Unmanned Aircraft Systems in Disaster Management

Module 4: UAS Regulations
Version 1.0

FEMA

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Module 4: UAS Regulations – Administration Page

Slide 4-1. UAS Regulations

Duration

65 minutes

Scope Statement

In this module, participants will be introduced to the regulatory requirements governing public, commercial, and recreational operation of UAS. Participants will learn who can operate UAS and where they can be operated. This module will focus on the public use of UAS, as it is the most pertinent to disaster management applications. This module will finish with a brief section on the current challenges in creating a regulatory framework to enable more widespread use of UAS in operations.

Terminal Learning Objective (TLO)

The participant will be able to understand the basic UAS regulations.

Enabling Learning Objectives (ELO)
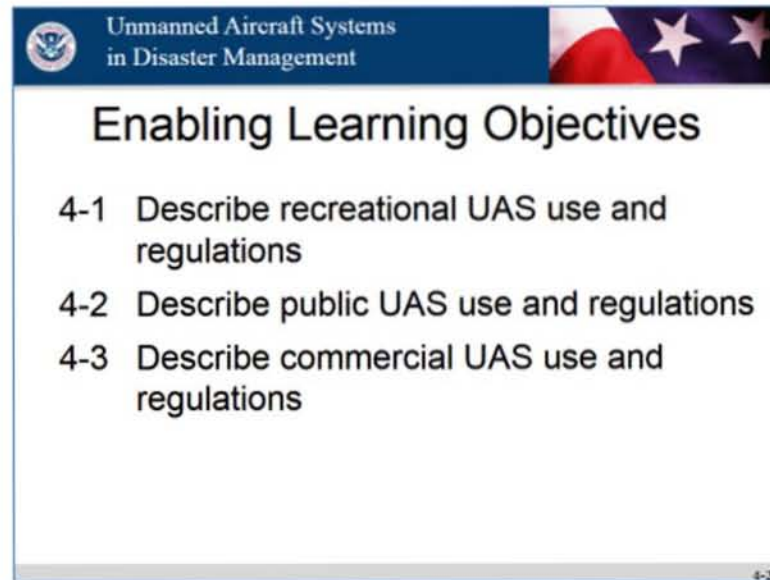
Slide 4-2. Enabling Learning Objectives

At the conclusion of this module, participants will be able to.

4-1   Describe recreational UAS use and regulations
4-2   Describe public UAS use and regulations
4-3   Describe commercial UAS use and regulations

Resources

- Instructor Guide (IG)
- Module 4 presentation slides
- Laptop with presentation software installed and CD-ROM capability
- Audio-visual (A/V projection unit)
- Projector screen
- Chalkboard (and chalk), whiteboard (and dry erase markers), or easel and easel paper (and permanent markers)
- One of each of the following items per participant:
    - Participant Guide (PG) available for download from http://ndptc.hawaii.edu/
    - Participant Handout

Instructor-to-Participant Ratio

2:40

Reference List

Aviation Safety Unmanned Aircraft Program Office Air-160, "Unmanned Aircraft Systems Operations in the U.S. National Airspace System." Federal Aviation Administration, Interim Operational Approval Guidance 08-01. Mar. 13, 2008.

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Federal Aviation Administration. "DOT and FAA Finalize Rules for Small Unmanned Aircraft Systems." June 21, 2016.

Federal Aviation Administration. "FAA Approves First Commercial UAS Flights Over Land." June 10, 2014. http://www.faa.gov/news/press_releases/news_story.cfm?newsId=16354

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Federal Aviation Administration. "Unmanned Aircraft Operations in the National Airspace System." Docket No. FAA-2006-25714, 14 CFR Part 91. Accessed June 2015.

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Huerta v. Pirker. Docket CP-217. National Transportation Safety Board Office of the General Counsel. Mar. 6, 2014.

Know Before You Fly website. http://www.knowbeforeyoufly.org. Accessed June 2015.

McNeal, Gregory. "FAA Approves Limited Use of Drones for Utility Company." Forbes, July 12, 2014. http://www.forbes.com/sites/gregorymcneal/2014/07/12/faa-approves-limited-use-of-drones-for-san-diego-utility-company/

Mesa County Sheriff's Office Law Operations Division. Unmanned Aerial System Team website. http://sheriff.mesacounty.us/uav/. Accessed June 2015.

Practical Exercise Statement

There is a practical exercise at the end of Module 4 that presents two possible scenarios in which UAS could be used. Participants will apply information learned in the course to help answer the questions. The instructor will ask participants either to break into groups to discuss the two scenarios and then discuss the possible answers together as a class, or not break into groups and discuss the questions together, at the discretion of the instructor.

Assessment Strategy

- Instructor observation of participants' involvement in the classroom exercise and discussion.
- Instructor-led discussion to ensure participants' understanding of module lesson topics.

Unmanned Aircraft Systems in Disaster Management

Icon Map

✔ **Knowledge Check:** Used when it is time to assess participant understanding.

➡ **Example:** Used when there is a descriptive illustration to show or explain.

⚷ **Key Points:** Used to convey essential learning concepts, discussions, and introduction of supplemental material.

📝 **Participant Note:** Used to indicate text that has been included as additional information for the participant. The text may not be directly addressed in the slide presentation or during class discussion.

Participant Notes:

Slide 4-3. Types of UAS Operations

This module will focus on explaining the different types of UAS operations and the requisite guidelines and regulations pertinent to each type of permitted use. It will help class participants discern the difference in operations between recreational, commercial, and public UAS uses, learn about many current misunderstandings, and understand the transition between recreational, commercial, and public use.

Because the regulations are evolving rapidly, it is important to stress the point that participants entering the field or planning to become UAS operators should always consult the FAA website for the most current updates to regulations.

The overall role of the FAA is to regulate air operations to achieve safety in the national airspace, while at the same time promote and advance the aeronautical component of U.S. competitiveness. These dual tasks ensure that a focus on continuous improvement drives FAA operations, and that is exactly what is happening in the world of UAS regulations. Field experience in one category of UAS operations will have an influence on another category of operations through standardization, harmonization, and simplification of rules to improve operations and reduce the complication of the regulatory system.

Participant Notes:

Slide 4-4. Recreational/Hobbyist Rules

Hobby or recreational flying does not require FAA approval, but operators must follow safety guidelines, FAA rules, and understand when operations become commercial.

