]

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[11] Petition from EPIC, *et al*., to Michael P. Huerta, Acting Administrator, United States Federal Aviation Administration (Feb. 24, 2012), *available at* http://epic.org/privacy/drones/FAA-553e-Petition-03-08-12.pdf [hereinafter "FAA Petition"].
[12] *Id*. at 1-2.
[13] *Id*. at 2-3 (internal citations omitted).
[14] *Id*. at 3.
[15] *Id*.

On February 14, 2013 the Agency responded to EPIC's petition and consented to making privacy a necessary part of the integration of drones into the U.S. national airspace:

> While the expanded use of [drones] presents great opportunities, it also presents significant challenges as [drones] are inherently different from manned aircraft. The FAA is working to ensure the safe and efficient integration of [drones] into the [National Air Space]. In addition to safety and efficiency considerations, the FAA recognizes that increasing the use of [drones] raises privacy concerns. The agency intends to address these issues through engagement and collaboration with the public, and we urge your organization to participate in this effort.[16]

EPIC now responds to the FAA's request for input on privacy requirements and recommendations for drone operators in conjunction with the Unmanned Aircraft System Test Site Program.

The FAA's Role in Implementing Individual Privacy Protections

The FAA is mandated to "promote safe flight of civil aircraft."[17] The FAA Modernization and Reform Act requires the FAA to, within a certain amount of time, "develop a comprehensive plan" to implement government and commercial drones into civil commerce.[18] The plan must "define the acceptable standards for operation" for civil drone use.[19] In addition, the FAA is required to "provide guidance on a public entity's responsibility when operating an unmanned aircraft."[20] Before May 14, 2012, the FAA must "simplify the process" through which government entities operate drones in the national airspace.[21]

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[16] Letter from Kathryn B. Thomson, Chief Counsel, FAA to Marc Rotenberg, President, EPIC (Feb. 14, 2013), *available at* http://epic.org/privacy/drones/DOT-UAS-Privacy-Issues-Letter.pdf.
[17] 49 U.S.C. § 44701(a).
[18] FMRA, *supra* n. 2 at § 322(a)(1).
[19] *Id*. at § 322 (a)(2)(B)(i).
[20] *Id*. at § 324(a)(4).
[21] *Id*. at § 324(c)(1).

There are, undoubtedly, additional protections that can only be implemented through legislation. For example, it may be outside of the FAA's congressional authority to institute a warrant requirement as a prerequisite for law enforcement drone surveillance operations. However, as the administrative agency with the statutory authority to issue drone operation licenses and maintain order in the national airspace, the FAA is the most appropriate agency to oversee comprehensive privacy rules and regulations for drone operators. The FAA is uniquely positioned to ensure that transparency, accountability, and other privacy-protective principles of data collection are built in to the drone authorization process.

The FAA's RFC/SIR on Drone Test Ranges and Privacy

The FAA requested comment on the development of a test site program for the integration of drones in to the National Airspace. The FAA's Request for Comment / Screening Information Request ("RFC/SIR") solicits public feedback concurrently with the application process for test site designation.[22] In regard to the test site applicants, the FAA indicates,

> Once the FAA has conducted and completed its considerations of the submissions, and the Administrator has issued an Order designating each successful applicant as a test site operator, each operator will be required to enter into an Other Transaction Agreement ("OTA") with the FAA. Each OTA will set out the legally binding terms and conditions under which the entity will operate the UAS Test Site.[23]

In the RFC/SIR, the FAA announced that the OTA will, in part, include "privacy requirements applicable to all operations at a test site."[24] The FAA has proposed four

[22] RFC/SIR, *supra* n. 1.
[23] *Id*. at 12260.
[24] *Id*.

privacy requirements for test site designees.[25] EPIC provides the following comments in response to the RFC/SIR and the draft privacy requirements.

(A) The Roles of NASA, and the Department of Defense Must Be Clarified

By way of the FAA Modernization and Reform Act, Public Law 112-95 ("FMRA"), Congress directed the FAA to "consult with the National Aeronautics and Space Administration and the Department of Defense," in determining the location of six test ranges for the development of drones.[26] Accordingly, the FAA has indicated that they are working "in coordination with the National Aeronautics and Space Administration ("NASA") and the Department of Defense ("DoD")."[27]

The roles of NASA and the DoD in the test site and operation process have never been publically clarified. In the interest of transparency, the FAA should take this opportunity to clearly elaborate on how these agencies intend to interact in the development of the six planned test sites.

(B) Test Site Operators Should Be Required to Comply with Fair Information Practices

Drone technology provides a new platform for persistent mass surveillance. Additionally, when compared to traditional aerial vehicles, drones drive down the cost of surveillance and make it cheaper and easier for government and corporate entities to collect information on individuals. EPIC has previously described the types of technology that drones are designed to carry:

> Gigapixel cameras used to outfit drones are among the highest definition cameras available, and can "provide real-time video streams at a rate of 10 frames a second." On some drones, operators can track up to 65 different targets across a distance of 65 square miles. Drones may also carry

[25] *Id*.
[26] FMRA, *supra* n. 2 at § 332(c)(3)(C).
[27] RFC/SIR, *supra* n. 1.

> infrared cameras, heat sensors, GPS, sensors that detect movement, and automated license plate readers. In the near future these cameras may include facial recognition technology that would make it possible to remotely identify individuals in parks, schools, and at political gatherings.[28]

The FAA has proposed that all Site Operators enact, through public notice and comment, a privacy policy to "govern[] all activities conducted under the OTA." The FAA requests, "these policies should be informed by Fair Information Practice[s]." The FAA falls short from mandating the full integration of the Fair Information Practices ("FIPs").

The FIPs outline rights and responsibilities that provide the basis for privacy laws. Not only have FIPs played a significant role in framing privacy laws in the United States,[29] but they have also contributed to development of privacy laws around the world and to the development of important international guidelines for privacy protection.[30] The FIPs provide the basis for the Safe Harbor arrangements between the United States and Europe.[31] Recently, President Obama's Consumer Privacy Bill of Rights incorporated the FIPs into a technology-neutral framework for consumer privacy protection.[32]

As a starting point for Site Operator privacy policies, the FAA needs to affirmatively require the implementation of the FIPs into Site Operator Privacy Policies. By merely recommending that FIPs be used, the FAA fails to establish necessary baseline privacy standards. For example, Site Operators may choose to rely on the FIPs or may

[28] FAA Petition, *supra* n. 11 (internal citations omitted).
[29] *See, e.g.*, Privacy Act of 1974, 5 U.S.C. § 552a (2012).
[30] OECD guidelines on the Protection of Privacy and Transborder Flows of Personal Data, *available at* http://www.oecd.org/document/18/0,3343,en_2649_34255_1815186_1_1_1_1,000.html.
[31] *See, e.g.*, U.S.-EU Safe Harbor Overview, Export.gov (Apr. 26, 2012), http://export.gov/safeharbor/eu/eg_main_018476.asp.
[32] Consumer Data Privacy in a Networked World, the White House (Feb. 2012), http://www.whitehouse.gov/sites/default/files/privacy-final.pdf.

promulgate policies that contain few, or no, actual privacy protections.[33] By contrast, if Operators are required to incorporate FIPs into their privacy policies, the FAA can ensure that basic privacy rights are preserved. At the same time, Site Operators will have the flexibility to consider the unique aspects of the test site and the submitted public comments to determine the best methods for implementation of the FIPs to suite their community's expectations and needs.

(C) Drone Operators Should be Listed in an Easily Accessible, Public Database

There is currently no publicly accessible repository for information on past or current drone operators in the United States. In response to a letter from Representative Ed Markey in 2012, the FAA released a list of 228 entities that have applied for authorization to operate a drone in the National Airspace, including entities that were denied or were issued authorizations that have since expired.[34] Prior to this release, the only information on the identity of U.S. drone operators issued from records released pursuant to a Freedom of Information Act lawsuit filed against the FAA.[35] Even the

[33] Wells Bennett, *the FAA Wants to Hear From You About Privacy and Domestic Drones* (Mar. 1, 2013), http://www.lawfareblog.com/2013/03/the-faa-wants-to-hear-from-you-about-privacy-and-domestic-drones/ ("Which bring us to (1), the operators' privacy policies. As written, the draft says little about what these will look like. I count three hard-and-fast obligations: a privacy policy must be available publicly; the operator must be capable of receiving comments on the policy; and the policy must govern all of the operators' activities. Perhaps more interestingly, the draft also recommends conformity with Fair Information Practice Principles—uniform guidelines for the protection of personal information—but pointedly does not go so far as to require that. Thus we might wonder: substantively, could an operator satisfy the FAA, by having a "privacy policy" wherein the operator committed to obey any applicable privacy laws, both current and future? Or must a policy do something that background privacy law does not do already? And may policies vary from one site operator to the next? It is too early to tell.")

[34] Letter from Michael P. Huerta, Acting Administrator, FAA to the Honorable Edward J. Markey, House of Representatives (Sept. 21, 2012), *available at* http://markey.house.gov/sites/markey.house.gov/files/documents/FAA%20drones%20response.pdf.

[35] *See, e.g.*, Jennifer Lynch, *Who is Flying Unmanned Aircraft in the U.S.*, EFF (Jan. 10, 2012), https://www.eff.org/press/releases/who-flying-unmanned-aircraft-us.

information in those records was questionably incomplete or inaccurate based on contradictory statement made by the FAA.[36]

By contrast, manned aircraft operators are maintained in a searchable database that is accessible by serial number, geographic location, or name on the FAA's official website.[37] Any individual that wants to know what aircraft are licensed within their territory, state, or county need only enter the information and pull up a list that can be searched in an Internet browser, printed, or downloaded into a spreadsheet. The website indicates that the information is "updated each federal working day at midnight."[38]

The test sites designated by the RFC/SIR are the first step toward large-scale use of drones into the NAS. The FMRA directs the FAA to safely and fully integrate civil and public drones into the NAS. By any estimate, the number of entities applying for authorization to pilot a drone domestically is expected to rise exponentially in the years following this integration, which is currently scheduled to happen by 2015.

Before drones flood the U.S. skies, the FAA should establish a database for aerial drones similar to its current database for manned aircraft in order to allow individuals to specifically search for drone operators. The database should be easy to find and search, and provide additional information about data collection practices, as described in the next section. The creation of this database would provide a baseline for transparency in drone operations and a measure of protection against errant drone operators.

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[36] *See* Jennifer Lynch, Just How Many Drone Licenses Has the FAA Really Issued, Electronic Frontier Foundation (Feb. 21, 2013), https://www.eff.org/deeplinks/2013/02/just---how---many---drone---licenses---has---faa---really---issued (providing details on contradictory statements made by the Federal Aviation Administration regarding the issuance of drone licenses).

[37] *See, e.g.*, FAA Registry – State / County Inquiry Results (District of Columbia), Federal Aviation Administration, http://registry.faa.gov/aircraftinquiry/StateCounty_Results.aspx?Statetxt=DC&Countytxt=DIST+OF+COLUMBIA&PageNo=1 (last visited Apr. 16, 2013).

[38] *Id*.

(D) Drone Operators Should be Required to Disclose Data Collection and Minimization Practices

As described above, drones provide the capacity for increased domestic surveillance by both government and corporate entities. Drone manufacturers freely advertise the different types of advanced surveillance equipment that may be built into their vehicles.[39] However, once installed it is impossible for an individual to identify by sight exactly how a specific drone has been equipped.

Drone operators should disclose the limits of their operational license and surveillance capabilities.[40] In order to ensure transparency and accountability in drone operations, the FAA should require drone operators to provide statements describing the full suite of surveillance equipment carried by a drone, the geographical area where the drone will be operated, and the purposes for which the drone will be deployed.[41] This information should be reported with the greatest possible amount of detail to provide the best notice to the public.[42]

(E) Drone Operators Should be Subject to Independent Auditing to Ensure Compliance with Representations

Drones present a unique threat to privacy. Drones are designed to undertake constant, persistent surveillance to a degree that former methods of surveillance were unable to achieve. Drone manufacturers have recently announced new designs that would

[39] *See, e.g.*, UAS RQ-11B Raven, Aerovironment, http://www.avinc.com/uas/small_uas/raven/ (last visited Apr. 16, 2013); Gray Eagle UAS, General Atomics Aeronautical, http://www.ga-asi.com/products/aircraft/gray_eagle.php (last visited Apr. 16, 2013).

[40] Notably, the collection of this data by the FAA may also be necessary to preserve certain safety standards. For example, the FAA may use geographic limits to control aircraft population in areas within the National Airspace. Similarly, the equipment built in to a drone will assist the FAA in determining the drone's weight and airworthiness.

[41] A similar requirement has been set forth in a bill introduced by Representative Ed Markey. Drone Aircraft Privacy and Transparency Act of 2013, H.R. 1262 (2013), *available at* http://beta.congress.gov/113/bills/hr1262/113hr1262ih.pdf.

[42] In the future the FAA may believe that drone operators should turn over additional information in order to fulfill their safety function, such as flight plans. To the greatest extent possible, this additional information should be added to the public database.

allow drones to operate for more than 48 consecutive hours,[43] and other technology could extend the flight time of future drones out into weeks and months.[44] Also, "by virtue of their design, size, and how high they can fly, [drones] can operate undetected in urban and rural environments."

These innate qualities of drones may make it difficult for individuals to police violations of law or policy by drone operators. Though drone use in the United States is still limited, reports have demonstrated that there is already widespread disregard of the FAA's operating rules.[45]

In order to ensure that drone operators comply with the terms of their authorizations and with the disclosed data collection and minimization practices, the FAA should implement a system of regular, independent audits for drone operators. Operators found to be in violation of an FAA-approved authorization should face the revocation on the authorization as well as monetary fines. Audits are a crucial oversight tool for ensuring that behaviour comports with the law and licensing requirements.

Conclusion

It is important to build privacy rules and norms into the proliferation of new surveillance technology. The FAA should use this opportunity in the test site process to implement meaningful regulations in order to preserve individual rights and civil liberties.

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[43] Mark Brown, *Lockheed Uses Ground-Based Laser to Recharge Drone Mid-Flight*, Wired (July 12, 2012), http://www.wired.co.uk/news/archive/2012-07/12/lockheed-lasers.
[44] Steven Aftergood, *Secret Drone Technology Barred by 'Political Conditions'*, Secrecy News (Mar. 22, 2012) http://www.fas.org/blog/secrecy/2012/03/sandia_drone.html.
[45] *See, e.g.* Chris Francescani, *Damn the Regulations! Drones Plying US Skies Without Waiting for FAA Rules*, NBC News (Mar. 4, 2013), http://openchannel.nbcnews.com/_news/2013/03/04/17181948-damn-the-regulations-drones-plying-us-skies-without-waiting-for-faa-rules?lite.

Deployment of drone aircraft poses immense privacy threats. To minimize these threats, the FAA should take affirmative steps to mandate specific safeguards. Specifically, EPIC urges the FAA to:

1. Clarify the roles of NASA and the Department of Defense;
2. Mandate compliance with Fair Information Practices;
3. List all drone operators in an easily accessible, public database;
4. Require drone operators to disclose data collection and minimization practices; and
5. Establish a process of independent auditing for drone operators

Respectfully submitted,

Marc Rotenberg
EPIC Executive Director

Amie Stepanovich
Director, EPIC Domestic Surveillance Project

Khaliah Barnes,
Director, EPIC Administrative Law Project

(h) Other FAA AD Provisions

The following provisions also apply to this AD:

(1) *Alternative Methods of Compliance (AMOCs):* The Manager, Standards Office, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. Send information to ATTN: Mike Kiesov, Aerospace Engineer, FAA, Small Airplane Directorate, 901 Locust, Room 301, Kansas City, Missouri 64106; telephone: (816) 329–4144; fax: (816) 329–4090; email: *mike.kiesov@faa.gov.* Before using any approved AMOC on any airplane to which the AMOC applies, notify your appropriate principal inspector (PI) in the FAA Flight Standards District Office (FSDO), or lacking a PI, your local FSDO.

(2) *Airworthy Product:* For any requirement in this AD to obtain corrective actions from a manufacturer or other source, use these actions if they are FAA-approved. Corrective actions are considered FAA-approved if they are approved by the State of Design Authority (or their delegated agent). You are required to assure the product is airworthy before it is returned to service.

(i) Special Flight Permit

Special flight permits are permitted with the following limitation: Aerobatic maneuvers are prohibited until the actions of the AD are complied with.

(j) Related Information

Refer to MCAI European Aviation Safety Agency (EASA) AD No.: 2012–0228R1, dated November 13, 2012, for related information. You may examine the MCAI on the Internet at *http://www.regulations.gov* by searching for and locating it in Docket No. FAA–2013–0939.

(k) Material Incorporated by Reference

(1) The Director of the Federal Register approved the incorporation by reference (IBR) of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(i) Alenia Aermacchi Una Societa Finmeccanica Mandatory Bollettino Tecnico (English Translation: Technical Bulletin) No. 205B65, Revision 1, dated November 12, 2012.

(ii) Alenia Aermacchi Una Societa Finmeccanica Mandatory Bollettino Tecnico (English Translation: Technical Bulletin) No. 260SB–136, Revision 1, dated November 12, 2012.

(3) For service information identified in this AD, contact Alenia Aermacchi S.p.A, Via Paola Foresio, 1, 21040 Venegono Superiore (Varese)—Italy; telephone: 0331–813111; fax: 0331–827595; Internet: *http://www.aleniaaermacchi.it/en-US/Pages/custsupp.aspx.*

(4) You may view this referenced service information at the FAA, Small Airplane Directorate, 901 Locust, Kansas City, Missouri 64106. For information on the availability of this material at the FAA, call (816) 329–4148.

(5) You may view this service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal-register/cfr/ibr-locations.html.*

Issued in Kansas City, Missouri, on October 31, 2013.

Earl Lawrence,

Manager, Small Airplane Directorate, Aircraft Certification Service.

[FR Doc. 2013–26681 Filed 11–13–13; 8:45 am]

BILLING CODE 4910–13–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA–2013–0029; Directorate Identifier 2013–NE–01–AD; Amendment 39–17599; AD 2013–19–17]

RIN 2120–AA64

Airworthiness Directives; Rolls-Royce plc Turbofan Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule; correction.