Key Point: Stress that under recreational use, UAS operators must not fly their UAS for business purposes, in the furtherance of their business, or be paid for the flight. It is important for agencies involved in disaster operations to understand what the recreational rules are that individuals may fly under when trying to fly near a disaster to capture images. Temporary Flight Restrictions (TFRs) can be put in place via the FAA to prohibit manned and unmanned aircraft flights around a particular area.

Operators should consult with the FAA to determine when UAS may be used for educational purposes under recreational rules. Student teams might be able to use UAS in an educational setting for a full range of operations from concept to vehicle configuration to communications to sensor payload and post flight analytics. Flight experience can be gathered in conjunction with field exercises, as long as the educational theme remains foremost and compensation does not occur specifically for the UAS flying.

Participant Notes:

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Recreational/Model Aircraft Use

- FAA Advisory Circular 91-57A and other guidelines limit recreational UAS flight
  - Below 400 ft above ground level (AGL)
  - At least 5 mi from airports
    - Within 5 mi must contact airport, control tower before flight
  - Daytime, within line of sight of operator
  - UAS under 55 lb
  - Not near people, stadiums, manned aircraft
  - No careless or reckless flight

4-5

Slide 4-5. Recreational/Model Aircraft Use

This slide lists the general guidelines of recreational UAS use. Reckless operation of UAS is subject to fines by the FAA.

Key Point. FAA Advisory Circular 91-57A provides:

Subject. MODEL AIRCRAFT OPERATING STANDARDS

OPERATING STANDARDS

a. The aircraft operates in accordance with a community-based set of safety guidelines and within the programming of a nationwide community-based organization

b. Select an operating site that is of sufficient distance from populated areas. The selected site should be away from noise sensitive areas such as parks, schools, hospitals, churches, etc.

c. Do not operate model aircraft in the presence of spectators until the aircraft is successfully flight tested and proven airworthy.

d. When flying aircraft within 5 miles of an airport, notify the airport operator, or when an air traffic facility is located at the airport, notify the control tower, or flight service station.

e. Limit operations to 400 feet above ground level.

f. Give right of way to, and avoid flying in the proximity of, full-scale aircraft. Use observers to help if possible.

Participant Notes:

Slide 4-6. How Can a Government Agency Fly UAS?

This section explains when a government agency can fly Public Aircraft Operations (PAO) and what defines a government agency under UAS laws and regulations.

This section also will discuss under which conditions a commercial operator could fly for government agencies.

Key Point: Photo is of a policeman about to launch the Aerovironment Qube rotorcraft UAS.

Participant Notes:

Slide 4-7. Public Agency UAS Options

Public agencies have several options under FAA regulations:

- Part 107
- Public aircraft operations with a COA
- Section 333 Exemption

The FAA's goals are to have UAS operations at the same level of safety as manned aircraft. UAS bring many new factors into play, including increasing the number of aircraft in the national airspace and having aircraft that are controlled from the ground rather than from the aircraft.

Public aircraft operations with a COA are the only option available exclusively to a public agency. Part 107 and Section 333 are also available to commercial operators.

Participant Notes:

Slide 4-8. Option 1: Part 107

Federal Aviation Regulations Part 107 (FAR 107) is a new set of rules for UAS in effect from August 29, 2016, for UAS under 55 lbs. Part 107 represents the first true certification category for UAS operations. The rules are based on many years of UAS operation under public aircraft operations and recent years of experience under Section 333 Exemption, as well as several years of discussion and analysis of preliminary proposed rules. As such, these rules are 'pre-tested' and well thought through and provide a lot of latitude in useful UAS operations. Furthermore, anticipating the need for extended operations such as night flights, the rules provide the capability for waivers beyond the basic set. For disaster operations, these rules open up a wide territory of operation. However, there are investments in time, training, and understanding of the larger domain of airspace operations that must be made in order to become certified under FAR 107.

By creating a certification rule set, the FAA has set the stage for understanding, behavior, and assurance of safety for the standard operator. The UAS operator is charged with being responsible for all of the factors required to achieve safety, including knowledge of the vehicle's operation, fault modes, corrective actions, preflight verification, flight and airspace rules, weather effects, normal and emergency procedures, and incident reporting.

Part 107 applies to all non-recreational UAS operations. Operators that are business, individuals, public agencies, universities, and others may fly under Part 107, under the rules stated on the following pages.

Participant Notes:

Slide 4-9. Part 107 Details

The airspace included in Part 107 is Class G airspace, which is uncontrolled airspace. Class G airspace is usually in uncongested areas and not in cities.

To have access to Class B, C, D, and E airspace, the operator would have to request permission from Air Traffic Control (ATC) via an online website.

Class G airspace is normally from the ground up to 1,200 feet (in some places it is 700 feet). It also is often between class B, C, and D airspace, which is like a cylinder of airspace around an airport with a control tower. Class E airspace is controlled airspace that is not Class B, C, or D, and starts at either 700 feet or 1,200 feet above ground level and extends to 18,000 feet mean sea level (where Class A airspace begins).

The entire Part 107 document is over 600 pages, but the important limitations or constraints for operating under 107 are listed here.

Key Point: Note that operators may obtain waivers to many of the rules of Part 107, and should contact the FAA for more details on how to pursue that option.

Participant Notes:

Unmanned Aircraft Systems in Disaster Management

Part 107 Remote Pilot in Command (PIC) Requirements

- Obtain a remote pilot certificate
  - At least 16 years old
  - Pass aeronautical knowledge test
  - Vetted by Transportation Safety Administration (TSA)
  - If individual holds a pilot certificate, must have completed flight review within previous 24 months and Part 107 online training course at faasafety.gov
- Uncertificated person can fly if directly supervised by a Remote PIC who can immediately take direct control of UAS

4-10

Slide 4-10. Part 107 Remote Pilot in Command (PIC) Requirements

A Remote Pilot Certificate requires studying and understanding a variety of areas related to UAS operation in the national airspace and passing the written aeronautical knowledge test. It also requires that the Transportation Security Administration (TSA) vet the applicant.

Note that someone may fly a UAS without having a Remote Pilot Certificate, as long as there is a person close by directly supervising the flight and able to take control if necessary

A larger portion of 'standard' UAS operations will be conducted by commercial individuals or service companies under Part 107 and will be heavily associated with commercial aerial imagery such as mapping, 3D rendering, real estate photography, and artistic expression. These functions have obvious and valuable application to disaster operations such that the commercial experience will greatly inform the disaster community. The major difference will be while commercial aerial imagery services can pick the optimum time of day, weather, and location for operations, disaster operations must move out when and where the disaster strikes regardless. It is important for the disaster operations community to define these operational needs.