SUMMARY: The FAA is correcting an airworthiness directive (AD) that published in the **Federal Register**. That AD applies to all Rolls-Royce plc (RR) RB211–535E4–B–37 series turbofan engines. The AD number is incorrect in the Regulatory text. This document corrects that error. In all other respects, the original document remains the same.

DATES: This final rule is effective November 7, 2013.

ADDRESSES: You may examine the AD docket on the Internet at *http://www.regulations.gov;* or in person at the Docket Management Facility between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this AD, the regulatory evaluation, any comments received, and other information. The address for the Docket Office (phone: 800–647–5527) is Document Management Facility, U.S. Department of Transportation, Docket Operations, M–30, West Building Ground Floor, Room W12–140, 1200 New Jersey Avenue SE., Washington, DC 20590.

FOR FURTHER INFORMATION CONTACT: Robert Green, Aerospace Engineer, Engine Certification Office, FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803; phone: 781–238–7754; fax: 781–238–7199; email: *robert.green@faa.gov.*

SUPPLEMENTARY INFORMATION: Airworthiness Directive 2013–19–17, Amendment 39–17599 (78 FR 61171, October 3, 2013), currently requires removal of affected parts using a drawdown plan for all RR RB211–535E4–B–37 series turbofan engines.

As published, the AD number 2013–19–17 under § 39.13 [Amended], is incorrect.

No other part of the preamble or regulatory information has been changed; therefore, only the changed portion of the final rule is being published in the **Federal Register**.

The effective date of this AD remains November 7, 2013.

Correction of Regulatory Text

§ 39.13 [Corrected]

In the **Federal Register** of October 3, 2013, on page 61173, in the first column, lines 4 and 5, under § 39.13 [Amended] of AD 2013–19–17, are corrected to read as follows:

* * * * *

2013–19–17 Rolls-Royce plc: Amendment 39–17599; Docket No. FAA–2013–0029;

* * * * *

Issued in Burlington, Massachusetts, on October 25, 2013.

Colleen M. D'Alessandro,

Assistant Directorate Manager, Engine & Propeller Directorate, Aircraft Certification Service.

[FR Doc. 2013–27190 Filed 11–13–13; 8:45 am]

BILLING CODE 4910–13–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 91

[Docket No. FAA–2013–0061]

Unmanned Aircraft System Test Site Program

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of availability of final privacy requirements for the unmanned aircraft system (''UAS'') test site program; response to comments.

SUMMARY: On February 22, 2013 the FAA published and requested public comment on the proposed privacy requirements (the ''Draft Privacy Requirements'') for UAS test sites (the ''Test Sites'') that the FAA will establish pursuant to the FAA Modernization and Reform Act of 2012 (''FMRA''). This document responds to the public comments received and publishes the FAA's final privacy requirements for the Test Sites (the ''Final Privacy Requirements'').

DATES: November 14, 2013.

ADDRESSES: You may review the public docket for this rulemaking (Docket No. FAA–2013–0061) on the Internet at *http://www.regulations.gov.* You may also review the public docket at the Docket Management Facility in Room W12–140 of the West Building Ground Floor at 1200 New Jersey Avenue SE., Washington, DC 20590–0001 between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: For technical questions concerning the test site program, contact Elizabeth Soltys, Unmanned Aircraft Systems Integration Office, Federal Aviation Administration, 800 Independence Avenue SW., Washington, DC 20591; email: *9-ACT-UASTSS@faa.gov.*

For legal questions concerning the FAA's privacy requirements for the Test Sites contact Carlos Siso, Office of the Chief Counsel, Federal Aviation Administration, 800 Independence Ave. SW., Washington, DC 20591; email: *9-AGC-UASPrivacy@faa.gov.*

SUPPLEMENTARY INFORMATION: This document summarizes and responds to the public comments received in response to the following **Federal Register** documents seeking public comment on the Draft Privacy Requirements for the Test Sites:

(i) Notice of availability and request for comments published in the **Federal Register** on February 22, 2013 (78 FR 12259), Docket No. FAA–2013–0061–0001; and

(ii) Notice of public engagement session published in the **Federal Register** on March 28, 2013 (78 FR 18932), Docket No. FAA–2013–0061–0050.

In addition, this document publishes the FAA's Final Privacy Requirements for the Test Sites which are set forth under the ''Conclusion'' section below.

Discussion of Comments

The FAA received 99 comments through Regulations.gov and 53 comments through the public engagement session. A transcript of the public engagement session is available at: *http://www.faa.gov/about/initiatives/uas/media/UAStranscription.pdf.* Public comments ranged from recommending that the FAA not impose any privacy requirements on the Test Sites to recommending that the FAA impose extensive privacy requirements on the Test Sites. The FAA also received comments that were not responsive to the notice or that were unclear.

The FAA analyzed the responsive comments and grouped them into ten categories. The following sections address the comments by category.

(1) The FAA should focus on its safety mission; it should not engage in regulating privacy.

The FAA received a number of comments advocating that the FAA should focus on its safety mission and should not engage in regulating privacy. The following comments were received:

- The FAA should focus on safety;
- Regulating privacy is outside the FAA's mission;
- The FAA does not have statutory authority to regulate privacy;
- The FAA does not have the authority to impose privacy requirements on the Test Sites;
- The FAA should allow privacy to be addressed by other more appropriate government bodies including: Federal agencies that have expertise and authority to deal with privacy concerns; Congress; state or local legislative bodies; and the judicial system;
- The Federal Government should not regulate privacy impacts of UAS; these issues should be left to states, cities, and counties to address;
- The FAA should only require compliance with privacy laws that are already in place and focus on developing safe operation of UAS;
- The FAA should not deny access to the national airspace for reasons other than safety;
- Existing privacy laws are sufficient to cover the responsible use of UAS. There already exist Federal, state and other laws that protect privacy. In addition, tort law may also provide avenues of recourse for plaintiffs to protect their privacy rights;
- The FAA should not implement privacy regulations that make entry into the market prohibitive for small businesses;
- The FAA should not allow privacy issues to hinder commercialization of UAS;
- There is no evidence that the operations at the Test Sites will harm privacy interests. Restricting activities at the test sites at this early stage will likely overprotect privacy at the expense of innovation;
- The FAA should afford adequate time for non-governmental solutions such as industry norms and practices to develop before intervening administratively to protect privacy. These less restrictive solutions will reduce the need for administrative intervention and will allow for increased innovation in the national airspace;
- Requiring Test Site operators to develop privacy policies that are informed by Fair Information Practice Principles is onerous for commercial operators of UAS and its cost will likely outweigh any hypothetical benefits;
- Requiring Test Site operators to issue privacy policies informed by Fair Information Practice Principles will limit the diversity of data that will inform integration of UAS into the national airspace. The FAA's approach would exclude an important possible alternative from the discussion: some operators might choose not to issue a privacy policy or adopt a non-FIPPs-compliant policy; and
- The FAA should treat data gathered by UAS no differently than data gathered by a manned aircraft or by other electronic means. There is no significant difference in terms of surveillance between a UAS and a manned aircraft, and manned aircraft are permitted to operate in the national airspace with cameras.

Response: The FAA's mission is to provide the safest, most efficient aerospace system in the world and does not include regulating privacy. At the same time, the FAA recognizes that there is substantial debate and difference of opinion among policy makers, industry, advocacy groups, and members of the public as to whether UAS operations at the Test Sites will raise novel privacy issues that are not adequately addressed by existing legal frameworks.

The FAA will require the Test Site operators to comply with the Final Privacy Requirements. Congress mandated that the FAA establish the Test Sites to further UAS integration into the national airspace system. The Final Privacy Requirements advance this purpose by helping inform the dialogue among policymakers, privacy advocates, and industry regarding the impact of UAS technologies on privacy.

The FAA's authority for including the Final Privacy Requirements in the Test Site OTAs is set forth in 49 U.S.C. 106(l)(6). That statute authorizes the FAA Administrator to enter into an OTA ''on such terms and conditions as the Administrator may consider appropriate.'' The FAA believes that it is appropriate to require Test Site operators to comply with the Final Privacy Requirements.

(2) The FAA should require warrants before law enforcement can use UAS in the Test Sites to conduct surveillance or gather evidence.

The FAA received a variety of comments advocating that:

- The FAA should include provisions in the OTA that require warrants to be obtained when UAS are used to conduct surveillance or gather evidence within the Test Site; and

• The OTA include appropriate safeguards to protect Fourth Amendment rights at and around our national borders.

Response: The FAA's mission is to provide the safest, most efficient aerospace system in the world. The FAA is establishing the UAS Test Sites consistent with its mission and the direction in the FMRA. The FAA appreciates the commenters' concerns. Accordingly, the final privacy requirements provide that the Site Operator and its team members must comply with all applicable privacy laws.

(3) The FAA should mandate specific privacy requirements for the Test Sites.

The FAA received a variety of comments advocating that the FAA mandate specific privacy requirements for the Test Sites. The recommendations included the following:

• The FAA should specify minimum privacy requirements and require each Test Site to comply with them;

• The FAA should mandate compliance with Fair Information Practice Principles for all Test Site operators;

• The FAA should establish prohibitions on where UAS can operate within a Test Site and the kinds of surveillance activities that UAS conduct at the Test Sites;

• The FAA should require all UAS flown at the Test Sites to have unencrypted down links so that all their data collection can be viewed by the public, including records contained onboard and recovered after landing;

• The FAA should require each Test Site operator to conduct a full Privacy Impact Assessment;

• The FAA should require each Test Site operator to establish a Chief Privacy Officer and centralize privacy responsibilities in that person;

• The FAA should require each Test Site operator to establish a privacy advisory committee to review proposed UAS research at the Test Sites for privacy concerns;

• The FAA should require each Test Site operator to provide a detailed response to public input it receives regarding the Test Site's privacy policy;

• The FAA should prohibit the sharing of recorded surveillance footage beyond the scope of its original purpose;

• The FAA should prohibit UAS in the Test Sites from flying below a minimum altitude;

• The FAA should prohibit UAS in the Test Sites from carrying any equipment that could be used to conduct surveillance;

• The FAA should limit the use of the data collected at the Test Sites;

• The FAA should prohibit (i) the use of Test Sites for government surveillance, and (ii) sharing data collected with law enforcement for the purpose of investigating or prosecuting a crime;

• The FAA should limit the type of data that can be collected by UAS at the Test Sites including limiting the resolution of visual imagery that UAS can collect, prohibiting recording of audio data, and restricting the ability to collect WiFi and cellular signals;

• The FAA should require Test Site operators to provide data on the payload of each UAS flown at the Test Site including specific information on the data the payload is capable of collecting;

• The FAA should mandate privacy policies that require deletion of collected data within a certain time period;

• The FAA should prohibit the Test Site operator and UAS operators at the Test Sites from retaining any data collected longer than is necessary to fulfill the purpose of the Test Site;

• The FAA should require UAS operators to file data collection statements with the FAA for UAS operations that involve remote sensing and signals surveillance from the UAS platform; and

• The FAA should require UAS operating at altitudes over 400 feet to carry an automatic dependent surveillance-broadcast transponder (ADS–B Out) so that UAS operations can be tracked.

Response: The FAA's mission is to provide the safest, most efficient aerospace system in the world. Although there is a long history of placing cameras and other sensors on aircraft for a variety of purposes—news helicopters, aerial surveys, film/television production, law enforcement, etc.—the FAA is not, through awarding and supervising these Test Sites, taking specific views on whether or how the Federal Government should regulate privacy or the scope of data that can be collected by manned or unmanned aircraft.

There was substantial difference of opinion among commenters as to whether UAS operations and manned aircraft operations present different privacy issues that justify imposing special privacy restrictions on UAS operations at the Test Sites. In addition, there was substantial difference of opinion among commenters regarding what elements would be appropriate for a Test Site privacy policy. Based on the comments received, the FAA will require Test Sites to comply with the following requirements in addition to those described in the Draft Privacy Requirements:

(1) Test site operators must maintain a record of all UAS operating in the test sites;

(2) Test site operators must require every UAS operator in the Test Site to have a written plan for the operator's use and retention of data collected by the UAS; and

(3) Test site operators must conduct an annual review of test site operations to verify compliance with stated privacy policy and practices and share those outcomes annually in a public forum with an opportunity for public feedback.

The above are reflected in the Final Privacy Requirements.

The FAA has determined that it should not impose privacy requirements beyond those in the Final Privacy Requirements for the following reasons. *First,* there are many privacy laws and applications of tort law that may address some of the privacy issues that arise from UAS operations at the Test Sites.

Second, the FAA believes that Test Sites operators will be responsive to local stakeholders' privacy concerns and will develop privacy policies appropriately tailored to each Test Site. The selection criteria for the Test Sites specify that only a ''public entity'' can serve as a Test Site operator. The term ''public entity'' is defined in the selection criteria to mean ''(A) any State or local government; (B) any department, agency, special purpose district, or other instrumentality of a State or States or local government; and (C) the National Railroad Passenger Corporation, and any commuter authority.'' The FAA expects that public entities will be responsive to stakeholder concerns.

Third, if UAS operations at a Test Site raise privacy concerns that are not adequately addressed by the Test Site's privacy policies, elected officials can weigh the benefits and costs of additional privacy laws or regulations. Forty-three states have already enacted or are considering legislation regulating use of UAS. *See Drone Legislation All the Rage; Varies Widely Across 43 States, According to WestlawNext,* June 17, 2013, *available at: http://thomsonreuters.com/press-releases/062013/drone_legislation_varies_across_states_according_to_Westlaw.*

(4) The FAA should conduct audits of the Test Sites to ensure compliance with privacy policies.

Various commenters recommended that the FAA should audit each Test Site to ensure compliance with the privacy policies in the OTA.

Response: Each Test Site will be operated by a public entity (see response to Category 3 above). The FAA expects that the public entity operating each test site will already be subject to oversight and audit requirements. The FAA does not believe that it is appropriate for the FAA to impose additional audit requirements on the Test Site operators.

(5) The FAA should require Test Site operators to keep records that will allow for effective citizen participation and reporting of privacy violations.

One commenter recommended that the FAA require Test Site operators to keep accurate, detailed, frequent, and accessible records to allow for effective citizen participation and reporting of privacy violations.

Response: Each Test Site operator will be a public entity (see response to Category 3 above). Public entities are generally subject to laws that establish record keeping requirements and provide the public access to records. The FAA does not believe that it is appropriate for the FAA to impose additional record keeping requirements on the Test Site operators other than those specified in the Final Privacy Requirements.

(6) The FAA should establish a searchable database or registry of UAS operators and operations at the Test Sites.

The FAA received a variety of comments advocating that:

- The FAA should create a public, searchable database or registry of all UAS operators. Some commenters recommended that the database include information about surveillance equipment used and the operator's data collection practices;
- The FAA should require UAS operators at the Test Sites to provide public statements describing the surveillance equipment that will be carried by a UAS, the geographical area where the UAS will be operated, and the purposes for which the UAS will be deployed; and
- The FAA should establish a means for the public to access the data on UAS flights collected by the FAA.

Response: The FAA believes that it is not appropriate for the FAA to create a public registry or database of UAS operations at the Test Sites. However, the FAA has included a contractual provision in the Final Privacy Requirements that will require each Test Site operator to maintain a record of all UAS operating at the Test Site.

(7) The FAA should modify its Test Site selection criteria to take into account privacy concerns.

Various commenters recommended that the FAA revise its selection criteria. Suggestions included the following:

- The FAA should choose an applicant that has an established UAS research program with active engagement with UAS privacy issues;
- The FAA should choose at least one Test Site in a state with strong privacy protective UAS laws and regulations;
- The FAA should select one or more Test Sites in or near a densely populated urban area in order to avoid a bias towards privacy issues relevant for rural UAS operations; and
- The FAA should consider the privacy track record of applicants as part of the selection process.

Response: The FAA believes that it is not appropriate to modify the Test Site selection criteria to include the recommended privacy considerations. Applicants have already submitted complete applications based on the announced selection criteria and the application period has closed.

The FAA published the Test Site selection criteria and application instructions on February 14, 2013 on *https://faaco.faa.gov* under Solicitation number DTFACT–13–R–00002. The selection criteria incorporate the factors that Congress directed the FAA to consider in the FMRA, including, geographic and climatic diversity; location of ground infrastructure; and research needs. The FAA required applicants to submit seven volumes of extensive and detailed information that address a broad set of considerations including safety, airspace use, experience, research objectives, and risk considerations. This information will allow the FAA to make a selection based on the direction provided by Congress in the FMRA and on the FAA's mission.

The FAA developed the Test Site selection criteria after seeking public input and consulting with other agencies regarding what selection criteria would be appropriate. In March 2012, the FAA published a request for comment in the **Federal Register** and in April 2012, the FAA hosted two public webinars to obtain public input on the FAA's proposed selection criteria. Although there was significant public participation, the FAA did not receive comments advocating that privacy issues be used as a factor in choosing the Test Sites.

(8) The FAA should require Test Site operators to conduct specific tests related to privacy and surveillance.

Commenters recommended that the FAA should:

- Require UAS operators at Test Sites to conduct specific tests related to surveillance and privacy;
- Require Test Site operators to design the sites—including the creation of ''fake'' houses or businesses—to allow UAS operators to test how accurate their surveillance systems are and test how much data those systems collect; and
- Develop and require Test Sites to implement a standard battery of privacy tests that each UAS operating within a Test Site should have to perform in order to collect data that the FAA can use to make decisions about privacy issues.

Response: The FAA is not planning to have the Test Site operators conduct specific research.

(9) The FAA should not take punitive actions against a Test Site operator for privacy violations without due process.

One commenter noted that if charges are filed by law enforcement against a Test Site operator due to potential violations of privacy laws, the OTA allows the FAA to suspend or modify the relevant operational authority for a Test Site (e.g. Certificate of Operation, or OTA). That commenter recommended that a Test Site operator be entitled to due process before the operational authority be suspended or modified.

Response: A Test Site operator's rights to operate a Test Site are set forth in the OTA and are subject to the terms and conditions in the OTA. The FAA believes that it is appropriate to include contractual provisions in the Final Privacy Requirements that allow the FAA to protect the public interest by suspending or modifying the relevant operational authority for a Test Site if charges are filed by law enforcement against a Test Site operator due to potential violations of privacy laws.