Participant Notes:

Unmanned Aircraft Systems in Disaster Management

Part 107 External Load

- Carrying an external load on UAS is allowed
  - Object must be securely attached to UAS
  - Cannot adversely affect flight of UAS
  - Can drop objects from UAS only if no hazard to persons or property
  - Air commerce disallowed (e.g. commercial package delivery)

4-11

Slide 4-11. Part 107 External Load

One area of Part 107 that should be of particular interest to disaster management is the ability to carry an external load on the UAS and to be allowed to drop objects if it causes no hazards. This capability will help when first responders want to deliver small payloads such as medical supplies, personal communication devices, food packets, communication relay devices, or other needed objects to stranded individuals. Search and rescue, for example, can be greatly aided by getting a cellphone or radio to an individual to help with self-rescue.

Fixed payloads for imagery, mapping, damage assessment, thermal imagery, multispectral assessment, communications relay, atmospheric contamination, radiological risk; or public address systems can be attached to UAS, which would be useful for disaster operations.

Participant Notes:

Unmanned Aircraft Systems in Disaster Management

Option 2: Public Aircraft Operations (PAO) Under a COA

- Use public-owned or leased aircraft in operations that benefit public (specified in US law)
- Obtain 'Declaration Letter' from State, County or City Attorney General qualifying that public agency for PAO
- Public agency self-certifies UAS and pilot qualifications, per its own risk management
- Apply for Certificate of Waiver or Authorization (COA) from FAA

4-12

Slide 4-12. Option 2: Public Aircraft Operations (PAO) Under a COA

Public Certificates of Waiver or Authorizations (COAs) generally permit UAS operations by recognized public agencies and organizations to operate a particular aircraft, for a particular purpose, in particular areas. A COA is necessary to ensure that UAS operations in the national airspace are both safe and responsible. The COA outlines the terms that operators must comply with, which the FAA determines as it balances the need to ensure safety in the national airspace while allowing certain UAS operations. The COA application process is explained in detail in Module 6 of this class

Key Point: It is important to note that public agencies must receive a declaration letter from the city, county, or state attorney's office recognizing it as a public agency to qualify for a public COA.

Participant Notes:

Slide 4-13. Who Can Receive COAs for Public UAS Operations?

The FAA website provides:

The FAA manages public aircraft COAs through its COA Online system. Before the FAA grants an agency access to COA Online, the agency (or proponent) will be asked to provide the FAA with a "declaration letter" from the city, county, or state attorney's office assuring the FAA that the proponent is recognized as a political subdivision of the government of the State … and that the proponent will operate its unmanned aircraft in accordance with 49 USC section 40125(b) (not for commercial purposes). **An agency's accountable executive <u>cannot</u> self-certify their agency is a "public" agency**. (Emphasis added.)

Only qualified public aircraft operations (PAO) qualify for a Public COA. In order to qualify as a PAO, a strict analysis qualifying the aircraft, operator, and purpose must be satisfied. Just because an aircraft is owned by a public agency does not qualify the operations as PAO that are allowed under a Public COA.

Public Aircraft Operations (PAO) refers to UAS operations by a Public Agency (a subdivision of state government) for public good in cases where the State, County, City, or Tribal government assumes the responsibility for managing the risk, using its own means of ensuring safety. This allows UAS systems and operators to perform valuable public service, certainly in disaster operations, under local rather than Federal certification control, leading to specific solutions for a particular locality to rapidly modify and adapt equipment and operations to meet local needs. Airspace access in the case of PAO is still the purview of FAA,

Participant Notes:

accomplished by FAA approval of airspace access via the Certificate of Waiver or Authorization process.

Key Point: Additional information on public aircraft operations (PAO) can be found in FAA Advisory Circular 00-1.1A, Public Aircraft Operations, February 12, 2014, and in 49 USC §§ 40102(a)(41), 40125.

Participant Notes:

Unmanned Aircraft Systems in Disaster Management

Example: COA Recipients

- Hays County, Kansas Emergency Services Office
- Barona Band of Mission Indians Risk Management Office
- Grand Forks Sheriff Dept.
- USDA-Forest Service
- University of Hawaii at Hilo

- Canyon County, Idaho
- North Little Rock Police Dept.
- Ohio Department of Transportation
- Mississippi Dept. of Marine Resources
- Texas A&M-Texas Engineering Experiment Station

4-14

Slide 4-14. Example: Public COA Recipients

This slide gives examples of the variety of public operators that have received public COAs, including public safety agencies, first responders, universities, and other types of public agencies.

Participant Notes:

Slide 4-15. Public Safety Agency Option A: Blanket Area Public Safety COA

For public aircraft operations, the FAA issues a Certificate of Waiver or Authorization (COA) that permits public agencies and organizations to operate in certain areas.

There are COA two options for public safety agencies:
1. Blanket Area Public Safety COA
2. Training COA, followed by a Jurisdictional COA

There are two options for all other types of public agencies:
1. Blanket Area COA
2. Site Specific COA

The Blanket Area Public Safety COA gives the operator use of a "blanket" area across the U.S. of Class G uncontrolled airspace at 400 feet or below during daylight hours. The operator must maintain visual line of sight with the UAS, and there must be adequate visibility. The UAS must be under 55 pounds. The operator must remain a distance of two to five miles from airports (depending on type of airport). The agency should work with the FAA to determine how and where the UAS will be used, and the FAA will help decide the best options for a COA.

Furthermore, the operator must conduct training covering UAS operations and conduct practice flights to become comfortable with operating the UAS and understanding procedures, all under either Part 107 or under a Training COA, before flying under the COA for actual operations.

Participant Notes:

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Public Safety Agency Option B:
Training COA and Jurisdictional COA

- First get Training COA to train and demonstrate ability to handle flight operations
- Once training is satisfactory, get Jurisdictional COA
- Jurisdictional COA is for wide area (entire city, county)
  - May include Class C, D, E, and G airspace, which is both controlled and uncontrolled airspace

4-16

Slide 4-16. Public Safety Agency Option B: Training COA and Jurisdictional COA

Another option for police departments, fire departments, and other first responder and safety agencies, is to apply for a Training COA, followed by a Jurisdictional COA. With a Training COA, an agency trains its UAS operators for a certain amount of time until they are ready to demonstrate their ability to handle their intended flight operations.

Once the FAA deems the operators' training to be satisfactory, the FAA issues the agency a Jurisdictional COA, which allows the agency to fly within its entire jurisdiction, such as the entire city or county (unless there are certain areas where UAS flights may not be conducted). The Jurisdictional COA area may include Class C, D, E, and G airspace, which is both controlled and uncontrolled airspace, depending on the airspace that is in that particular jurisdiction.