(10) The FAA should establish sanctions for violations of privacy policies or rights.

One commenter recommended that the FAA rescind the OTA for a Test Site where serious privacy violations have occurred and levy fines against operators that fail to comply with privacy policies.

Response: The Final Privacy Requirements provide that violations of privacy laws can result in suspension or termination of the OTA.

The FAA will not monitor a Test Site's compliance with its own privacy policies. The FAA expects the public entities operating the Tests Sites and their respective state/local oversight bodies to monitor and enforce a Test Site's compliance with its own policies.

Conclusion

Based on the comments submitted, the FAA intends to require each test site

operator to comply with all of the privacy requirements included in the Draft Privacy Requirements as well as the following additional privacy requirements:

(1) Test site operators must maintain a record of all UAS operating in the test sites;

(2) Test site operators must require every UAS operator in the Test Site to have a written plan for the operator's use and retention of data collected by the UAS; and

(3) Test site operators must conduct an annual review of test site operations to verify compliance with stated privacy policy and practices and share those outcomes annually in a public forum with an opportunity for public feedback.

Accordingly, the FAA intends to include the following terms and conditions into Article 3 of the OTA:

''ARTICLE 3 PRIVACY; APPLICABLE LAW

a. Privacy Policies

The Site Operator must:

(i) Have privacy policies governing all activities conducted under the OTA, including the operation and relevant activities of the UAS authorized by the Site Operator.

(ii) Make its privacy policies publicly available;

(iii) Have a mechanism to receive and consider comments from the public on its privacy policies;

(iv) Conduct an annual review of test site operations to verify compliance with stated privacy policy and practices and share those outcomes annually in a public forum with an opportunity for public feedback;

(v) Update its privacy policies as necessary to remain operationally current and effective; and

(vi) Ensure the requirements of its privacy policies are applied to all operations conducted under the OTA.

The Site Operator's privacy policies should be informed by Fair Information Practice Principles.

b. Compliance With Applicable Privacy Laws

For purposes of this agreement, the term ''Applicable Law'' shall mean (i) a law, order, regulation, or rule of an administrative or legislative government body with jurisdiction over the matter in question, or (ii) a ruling, order, decision or judgment of a court with jurisdiction over the matter in question. The Site Operator and its team members must operate in accordance with all Applicable Law regarding the protection of an individual's right to privacy (hereinafter referred to as ''Privacy Laws''). If the U.S. Department of Justice or a state's law enforcement authority files criminal or civil charges over a potential violation of a Privacy Law, the FAA may take appropriate action including suspending or modifying the relevant operational authority (e.g., Certificate of Operation, or OTA) until the proceedings are completed. If the proceedings demonstrate the operation was in violation of the Privacy Law, the FAA may terminate the relevant operational authority.

c. Change in Law

If during the term of this Agreement an Applicable Law comes into effect which may have an impact on UAS, including impacts on the privacy interests of individuals or entities affected by any operation of any UAS operating at the Test Site, such Applicable Law will be applicable to the OTA and the FAA may update or amend the OTA to reflect these changes.

d. Transmission of Data to the FAA

The Site Operator should not provide or transmit to the FAA or its designees any data other than the data the data requested by the FAA pursuant to Article 5 of this OTA.

e. Other Requirements

The Site Operator must:

(i) Maintain a record of all UAS operating at the test sites; and

(ii) Require each UAS operator in the Test Site to have a written plan for the operator's use and retention of data collected by the UAS.''

Issued in Washington, DC, on November 7, 2013.

Marc L. Warren,

Acting Chief Counsel, Federal Aviation Administration.

[FR Doc. 2013–27216 Filed 11–8–13; 11:15 am]

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DEPARTMENT OF VETERANS AFFAIRS

38 CFR Part 17

RIN 2900–AN98

Payment for Home Health Services and Hospice Care to Non-VA Providers; Delay of Effective Date

AGENCY: Department of Veterans Affairs.

ACTION: Final rule; delay of effective date.

SUMMARY: The Department of Veterans Affairs (VA) published in the **Federal Register** on May 6, 2013 (78 FR 26250) a final rule to change the billing methodology for non-VA providers of home health services and hospice care. The preamble of that final rule stated the effective date was November 15, 2013. This document delays that effective date to April 1, 2014.

DATES: *Effective Date:* The effective date for the final rule published May 6, 2013, at 78 FR 26250, is delayed from November 15, 2013, until April 1, 2014.

FOR FURTHER INFORMATION CONTACT: Harold Bailey, Director of Administration, Department of Veterans Affairs, Veterans Health Administration, 3773 Cherry Creek Drive North, East Tower, Ste. 485, Denver, CO 80209, (303) 331–7829. (This is not a toll-free number.)

SUPPLEMENTARY INFORMATION: This rulemaking makes the VA regulation governing payments for certain non-VA health care, 38 CFR 17.56, applicable to non-VA home health services and hospice care. Section 17.56 provides, among other things, that Centers for Medicare and Medicaid (CMS) fee schedule or prospective payment system amounts will be paid to certain non-VA providers, unless VA negotiates other payment amounts with such providers. See 38 CFR 17.56(a)(2)(i). This change in the billing methodology for non-VA home health and hospice care was put forth in a proposed rule. We received one comment to this change and responded to that comment in a final rule published in the **Federal Register** on May 6, 2013 (78 FR 26250). The original effective date of the final rule was stated as November 15, 2013; however, we now delay the effective date of the final rule at 78 FR 26250 to the new effective date of April 1, 2014. The delay of the effective date is necessary to accommodate unforeseen difficulties in contracting and information technology procedures required to apply the billing methodology under § 17.56 to non-VA home health services and hospice care. These difficulties relate to separate administration of hospice care and home health services by the Veterans Health Administration's Office of Geriatrics and Extended Care, which uses separate methods for forming agreements with non-VA providers for the provision of these services, and difficulties regarding information technology systems necessary to use the CMS rate made applicable under § 17.36.

Dated: November 8, 2013.

Robert C. McFetridge,

Director, Regulation Policy and Management, Office of the General Counsel, Department of Veterans Affairs.

[FR Doc. 2013–27218 Filed 11–13–13; 8:45 am]

BILLING CODE 8320–01–P

Federal Aviation Administration

Fact Sheet – Unmanned Aircraft Systems (UAS)

For Immediate Release

January 6, 2014
Contact: Les Dorr or Alison Duquette
Phone: (202) 267-3883

Unmanned Aircraft Systems (UAS) come in a variety of shapes and sizes and serve diverse purposes. They may have a wingspan as large as a Boeing 737 or smaller than a radio-controlled model airplane. Regardless of size, the responsibility to fly safely applies equally to manned and unmanned aircraft operations.

Because they are inherently different from manned aircraft, introducing UAS into the nation's airspace is challenging for both the FAA and aviation community. UAS must be integrated into a National Airspace System (NAS) that is evolving from ground-based navigation aids to a GPS-based system in NextGen. Safe integration of UAS involves gaining a better understanding of operational issues, such as training requirements, operational specifications and technology considerations.

The FAA's Role: Safety
Safety is the FAA's top mission, and the agency maintains the world's safest aviation system. As a provider of air traffic control services, the FAA also must ensure the safety and efficiency of the nation's entire airspace.

The FAA first authorized use of unmanned aircraft in the NAS in 1990. Since then, the agency has authorized limited use of UAS for important missions in the public interest, such as firefighting, disaster relief, search and rescue, law enforcement, border patrol, military training and testing and evaluation. Today, UAS perform border and port surveillance by the Department of Homeland Security, help with scientific research and environmental monitoring by NASA and NOAA, support public safety by law enforcement agencies, help state universities conduct research, and support various other missions for public (government) entities.

Unmanned aircraft are flying now in the national airspace system under very controlled conditions. Operations potentially range from ground level to above 50,000 feet, depending on the specific type of aircraft. However, UAS operations are currently not authorized in Class B airspace, which exists over major urban areas and contains the highest density of manned aircraft in the National Airspace System.

There are currently two ways to get FAA approval to operate a UAS. The first is to obtain an experimental airworthiness certificate for private sector (civil) aircraft to do research and development, training and flight demonstrations. The second is to obtain a Certificate of Waiver or Authorization (COA) for public aircraft. Routine operation of UAS over densely-populated areas is prohibited.

Civil UAS

Obtaining an experimental airworthiness certificate for a particular UAS is currently the only way civil operators of unmanned aircraft are accessing the NAS. Experimental certificate regulations preclude carrying people or property for compensation or hire, but do allow operations for research and development, flight and sales demonstrations and crew training. The FAA is working with civilian operators to collect technical and operational data that will help refine the UAS airworthiness certification process. The agency is currently developing a future path for safe integration of civil UAS into the NAS as part of NextGen implementation.

Public UAS

COAs are available to public entities that want to fly a UAS in civil airspace. Common uses today include law enforcement, firefighting, border patrol, disaster relief, search and rescue, military training, and other government operational missions.

Applicants make their request through an online process and the FAA evaluates the proposed operation to see if it can be conducted safely.