✔ **Knowledge Check:** Any agency interested in this option should ask the FAA for Jurisdictional COAs that have been approved and model training programs for similar outcomes.

Participant Notes:

Slide 4-17. COAs for Other Types of Public Agencies

Two other types of COAs are available to all types of public agencies, not restricted to public safety agencies.

The first option is a Blanket Area COA, which has similar rules and restrictions as the Blanket Area Public Safety COA, including the 400 feet or below altitude restriction and flight only in Class G airspace.

The second option is a Site Specific COA. This type of COA is the original type of COA for public aircraft operations that the FAA first started issuing to public agencies. The public agency applies for this COA by requesting a specific location where it wants to fly UAS. The agency also provides details on the specific UAS (one or more) it would like to fly, the specific payload the UAS will carry, the specific activities that the agency plans to conduct using the UAS, the specific times of day it wants to fly, and an explanation of its planned safety measures and limitations.

Participant Notes:

Slide 4-18. COA Examples

Naperville, Illinois, Fire Department has a Blanket Area Public Safety COA that it uses for search and rescue, natural disasters, water rescues, hazardous materials incidents, and pre-planning analysis for certain large buildings.

The Sheriff's Department in Grand Forks, North Dakota, has a Jurisdictional COA covering 16 counties that it uses for public safety, missing persons, post-disaster assessments, and traffic accident/crime scene photography. An interesting element of the Grand Forks COA is that University of North Dakota pilots fly the UAS and work together with specially trained law enforcement sensor system operators. This example of cooperation between the University of North Dakota and the Grand Forks Sheriff's department provides a good model of cooperation between two public agencies collaborating to attain the goals of both education and law enforcement.

Key Point: This type of collaboration could also be between a public agency and civil/commercial operator.

Participant Notes:

Slide 4-19. COA Examples (continued)

The Mesa County, Colorado, Sheriff's COA is another good example of a Jurisdictional COA and shows the economic benefit of its UAS operations. After receiving three UAS, the sheriff's office received a county-wide Jurisdictional COA to test and evaluate UAS for a number of applications in support of law enforcement.

The cost of using UAS compared to manned aircraft was estimated at $25 per hour for UAS versus $400 to $1,200 per hour for manned operations. With trained county operators, the Sheriff's department uses its UAS for several types of emergency missions.

- Crash investigations
- Fire hot spot sensing
- Search and rescue

Key Point: Due to the miniaturization and improved quality of new payloads and sensors, UAS are now able to carry payloads that are as good as what manned aircraft can carry. The cost/benefit of using UAS versus manned aviation is a key point of this slide.

Participant Notes:


Slide 4-20. Amended COA

🔑 **Key Point:** COA terms may be expanded to include additional aircraft, additional types of operations, or additional areas of operation; however, expansion of such parameters must be applied for and accepted by the FAA. It is most efficient to analyze all possible uses for which an agency might use their UAS and all possible locations, so that their original application for a COA includes all of these options. The FAA may or may not approve all of these options, but the FAA will work with the agency to create a COA; they will not just reject an entire application without input.

🔑 **Key Point:** It is generally easier and faster to amend a COA compared to applying for a new COA. For instance, an amended COA could be approved in a matter of weeks, rather than a new COA, which could take months for approval.

Participant Notes:
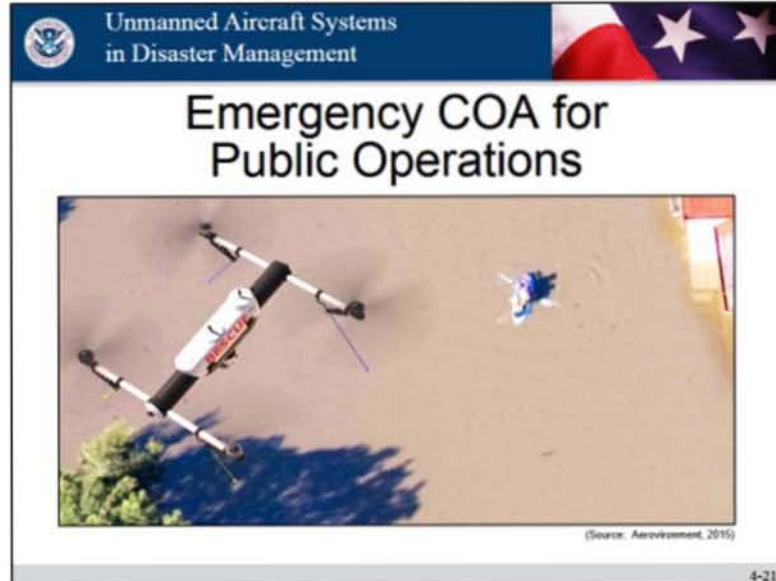
Slide 4-21. Emergency COA for Public Operations

UAS are proving to be a very effective tool in gathering valuable information in all phases of disaster management, mitigation, preparedness, response, and recovery. In all types of disasters, UAS are a means of gathering information in hard to access areas and without endangering the lives of first responders.

Emergency COAs, which will be discussed in the next group of slides, are an option under very limited circumstances that allows public agencies to conduct UAS operations in emergency situations.

Participant Notes:

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Emergency COA Details

- When a disaster happens, COA holders may get an Emergency COA
  - Useful if emergency happens in an area not normally open to COA holders
    - Such as Class B airspace near busy airports
    - Or in airspace not included in Jurisdictional COA

4-22

Slide 4-22. Emergency COA Details

Emergency COAs are an option in natural disasters and other life threatening situations, but they are limited, and usually an operator already needs to have an existing COA to be granted an Emergency COA. If an agency has an active COA and wants to use UAS for a disaster situation that does not fit into the parameters of its COA, which could happen if the emergency is in an area that is not included in the COA, then the agency would need to request an Emergency COA that applies to the emergency situation.

Key Point: Emergency COAs are limited, in that they are valid usually for only a short time, several days or so. A public operator with a COA may prefer to request an amendment to its COA, as discussed in previous slides, if the emergency will last more than a few days. If the emergency situation needs immediate attention, then an Emergency COA is better because the FAA likely will respond the same day. If an agency will need to use UAS for disaster response and recovery for days and weeks, then requesting an amendment to a COA may be the best option because it is long lasting, though it could take several weeks for the FAA to approve it.