The COA allows an operator to use a defined block of airspace and includes special provisions unique to the proposed operation. For instance, a COA may require flying only under Visual Flight Rules (VFR) and/or only during daylight hours. COAs usually are issued for a specific period—up to two years in many cases.

Most COAs require coordination with an appropriate air traffic control facility and may require a transponder on the UAS to operate in certain types of airspace.

Because UAS technology cannot currently comply with “see and avoid” rules that apply to all aircraft, a visual observer or an accompanying “chase plane” must maintain visual contact with the UAS and serve as its “eyes” when operating outside airspace restricted from other users.

COAs Issued:

2009	146

2010 298

2011 313

2012 257

2013 373 (as of October 31)

There were 545 COAs active as of December 4, 2013.

Streamlining the Process

The FAA has been working with its government partners to streamline COA procedures. In 2009, the FAA, NASA and the Departments of Defense and Homeland Security formed a UAS Executive Committee, or "ExCom" to address UAS integration issues. The ExCom established a working group that developed suggestions to expedite the COA process and increase transparency.

For new applications from public users, the FAA has an on-line process that ensures paperwork is complete and ready to be assessed. Today, the average time to issue an authorization for non-emergency operations is less than 60 days, and the renewal period is two years. The agency has expedited procedures in place to grant one-time COAs for time-sensitive emergency missions, such as disaster relief and humanitarian efforts.

Model Aircraft

Recreational use of airspace by model aircraft is covered by FAA Advisory Circular 91-57, which generally limits operations to below 400 feet above ground level and away from airports and air traffic. In 2007, the FAA clarified that AC 91-57 only applies to modelers, and specifically excludes individuals or companies flying model aircraft for business purposes.

The FAA guidance is available at: http://www.faa.gov/documentLibrary/media/Advisory_Circular/91-57.pdf

Operation and Certification Standards

Integrating UAS into the nation's airspace presents both opportunities and challenges. However, everything the FAA does is focused on ensuring the safety of the nation's aviation system. New policies, procedures and approval processes will address the increasing desire by civilian operators to fly UAS in the NAS. Developing and implementing new UAS standards and guidance is a long-term effort.

The FAA chartered a UAS Aviation Rulemaking Committee in 2011 to develop inputs and recommendations on appropriate operational procedures, regulatory standards and policies before allowing routine UAS access to the nation's airspace.

The FAA has asked RTCA – organized in 1935 as the Radio Technical Commission for Aeronautics, a group that facilitates expert advice to the agency on technical issues – to work with industry to assist in the development of UAS standards. RTCA's technical group will address how UAS will handle communication, command and control and how they will "sense and avoid" other aircraft.

The FAA continues to work closely with its international aviation counterparts to harmonize standards, policies, procedures and regulatory requirements.

UAS Test Sites

After a rigorous 10-month selection process involving 25 proposals from 24 states, on December 30, 2013, the Federal Aviation Administration chose six UAS research and test site operators across the country.

In selecting the six test site operators, the FAA considered geography, climate, location of ground infrastructure, research needs, airspace use, safety, aviation experience and risk. In totality, these six test applications achieve cross-country geographic and climatic diversity and help the FAA meet its UAS research needs.

A brief description of the six test site operators and the research they will conduct into future UAS use are below:

- University of Alaska. The University of Alaska proposal contained a diverse set of test site range locations in seven climatic zones as well as geographic diversity with test site range locations in Hawaii and Oregon. The research plan includes the development of a set of standards for unmanned aircraft categories, state monitoring and navigation. Alaska also plans to work on safety standards for UAS operations.
- State of Nevada. Nevada's project objectives concentrate on UAS standards and operations as well as operator standards and certification requirements. The applicant's research will also include a concentrated look at how air traffic control procedures will evolve with the introduction of UAS into the civil environment and how these aircraft will be integrated with NextGen. Nevada's selection contributes to geographic and climatic diversity.
- New York's Griffiss International Airport. Griffiss International plans to work on developing test and evaluation as well as verification and validation processes under FAA safety oversight. The applicant also plans to focus its research on sense and avoid capabilities for UAS and its sites will aid in researching the complexities of integrating UAS into the congested, northeast airspace.
- North Dakota Department of Commerce. North Dakota plans to develop UAS airworthiness essential data and validate high reliability link technology. This applicant will also conduct human factors research. North Dakota's application was the only one to offer a test range in the Temperate (continental) climate zone and included a variety of different airspace which will benefit multiple users.
- Texas A&M University – Corpus Christi. Texas A&M plans to develop system safety requirements for UAS vehicles and operations with a goal of protocols and procedures for airworthiness testing. The selection of Texas A&M contributes to geographic and climatic diversity.
- Virginia Polytechnic Institute and State University (Virginia Tech). Virginia Tech plans to conduct UAS failure mode testing and identify and evaluate operational and technical risks areas. This proposal includes test site

range locations in both Virginia and New Jersey.

Across the six applicants, the FAA is confident that the agency's research goals of System Safety & Data Gathering, Aircraft Certification, Command & Control Link Issues, Control Station Layout & Certification, Ground & Airborne Sense & Avoid, and Environmental Impacts will be met.

Each test site operator will manage the test site in a way that will give access to parties interested in using the site. The FAA's role is to ensure each operator sets up a safe testing environment and to provide oversight that guarantees each site operates under strict safety standards.

Small Unmanned Aircraft

Small unmanned aircraft (sUAS) are likely to grow most quickly in civil and commercial operations because of their versatility and relatively low initial cost and operating expenses. The FAA is working on a proposed rule governing the use of a wide range of small civil unmanned aircraft systems.

The 2012 reauthorization bill also directed the FAA to "allow a government public safety agency to operate unmanned aircraft weighing 4.4 pounds or less" under certain restrictions. The bill specified these UAS must be flown within the line of sight of the operator, less than 400 feet above the ground, during daylight conditions, inside Class G (uncontrolled) airspace and more than five miles from any airport or other location with aviation activities.

Prior to the congressional action, the FAA and the Justice Department had been working on an agreement to streamline the COA process for law enforcement – an agreement that also meets the mandate. Initially, law enforcement organizations will receive a COA for training and performance evaluation. When the organization has shown proficiency in flying its UAS, it will receive an operational COA. The agreement expands the allowable UAS weight up to 25 pounds.

A New Office for New Technology

In 2012, the FAA established the Unmanned Aircraft Systems Integration Office to provide a one-stop portal for civil and public use UAS in U.S. airspace. This office is developing a comprehensive plan to integrate and establish operational and certification requirements for UAS. It will also oversee and coordinate UAS research and development.

Over more than 50 years, the FAA has a proven track record of introducing new technology and aircraft safely into the NAS. The agency will successfully meet the challenges posed by UAS technology in a thoughtful, careful manner that ensures safety and addresses privacy issues while promoting economic growth.

States, Cities and UAS

A number of states and municipalities have passed or are considering limitations on unmanned aircraft. The effect of such restrictions depends on the precise nature of the limitation.

By law, the FAA is charged with ensuring the safe and efficient use of U.S. airspace. This authority generally preempts any state or local government from enacting a statute or regulation concerning matters – such as airspace regulation—that are reserved exclusively to the U.S. Government.

For example, a state law or regulation that prohibits or limits the operation of an aircraft, sets standards for airworthiness, or establishes pilot requirements generally would be preempted. But state and local governments do retain authority to limit the aeronautical activities of their own departments and institutions. Under most circumstances, it would be within state or local government power to restrict the use of certain aircraft, including a UAS, by the state or local police or by a state department or university.

For more information: http://www.faa.gov/about/initiatives/uas/ (http://www.faa.gov/about/initiatives/uas/)

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Federal Aviation Administration

Fact Sheet – Unmanned Aircraft Systems (UAS)

For Immediate Release

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Unmanned aircraft systems (UAS (Unmanned aircraft systems)) come in a variety of shapes and sizes and serve diverse purposes. They may have a wingspan as large as a jet airliner or smaller than a radio-controlled model airplane.

Because they are inherently different from manned aircraft, introducing UAS into the nation's airspace is challenging for both the FAA and aviation community. UAS must be integrated into the busiest, most complex airspace in the world — one that is evolving from ground-based navigation aids to a GPS-based system in NextGen. And because UAS technology also continues to evolve, the agency's rules and policies must be flexible enough to accommodate that progress.

Integration of UAS has to be safe, efficient and timely. Safety is the FAA's primary mission, the agency is committed to reducing delays and increasing system reliability. This new technology has significant potential safety and economic benefits to help achieve these goals.

The FAA is taking an incremental approach to safe UAS integration as the agency acquires a better understanding of operational issues such as training requirements, operational specifications, and technology considerations.

Safety First

The FAA maintains the world's safest aviation system. As a provider of air traffic control services, the agency also must ensure the safety and efficiency of the nation's entire airspace.

Since 1990, the agency has allowed limited use of UAS for important public missions such as firefighting, disaster relief, search and rescue, law enforcement, border patrol, scientific research, and testing and evaluation. Recently, the FAA has authorized some non-recreational UAS operations in controlled, low-risk situations.

UAS operations potentially range from ground level to above 50,000 feet, depending on the specific type of aircraft. However, no operations are currently authorized in the airspace that exists over major urban areas and contains the highest density of manned aircraft.