Participant Notes:

Unmanned Aircraft Systems in Disaster Management

Emergency COA Considerations

- Emergency COA is for a short time for a specific event to aid disaster relief, search and rescue, other life-threatening situation
  - Possible loss of life is great
  - Manned flight not possible or practical due to a hazard, or manned aircraft not available
  - FAA response within 24 hours (possibly within 2 hours)
- Applicant and UAS usually are under current approved COA

4-23

Slide 4-23. Emergency COA Considerations

The FAA will consider issuing an Emergency COA when there is a high possibility of loss of life or when manned flight is not possible or practical due to a hazard, or when manned aircraft are not available or unusable. An Emergency COA is for a short time for a specific event to aid disaster relief, search and rescue, or other life-threatening situations.

The FAA usually requires that an Emergency COA is issued to a UAS operator that already has an existing COA, because the FAA is comfortable that the operator knows how to fly UAS and has operational and safety procedures in place.

The FAA will respond to an Emergency COA within 24 hours, and possibly within two hours.

Participant Notes:

Slide 4-24. Example: Emergency COA

An example of Emergency COA use is Mid-Atlantic Aviation Partnership, which is one of the FAA-approved UAS Test Sites. Virginia Tech, which is one of the operators under this test site, received two separate Emergency COAs to assist Virginia State Police with searches for two missing students in two different incidents. This is another good example of partnership between two public groups working together on a UAS operation.

In an example of an attempt to receive an Emergency COA, the University of Hawaii at Hilo had an existing COA for natural resource work in a specific area on the Island of Hawaii. When Tropical Storm Iselle hit the island, the university requested an Emergency COA, but the request was denied because the FAA said there was no immediate threat to life. In a later event, there was a lava flow that was headed to the town of Pahoa on the same island, and this time the university applied for an Amended COA for a new location and new mission. Within ten days, the FAA approved the request, which was adequate time because the lava flow was a very slow-moving event.

Key Point: The instructor should stress the importance of maintaining good standing and fostering a relationship with the FAA.

Key Point: The instructor should note that an Emergency COA is in effect for only a limited time frame, while an Amended COA is for the remaining life of the COA.

Participant Notes:


Slide 4-25. Option 3: Section 333 Exemption

Key Point: This is a workaround so that a better result will not be held back because current laws do not match all UAS technology as long as safety increases. The Section 333 Exemption was put in place for UAS commercial operations while the FAA developed a more permanent set of rules for UAS commercial operations which is Part 107. So with Part 107 in place from August 2016, Section 333 exemptions will only be used in very rare cases. Section 333 might be used when a UAS operation would improve overall safety, but the system is beyond the limits of Part 107 or a COA for public operations. One example is for UAS with a total weight that exceeds 55 lbs.

Section 333 Exemption refers to a legal construct that exempts UAS from FAA certification in cases where use of the UAS will result in a net safer operation than if traditional manned aircraft were used. To achieve the exemption, the operator submits a petition to the FAA with a safety analysis proving the safer status with UAS. Considerable UAS operational experience has been achieved nationwide under Section 333 since 2014, which helped inform the creation of the Part 107 regulations. The exemption construct will find continued use in disaster operations as disaster teams explore the beneficial use of UAS and define vehicle configurations and concepts of operation that are desirable but not permitted under FAR 107. The Section 333 exemption will be explained in upcoming slides on commercial operations.

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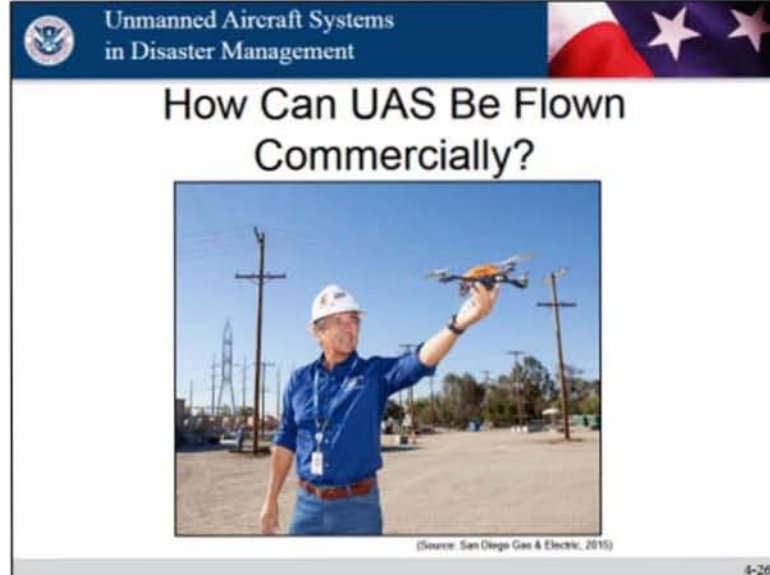
Slide 4-26. How Can UAS Be Flown Commercially?

Any non-recreational operation that does not meet regulatory criteria for public aircraft operations is considered a civil aircraft operation by the FAA and must comply with its regulations governing civil or commercial operations.

Key Point: Photo is of PSI InstantEye during San Diego Gas and Electric work.

Participant Notes:

Slide 4-27. Commercial UAS Operations History

These examples show the historical progression of FAA authorizations of commercial operations. Initially, the FAA approved a UAS operation over Arctic waters, and next progressed to operations in Alaska over land in areas that were controlled by the operator (BP). Following this approval, the FAA approved San Diego Gas and Electric UAS operations, initially in remote areas, to train their staff on UAS operations involving transmission line inspections.

Participant Notes:

Slide 4-28. Flare Stack Inspection

The image on the left shows inspectors, fully covered in protective suits, being suspended from a basket on a crane, while the right shows a UAS doing the same inspection.

Key Point: This is a good illustration of UAS suitability for jobs that include one or more of the 3 Ds: Dull, Dirty, Dangerous.

Participant Notes:

Slide 4-29. Commercial UAS Options

This slide introduces the options for commercial UAS operations authorized by the FAA. There are currently three methods to receive FAA authorization to fly UAS commercially.

1. Part 107
   a. Most commercial operations will be authorized under Part 107, in effect from August 29, 2016. The details were discussed earlier in this module under public UAS.

2. Section 333 Exemption
   a. For commercial operations that cannot meet the limitations of Part 107 or a waiver to Part 107

3. Special Airworthiness Certificate
   a. Allows civil UAS to perform research and development, crew training, and market surveys

Participant Notes:

Unmanned Aircraft Systems in Disaster Management

Section 333 Exemption for Commercial Operations

- Issuing began September 2014
- Need airman certificate (pilot's license)
- No medical certificate required
- Apply for 333 to get COA for commercial operations
  - Includes "blanket COA" (similar to COA for public agencies)
  - Existing 333s can still be used until expiration

4-30

Slide 4-30. Section 333 Exemption for Commercial Operations

Section 333 exemptions were the primary commercial UAS authorization until August 2016, but were a temporary bridge to Part 107, which is the first comprehensive FAA regulation of commercial UAS operations. Now with Part 107, Section 333 exemptions will only be available in very rare cases, such as when the system or operation is beyond the limits of Part 107 or a COA for public operations, but the UAS operation would improve overall safety.

Approximately six months after the first Section 333 Exemptions, the FAA introduced "Blanket" 333 COAs to operators with Section 333 Exemptions. "Blanket" COAs allow operations throughout the United States, subject to certain restrictions, such as remaining under 400 feet and two to five miles away from airports (depending on the type of airport), and flying in daylight hours.

Key Point: It is important to stress that any operation outside of the Blanket COA restrictions requires a separate COA from the FAA authorizing those operations.

Key Point: One key difference between Section 333 and a Public COA is that operators under a Public COA do not need an Airman Certificate, because the agency self-certifies its pilots.

Participant Notes:

Unmanned Aircraft Systems in Disaster Management

Module 4 Summary
UAS Regulations

- Three main categories of users
  - Recreational/Hobby
  - Public
  - Civil/Commercial
- FAA regulates and enforces UAS operations
  - What if an operator does not follow the regulations?
    - FAA enforcement, fines, loss of certificate
    - Police enforcement, if action violates laws
    - Liability and criminal enforcement if action causes accident or injures people

4-31

Slide 4-31. Module 4 Summary UAS Regulations

In summary, the FAA has the right to regulate both recreational and non-recreational (Public/Civil) use in the United States. Regulations are divided into three groups: recreational/hobbyist use, public/government use, and civil/commercial use. The regulations are evolving quickly and operators in each category must stay on top of changes both at the federal and state/local level.

Key Point: Some participants may question the importance of following the regulations and may ask what would happen if an operator does not follow the regulations.

- There likely would be FAA enforcement and fines.
- There could be police enforcement, if the actions violate laws.
- Remind participants that the laws are there to help protect manned aircraft and people on the ground. If people disobey the regulations, they could cause an accident, which could injure or kill others, and flying in violation of the regulations would lead to increased criminal liability and criminal enforcement.

Participant Notes:

Slide 4-32. Summary for Recreational/Hobby Use

There is often confusion about where the line is between recreational and commercial operations. Potential UAS operators should contact the FAA if they need clarification on whether an operation would be considered commercial. In certain instances, students at educational institutions may fly their UAS under recreational rules. Operators may check with the FAA to see if their operations would qualify under recreational rules.

Key Point: Hobbyists cannot fly UAS as part of public disaster operations. First responders cannot fly their personal UAS under hobbyist rules for disaster operations.

The FAA website provides:

> **Do I need approval from the FAA to fly a model aircraft for recreation or hobby?**
>
> No. FAA guidance says that model aircraft flights should be flown a sufficient distance from populated areas and from manned aircraft, should be kept within visual line of sight of the operator, should weigh under 55 lbs. unless certified by an aeromodeling community-based organization, and are not for business purposes.

Participant Notes:

Summary: Public Agency Options for FAA Authorization

Public Aircraft Operations With COA	Part 107	Section 333
For public agencies conducting public aircraft ops	Commercial operations (but can be a public agency)	Commercial operations (but can be a public agency)
COAs: Blanket Area Public Safety, Jurisdictional, Blanket Area, or Site Specific	Class G airspace, and with permission other airspace	Blanket COA for most of U.S., request COA for specific changes to limitations
Class G, or variety of airspace, depending on COA	Class G	Class G for blanket, other airspace for specific COA
Self-certify pilots	Need remote pilot certificate	Need airman certificate
Need declaration letter from city, county, or state office	Pass aeronautical knowledge test	Apply for this if operations do not fit into first two options

4-33

Slide 4-33. Summary: Public Agency Options for FAA Authorization

Public agencies have three main ways to get FAA authorization.

1. **Public Aircraft Operations With COA**

   Public agencies conducting public aircraft operations may apply for a COA to fly UAS. The options are to apply for a Blanket Area Public Safety COA or a Training COA followed by a Jurisdictional COA.

   The advantages of flying under public aircraft operations is that the agency can self-certify its pilots and UAS, and its UAS operators do not need to obtain a pilot's license or a remote pilot certificate, but the agency assumes more risk by taking on this responsibility.

   A challenge is that the agency must obtain a 'declaration letter' from the city, county, or state office, and this can be time consuming.

   A disadvantage of the Blanket Area Public Safety COA is that it is for Class G airspace, and this might not include areas where an agency wants to fly, but the agency can petition the FAA to request a waiver to some of the limitations. A Jurisdictional COA includes a wider area covering an entire jurisdiction, so it is helpful for an agency that wants a large area and flexibility, but it could take longer for the training portion for the FAA to accept that the agency's pilots are ready to operate in the entire jurisdiction.

Participant Notes:

2. **Part 107**

   Public agencies may operate under Part 107 even though it is designed for commercial operations, but by doing so, the agency is no longer flying under public aircraft operations. An advantage is that the agency does not need a declaration letter from the city, county, or state office.

   Part 107 allows for flights that are only Class G airspace, which may be limiting to an agency, but the agency may request a waiver from some of the limitations of Part 107. The UAS operator will need to pass the aeronautical knowledge test and be vetted by the TSA to receive a Remote Pilot Certificate to operate under Part 107.

3. **Section 333 Exemption**

   Public agencies also may operate with a Section 333 Exemption, even though it is designed for commercial operations. While this was only a temporary set of rules for UAS operations, it is still available in rare cases in which operations cannot meet the limits of Part 107 or public aircraft operations with a COA. A downside of the Section 333 is that the operator must have an airman certificate.

The FAA website states:

> **What is the difference between public and civil aircraft?**
>
> A public aircraft is one that is only for the United States government or owned and operated by the government of a state, the District of Columbia, or a territory or possession of the US or a political subdivision. Operators of public aircraft include DOD, DOJ, DHS, NASA, NOAA, state/local agencies and qualifying universities. Civil aircraft means other than a public aircraft.

Participant Notes:

Slide 4-34. Summary of Regulations for Civil/Commercial Operations

Most civil/commercial UAS operators will operate under Part 107, but it allows for flights that are only Class G airspace, which may be limiting for certain commercial operations. The operator may request a waiver from some of the limitations of Part 107. The UAS operator will need to pass the aeronautical knowledge test and be vetted by the TSA to receive a Remote Pilot Certificate to operate under Part 107.