Flying model aircraft/UAS for a hobby or recreational purpose does not require FAA approval, but all model aircraft operators must fly according to the law.

The FAA authorizes non-recreational UAS operations on a case-by-case basis, and there are several ways to gain agency approval.

Civil UAS Operations

In February 2015, the Department of Transportation and the FAA released a proposed set of regulations that will pave the way for small UAS — those under 55 pounds — to enter the mainstream of U.S. civil aviation. The rulewould allow routine use of small UAS in today's aviation system, and is flexible enough to accommodate future technological innovations.

The proposal offers safety rules addressing non-recreational small UAS operations and for model aircraft operations that do not meet the criteria in Section 336 of Public Law 112-95. The rule would limit small UAS to daylight flights and visual-line-of-sight operations. The proposed rule also addresses issues such as height restrictions, operator certification, optional use of a visual observer, aircraft registration and marking, and operational limits. The proposed rule also includes extensive discussion of a possible "micro" classification for UAS under 4.4 pounds. The FAA is asking the public to comment on whether it should include this option as part of a final rule (www.faa.gov/news/press_releases/news_story.cfm?newsId=18295) .

Private sector manufacturers and technology developers currently can obtain a Special Airworthiness Certificate in the experimental category to conduct research and development, crew training, market surveys, and flight demonstrations. Experimental certificates preclude carrying people or property for compensation or hire and typically include operating limitations such as altitude and geographical area.

Commercial firms also may fly a UAS that has an FAA Restricted Category Type Certificate. The agency issues these certificates to UAS models previously flown by the military. They allow limited operations, such as wildlife conservation flights, aerial surveying, and oil/gas pipeline patrols. As of October 2014, the FAA had approved

operations using two certificated UAS.

Since June 2014, the agency has received petitions for exemptions under Section 333 of Public Law 112-95 to permit non-recreational UAS operations before the small UAS rule is finalized. Under that section of the law, the Secretary of Transportation can determine whether certain airworthiness requirements are necessary to authorize specific UAS to fly safely in narrowly-defined, controlled, low-risk situations.

Commercial entities ask for relief from airworthiness certification requirements as allowed under Section 333, in addition to relief from regulations that address general flight rules, pilot certificate requirements, manuals, and maintenance and equipment mandates.

Model Aircraft

On June 23, 2014, the FAA issued an interpretation of Public Law 112-95 providing clear guidance to model operators on the "do's and don'ts" of flying safely in accordance with the Act.

In the document, the FAA restates the law's definition of "model aircraft," including requirements that they not interfere with manned aircraft, be flown within sight of the operator, and be operated only for hobby or recreational purposes. The agency also explains that model aircraft operators flying within five miles of an airport must notify the airport operator and air traffic control tower.

The FAA reaffirms that the law's model aircraft provisions apply only to hobby or recreation operations and do not authorize the use of model aircraft for non-recreational operations.

Government (Public) UAS Operations (www.faa.gov/uas/public_operations/)

A "Certificate of Waiver or Authorization" (COA (Certificate of Waiver or Authorization)) is available to government entities that want to fly a UAS in civil airspace. Common uses include law enforcement, firefighting, border patrol, disaster relief, search and rescue, military training and other government operational missions.

Applicants must submit their COA request through an online system. The FAA then evaluates the proposed operation to see if it can be conducted safely. If granted, the COA allows an operator to use a defined block of airspace, and includes special provisions unique to the proposed operation. For instance, a COA may require flying only under Visual Flight Rules (VFR (Visual Flight Rules)) and/or only during daylight hours.

Today, the average time to obtain an authorization for non-emergency operations is less than 60 days, and the renewal period is two years. The agency has expedited procedures to grant one-time COAs for time-sensitive emergency missions such as disaster relief and humanitarian efforts — sometimes in just a few hours.

Most COAs require coordination with an appropriate air traffic control facility and may require a transponder on the UAS to operate in certain types of airspace. Because UAS technology cannot yet comply with "see and avoid" rules that apply to all aircraft, a visual observer or an accompanying "chase plane" must maintain visual contact with the UAS and serve as its "eyes" when operating outside airspace restricted from other users.

COAs Issued, by year

Year	2009	2010	2011	2012	2013	2014
COAs Issued	146	298	313	257	423	609

Operating and Certification Standards

Integrating UAS into the nation's airspace presents both opportunities and challenges. However, everything the FAA does is focused on ensuring the safety of the nation's aviation system. New policies, procedures, and approval processes are needed to deal with the increasing desire by civilian operators to fly UAS. Developing and implementing these new UAS standards and guidance is a long-term effort.

In November 2013, the Department and the FAAreleased its first annual Integration of Civil UAS in the National Airspace System (NAS) Roadmap (www.faa.gov/uas/media/UAS_Roadmap_2013.pdf) (PDF)outlining efforts needed to safely integrate unmanned aircraft into the nation's airspace. The Roadmap addresses current and future policies, regulations, technologies, and procedures that will be required as demand moves from today's limited accommodation of UAS operations to the extensive integration of UAS into the NextGen aviation system in the future.

The Department of Transportation also released a Comprehensive Plan (www.faa.gov/about/office_org/headquarters_offices/agi/reports/media/UAS_Comprehensive_Plan.pdf) (PDF) that dovetails with the Roadmap. This Comprehensive Plan details the multi-agency approach to the safe and timely integration of unmanned aircraft. The plan establishes goals to integrate both small and larger unmanned aircraft, and to foster America's leadership in advancing this technology.

The FAA chartered a UAS Aviation Rulemaking Committee in 2011, which is still active. The group's goal is to develop inputs and recommendations on appropriate operational procedures, regulatory standards and policies before allowing routine UAS access to the nation's airspace.

The FAA also has asked RTCA — a group that facilitates expert advice to the agency on technical issues — to work with industry to help develop UASstandards. RTCA's technical group (Special Committee 228) is addressing how UAS will handle communication, command and control and how they will "sense and avoid" other aircraft.

The FAA continues to work closely with its international aviation counterparts to harmonize standards, policies, procedures, and regulatory requirements.

UAS Test Sites (www.faa.gov/uas/legislative_programs/test_sites/)

After a rigorous selection process, the Federal Aviation Administration chose six UAS test sites on December 30, 2013. These six test sites have geographic and climatic diversity and help the FAA meet its UASresearch needs.

The six Test Sites, which were operational as of mid-August 2014, include:

- University of Alaska — Fairbanks
- State of Nevada
- Griffiss International Airport (Rome, NY)
- North Dakota Department of Commerce
- Texas A&M University — Corpus Christi
- Virginia Polytechnic Institute and State University (Virginia Tech)

Each test site operator manages the site in a way that gives access to parties interested in using the site. The FAA's role is to ensure each site sets up a safe testing environment and operates under strict safety standards.

First Responders

The FAA Modernization and Reform Act of 2012 also directed the agency to expedite the COA process for government public safety agencies that want to use small UAS. In May 2013, the FAA and the Justice Department signed an agreement to streamline the COAprocess for law enforcement — an agreement that meets the mandate. The agreement expanded the allowable UASweight up to 25 pounds, an increase from the 4.4 pounds specified in the Act.

Today, a law enforcement organization first receives a COA for training and performance evaluation. When the organization has shown proficiency in flying its UAS, it receives a "jurisdictional" COA.

Meeting the Challenge

For more than 50 years, the FAA has maintained a proven track record of introducing new technology and aircraft safely into the national airspace system. The agency will successfully meet the challenges posed by UAStechnology in a thoughtful, careful manner that ensures safety and addresses privacy issues while promoting economic growth.

While aviation is unquestionably an industry known for innovation, it is also an industry with a strong history of collaboration between government and industry. This collaboration has helped the FAA achieve a position of international leadership. By working together, government and industry will overcome the challenges UAS integration presents and open the door to a more diverse and dynamic aviation future for both manned and unmanned aircraft.

For more information: www.faa.gov/uas/ (www.faa.gov/uas/)

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Memorandum on Promoting Economic Competitiveness While Safeguarding Privacy, Civil Rights, and Civil Liberties in Domestic Use of Unmanned Aircraft Systems

February 15, 2015

Memorandum for the Heads of Executive Departments and Agencies

Subject: Promoting Economic Competitiveness While Safeguarding Privacy, Civil Rights, and Civil Liberties in Domestic Use of Unmanned Aircraft Systems

Unmanned Aircraft Systems (UAS) technology continues to improve rapidly, and increasingly UAS are able to perform a variety of missions with greater operational flexibility and at a lower cost than comparable manned aircraft. A wide spectrum of domestic users—including industry, private citizens, and Federal, State, local, tribal, and territorial governments—are using or expect to use these systems, which may play a transformative role in fields as diverse as urban infrastructure management, farming, public safety, coastal security, military training, search and rescue, and disaster response.

The Congress recognized the potential wide-ranging benefits of UAS operations within the United States in the FAA Modernization and Reform Act of 2012 (Public Law 112–95), which requires a plan to safely integrate civil UAS into the National Airspace System (NAS) by September 30, 2015. As compared to manned aircraft, UAS may provide lower-cost operation and augment existing capabilities while reducing risks to human life. Estimates suggest the positive economic impact to U.S. industry of the integration of UAS into the NAS could be substantial and likely will grow for the foreseeable future.