In rare cases, an operator may obtain a Section 333 Exemption. While this was only a temporary set of rules for UAS operations, it is still available in cases in which operations cannot meet the limits of Part 107 nor a waiver to the limitations of Part 107. A downside of the Section 333 is that the operator must have an airman certificate. The Section 333 Exemption allows commercial operations in low-risk, controlled environments and is issued to operators and systems that have demonstrated safe and reasonable use.

Commercial UAS operators may obtain a Special Airworthiness Certificate for research and development, demonstration, or training, but this is very rare.

Participant Notes:

**Unmanned Aircraft Systems
in Disaster Management**

Practical Exercise Scenario 5

The Office of Emergency Management received word that a river breach due to unprecedented rainfall has left people stranded throughout a widespread area. A recreational UAS user living nearby is out flying her UAS. The county fire department's helicopter is deployed in another area of the flooding, so the department wants to ask her to fly her UAS up the valley to determine where people are stranded.

   A. Can she accept the fire department's request?
      Why or why not?
   B. Could she do this search on her own?
      Why or why not?

4-35

Slide 4-35. Practical Exercise Scenario 5

The exercises at the end of Module 4 present possible scenarios in which UAS could be used. Participants will apply information learned in the modules to help answer the questions.

The instructor will ask participants either to break into groups to discuss the two scenarios here and on the next page and then discuss the possible answers together as a class, or not break into groups and discuss the questions together, at the discretion of the instructor.

Participant Notes:

Unmanned Aircraft Systems
in Disaster Management

Practical Exercise Scenario 6

A tornado has caused a train crash that scattered locomotives and passengers over a long stretch of track several miles outside of a city. The point-of-contact for the mission inside the ICS structure needs information immediately on the status of injuries, the train's condition, and the topography so that access can be designed. A commercial helicopter has been called but is two hours away. The city's police department has a Jurisdictional COA to fly UAS within its city limits, but this accident occurred outside of that COA area.

    A. Can the police department use its UAS to help?
       Why or why not?
    B. What steps would need to be taken?

4-36

Slide 4-36. Practical Exercise Scenario 6

The exercises at the end of Module 4 present possible scenarios in which UAS could be used. Participants will apply information learned in the modules to help answer the questions.

The instructor will ask participants either to break into groups to discuss the two scenarios here and on the previous page and then discuss the possible answers together as a class, or not break into groups and discuss the questions together, at the discretion of the instructor.

Participant Notes:

Slide 4-37. Resources

FAA Unmanned Aircraft Systems
http.//www.faa.gov/uas

Know Before You Fly
http.//www.knowbeforeyoufly.org/

FAA Model Aircraft
http.//www.faa.gov/uas/model_aircraft

FAA Section 333
http.//www.faa.gov/uas/legislative_programs/section_333/

FAA UAS Airmen Certification
http.//fsims.faa.gov/PICDetail.aspx?docId=8900.1,Vol.16,Ch4,Sec1

Unmanned Aircraft Systems in Disaster Management

Module 5: Essential Elements for UAS Success
Version 1.0

FEMA

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Module 5: Essential Elements for UAS Success – Administration Page

Unmanned Aircraft Systems in Disaster Management
Module 5: Essential Elements for UAS Success
Version 1.0
FEMA

Slide 5-1. Essential Elements for UAS Success

Duration

60 minutes

Scope Statement

Participants will learn several essential elements for successful integration of UAS into the national airspace and disaster management, including requirements to ensure privacy, civil rights, and civil liberties, the importance of engaging the local community, and the challenges of developing UAS regulations and equipment. Participants will understand the challenges of integrating new UAS technology, the key factors in making UAS programs successful, and how agencies can prepare for UAS integration to make it the most effective in their work.

Terminal Learning Objectives (TLO)

The participant will be able to discuss several current challenges and issues with UAS.

Enabling Learning Objectives (ELO)

Slide 5-2. Enabling Learning Objectives

At the conclusion of this module, participants will be able to.

5-1   Describe the essential elements in designing a successful UAS program, including ensuring privacy, civil rights, and civil liberties protections

5-2   Describe how to build public trust when developing a UAS program

5-3   Describe elements of UAS technology evolution and the importance of voicing disaster management needs

Resources

- Instructor Guide (IG)
- Module 5 presentation slides
- Laptop with presentation software installed and CD-ROM capability
- Audio-visual (A/V projection unit)
- Projector screen
- Chalkboard (and chalk), whiteboard (and dry erase markers), or easel and easel paper (and permanent markers)
- One of each of the following items per participant:
  - Participant Guide (PG) available for download from http://ndptc.hawaii.edu/
  - Participant Handouts

Instructor-to-Participant Ratio

2:40

Reference List

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Matiteyahu, Taly G. "Drone Regulations and Fourth Amendment Rights. The Interaction of State Drone Statutes and the Reasonable Expectation of Privacy." Columbia Journal of Law and Social Problems, 2014.

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United States Department of Justice. *Interim Report on the Department of Justice's Use and Support of Unmanned Aircraft Systems.* Office of the Inspector General Audit Division. Report 13-37 Sep. 2013.

United States Government Accountability Office. *Unmanned Aircraft Systems Measuring Progress and Addressing Potential Privacy Concerns Would Facilitate Integration into the National Airspace System.* Report to Congressional Requesters. Sep. 2012.

Villasenor, John. Observations From Above. Unmanned Aircraft Systems and Privacy. Harvard Journal of Law & Public Policy, Vol. 36, Issue 2, Spring 2013.

Practical Exercise Statement

There is a practical exercise at the end of Module 5 that presents two possible scenarios in which UAS could be used. Participants will apply information learned in the course to help answer the questions. The instructor will ask participants either to break into groups to discuss the two scenarios and then discuss the possible answers together as a class, or not break into groups and discuss the questions together, at the discretion of the instructor.

Assessment Strategy

- Instructor observation of participant involvement in the classroom exercise and discussion.
- Instructor-led discussion to ensure that participants understand the options for UAS use in disaster operations

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Icon Map

✔ **Knowledge Check:** Used when it is time to assess participant understanding.

➡ **Example:** Used when there is a descriptive illustration to show or explain.

🔑 **Key Points:** Used to convey essential learning concepts, discussions, and introduction of supplemental material.

📝 **Participant Note:** Used to indicate text that has been included as additional information for the participant. The text may not be directly addressed in the slide presentation or during class discussion.