As UAS are integrated into the NAS, the Federal Government will take steps to ensure that the integration takes into account not only our economic competitiveness and public safety, but also the privacy, civil rights, and civil liberties concerns these systems may raise.

By the authority vested in me as President by the Constitution and the laws of the United States of America, and in order to establish transparent principles that govern the Federal Government's use of UAS in the NAS, and to promote the responsible use of this technology in the private and commercial sectors, it is hereby ordered as follows:

Section 1. UAS Policies and Procedures for Federal Government Use. The Federal Government currently operates UAS in the United States for several purposes, including to manage Federal lands, monitor wildfires, conduct scientific research, monitor our borders, support law enforcement, and effectively train our military. As with information collected by the Federal Government using any technology, where UAS is the platform for collection, information must be collected, used, retained, and disseminated consistent with the Constitution, Federal law, and other applicable regulations and policies. Agencies must, for example, comply with the Privacy Act of 1974 (5 U.S.C. 552a) (the "Privacy Act"), which, among other things, restricts the collection and dissemination of individuals' information that is maintained in systems of records, including personally identifiable information (PII), and permits individuals to seek access to and amendment of records.

(a) *Privacy Protections*. Particularly in light of the diverse potential uses of UAS in the NAS, expected advancements in UAS technologies, and the anticipated increase in UAS use in

the future, the Federal Government shall take steps to ensure that privacy protections and policies relative to UAS continue to keep pace with these developments. Accordingly, agencies shall, prior to deployment of new UAS technology and at least every 3 years, examine their existing UAS policies and procedures relating to the collection, use, retention, and dissemination of information obtained by UAS, to ensure that privacy, civil rights, and civil liberties are protected. Agencies shall update their policies and procedures, or issue new policies and procedures, as necessary. In addition to requiring compliance with the Privacy Act in applicable circumstances, agencies that collect information through UAS in the NAS shall ensure that their policies and procedures with respect to such information incorporate the following requirements:

(i) *Collection and Use*. Agencies shall only collect information using UAS, or use UAS-collected information, to the extent that such collection or use is consistent with and relevant to an authorized purpose.

(ii) *Retention*. Information collected using UAS that may contain PII shall not be retained for more than 180 days unless retention of the information is determined to be necessary to an authorized mission of the retaining agency, is maintained in a system of records covered by the Privacy Act, or is required to be retained for a longer period by any other applicable law or regulation.

(iii) *Dissemination*. UAS-collected information that is not maintained in a system of records covered by the Privacy Act shall not be disseminated outside of the agency unless dissemination is required by law, or fulfills an authorized purpose and complies with agency requirements.

(b) *Civil Rights and Civil Liberties Protections*. To protect civil rights and civil liberties, agencies shall:

(i) ensure that policies are in place to prohibit the collection, use, retention, or dissemination of data in any manner that would violate the First Amendment or in any manner that would discriminate against persons based upon their ethnicity, race, gender, national origin, religion, sexual orientation, or gender identity, in violation of law;

(ii) ensure that UAS activities are performed in a manner consistent with the Constitution and applicable laws, Executive Orders, and other Presidential directives; and

(iii) ensure that adequate procedures are in place to receive, investigate, and address, as appropriate, privacy, civil rights, and civil liberties complaints.

(c) *Accountability*. To provide for effective oversight, agencies shall:

(i) ensure that oversight procedures for agencies' UAS use, including audits or assessments, comply with existing agency policies and regulations;

(ii) verify the existence of rules of conduct and training for Federal Government personnel and contractors who work on UAS programs, and procedures for reporting suspected cases of misuse or abuse of UAS technologies;

(iii) establish policies and procedures, or confirm that policies and procedures are in place, that provide meaningful oversight of individuals who have access to sensitive information (including any PII) collected using UAS;

(iv) ensure that any data-sharing agreements or policies, data use policies, and record management policies applicable to UAS conform to applicable laws, regulations, and policies;

(v) establish policies and procedures, or confirm that policies and procedures are in place, to authorize the use of UAS in response to a request for UAS assistance in support of Federal, State, local, tribal, or territorial government operations; and

(vi) require that State, local, tribal, and territorial government recipients of Federal grant funding for the purchase or use of UAS for their own operations have in place policies and procedures to safeguard individuals' privacy, civil rights, and civil liberties prior to expending such funds.

(d) *Transparency*. To promote transparency about their UAS activities within the NAS, agencies that use UAS shall, while not revealing information that could reasonably be expected to compromise law enforcement or national security:

(i) provide notice to the public regarding where the agency's UAS are authorized to operate in the NAS;

(ii) keep the public informed about the agency's UAS program as well as changes that would significantly affect privacy, civil rights, or civil liberties; and

(iii) make available to the public, on an annual basis, a general summary of the agency's UAS operations during the previous fiscal year, to include a brief description of types or categories of missions flown, and the number of times the agency provided assistance to other agencies, or to State, local, tribal, or territorial governments.

(e) *Reports*. Within 180 days of the date of this memorandum, agencies shall provide the President with a status report on the implementation of this section. Within 1 year of the date of this memorandum, agencies shall publish information on how to access their publicly available policies and procedures implementing this section.

Sec. 2. Multi-stakeholder Engagement Process. In addition to the Federal uses of UAS described in section 1 of this memorandum, the combination of greater operational flexibility, lower capital requirements, and lower operating costs could allow UAS to be a transformative technology in the commercial and private sectors for fields as diverse as urban infrastructure management, farming, and disaster response. Although these opportunities will enhance American economic competitiveness, our Nation must be mindful of the potential implications for privacy, civil rights, and civil liberties. The Federal Government is committed to promoting the responsible use of this technology in a way that does not diminish rights and freedoms.

(a) There is hereby established a multi-stakeholder engagement process to develop and communicate best practices for privacy, accountability, and transparency issues regarding commercial and private UAS use in the NAS. The process will include stakeholders from the private sector.

(b) Within 90 days of the date of this memorandum, the Department of Commerce, through the National Telecommunications and Information Administration, and in consultation with other interested agencies, will initiate this multi-stakeholder engagement process to develop a framework regarding privacy, accountability, and transparency for commercial and private UAS use. For this process, commercial and private use includes the use of UAS for commercial purposes as civil aircraft, even if the use would qualify a UAS as a public aircraft

under 49 U.S.C. 40102(a)(41) and 40125. The process shall not focus on law enforcement or other noncommercial governmental use.

Sec. 3. Definitions. As used in this memorandum:

(a) "Agencies" means executive departments and agencies of the Federal Government that conduct UAS operations in the NAS.

(b) "Federal Government use" means operations in which agencies operate UAS in the NAS. Federal Government use includes agency UAS operations on behalf of another agency or on behalf of a State, local, tribal, or territorial government, or when a nongovernmental entity operates UAS on behalf of an agency.

(c) "National Airspace System" means the common network of U.S. airspace; air navigation facilities, equipment, and services; airports or landing areas; aeronautical charts, information, and services; related rules, regulations, and procedures; technical information; and manpower and material. Included in this definition are system components shared jointly by the Departments of Defense, Transportation, and Homeland Security.

(d) "Unmanned Aircraft System" means an unmanned aircraft (an aircraft that is operated without direct human intervention from within or on the aircraft) and associated elements (including communication links and components that control the unmanned aircraft) that are required for the pilot or system operator in command to operate safely and efficiently in the NAS.

(e) "Personally identifiable information" refers to information that can be used to distinguish or trace an individual's identity, either alone or when combined with other personal or identifying information that is linked or linkable to a specific individual, as set forth in Office of Management and Budget Memorandum M–07–16 (May 22, 2007) and Office of Management and Budget Memorandum M–10–23 (June 25, 2010).

Sec. 4. General Provisions. (a) This memorandum complements and is not intended to supersede existing laws and policies for UAS operations in the NAS, including the National Strategy for Aviation Security and its supporting plans, the FAA Modernization and Reform Act of 2012, the Federal Aviation Administration's (FAA's) Integration of Civil UAS in the NAS Roadmap, and the FAA's UAS Comprehensive Plan.

(b) This memorandum shall be implemented consistent with applicable law, and subject to the availability of appropriations.

(c) Nothing in this memorandum shall be construed to impair or otherwise affect:

(i) the authority granted by law to an executive department, agency, or the head thereof; or

(ii) the functions of the Director of the Office of Management and Budget relating to budgetary, administrative, or legislative proposals.

(d) Independent agencies are strongly encouraged to comply with this memorandum.

(e) This memorandum is not intended to, and does not, create any right or benefit, substantive or procedural, enforceable at law or in equity by any party against the United States, its departments, agencies, or entities, its officers, employees, or agents, or any other person.

(f) The Secretary of Commerce is hereby authorized and directed to publish this memorandum in the *Federal Register*.

BARACK OBAMA

[Filed with the Office of the Federal Register, 2:00 p.m., February 19, 2015]

NOTE: This memorandum was published in the Federal Register on February 20.

Categories: Communications to Federal Agencies : Unmanned Aircraft Systems, efforts to safeguard privacy, civil rights, and civil liberties in domestic use, memorandum.

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