Participant Notes:

Slide 5-3. Several Elements of a Successful UAS Program

🗝 **Key Point:** The Informational Handout that participants were given describes in detail some information that they can reference as they decide to develop a UAS program. It captures the experiences and lessons learned of those who have gone down this path. It is a roadmap to take back to their agencies.

🗝 **Key Point:** There are a number of considerations underlying UAS in disaster management. While UAS is a simple concept, implementation is not simple, as there is no model to follow and the challenges that must be met include principles as fundamental as protecting basic civil rights and civil liberties. Furthermore, there are multiple sets of regulations that are generally not coordinated, and in flux, but which must be dealt with—from Federal to state to county to local.

In order to build a successful UAS program, agencies must consider many elements, which will be discussed in this module.

Participant Notes:

Slide 5-4. Essential UAS User Responsibilities

United States Government agencies considering UAS for disaster management must focus on compliance with the current and impending Federal, state, and local rules regarding UAS operations. These rules are changing, as we will see. UAS users have the obligation to keep current and comply with operating rules, certifications, and authorizations associated with UAS in disaster operations.

Key Point: Involving the community in advance and addressing privacy are important factors in enabling the proper use of UAS in disaster operations. Some of the privacy, civil rights, and civil liberties protections include permission to capture imagery while flying over private property, guidelines for sharing information, storage of data, protocols for who may obtain access to data, etc.

Participant Notes:

Slide 5-5. Deliberate Integration Pace Assures Long-Term Success

> 🗝 **Key Point:** Parallel efforts are underway across the government to deal with the challenges presented by UAS. Use of UAS in disaster operations will benefit from these efforts.

Congress is dealing with the balance between United States economic competitiveness, as represented by future UAS business, and safety, by working with the business community to find ways to move forward safely with an economically viable UAS industry.

The FAA is dealing with Congressional direction, crafting new UAS Federal Aviation Regulations and means of compliance, while working with NASA and universities to generate the technology needed for progressively more competent UAS.

Branches of government, and the agencies that have an interest in UAS, are developing means of protecting personal rights and privacy, while the FAA and NASA tackle the technical issues.

By engaging the full range of government at a deliberate but quick pace, while including industry, the community, and academia, the FAA and Congress together are working for a high level of success.

Participant Notes:

Slide 5-6. UAS Future Emerging Rapidly

Key Point: As directed by Congress, the FAA has created new Federal Aviation Regulations (FAR 107) which, when formally processed through rulemaking, will provide regulatory guidance for UAS.

Key Point: As directed by the President, Federal and civil agencies dealing with UAS are reviewing and correcting procedures and policy for adherence to privacy and personal rights law.

Using UAS in disaster management operations will benefit from these parallel efforts. Given the sensitive nature of the perceived role of UAS in unauthorized or undesired surveillance, UAS use in disaster operations must be approached carefully, openly, and with an overabundance of compliance.

In the meantime, UAS industrial and business development is in full swing. Business opportunities are driving the design and development of UAS.

Key Point: It is important for the disaster management community to bring UAS requirements for disaster management to the attention of the design community.

Participant Notes:

Unmanned Aircraft Systems in Disaster Management

Legal Framework for UAS Operations

- UAS operators must comply with city, state, and federal laws
  - Understand laws in jurisdiction
  - Protect privacy, civil rights, civil liberties
  - Know liability and accountability, insurance requirements
  - Future UAS court cases will test laws
- Legislative responses will shape future
  - Defining law enforcement use of UAS
  - Criminalizing misbehavior of UAS operator, nuisance laws
  - As technology advances, laws may change to keep pace
    - Image analysis, facial recognition, acoustics

5-7

Slide 5-7. Legal Framework for UAS Operations

Key Point: UAS (and other forms of newly-available data collection) represent the opportunity for unauthorized surveillance against which United States citizens must be protected. Legislative responses to UAS and other similar technology will potentially emerge, providing guidance on the changing expectations towards privacy. Operating regulations will presumably follow and will likely be tested in the courts, and hopefully, over time, an acceptable framework for the use of UAS in a manner that protects individual rights will develop.

Key Point: As this all develops, it is important for the disaster response community to pay attention and understand the laws that govern their work and their region, and make sure they understand the state and local laws on UAS use related to disaster operations in a given area.

Key Point: Public agencies that operate UAS should keep their privacy officers and legal counsel apprised of UAS program developments to ensure the program continues to comply with laws, regulations, and policies, and agencies' privacy officers and legal counsel should inform UAS program operators of any changes in law, regulation, or policy. As public policy and the law evolve, this is an area on which to keep an eye. We will provide some tools and current resources but more is likely to come over the next 5 to 10 years.

Participant Notes:

Unmanned Aircraft Systems in Disaster Management

UAS Programs Must Comply With P/CRCL Protections

- Follow P/CRCL requirements
- Employ UAS according to local, state, federal laws
  - Reasonable expectation of privacy, protection of free speech, right to protest, and other civil liberties
- Perform formal analysis of potential privacy risks and develop mitigations (PIA/CLIA)
- Involve community in all stages of UAS program development
- Include P/CRCL protections in UAS-related policies and include approach for handling complaints and redress

5-8

Slide 5-8. UAS Programs Must comply With P/CRCL Protections

Key Point: Most agencies involved in disaster management participate in disaster monitoring, a necessary component of disaster operations. These agencies must take precautions to ensure that information collected via UAS as part of disaster management is properly handled to avoid any privacy, civil rights, and civil liberties concerns, as would be the case with all information and imagery collected through various means (helicopters, airplanes, on-the-ground personnel, etc.).

The privacy picture, which includes the total of concern for unauthorized surveillance by UAS, has as its basis the Fourth Amendment. The basic right to privacy, civil rights, and civil liberties must be sustained as UAS enter the operational field. It is important to perform a formal analysis of potential privacy risks and develop mitigations through a PIA (Privacy Impact Assessment or a CLIA (Civil Liberties Impact Assessment).

As with any new technology, public information and concerns are not uniform in disaster operations. Thus, it is extremely critical that extensive and continuous public awareness be generated for disaster-related UAS programs.

The ability of disaster management to take advantage of the utility and capability provided by UAS will rest largely upon successful communication with the general public through awareness campaigns, a streamlined complaint resolution process, and 'socialization,' helping the public become comfortable with UAS through education and information.

Participant Notes:

Slide 5-9. Data Management To Ensure Privacy,
Civil Rights, and Civil Liberties

Key Point: It is essential when creating a UAS program to determine data management policies and protocols to ensure privacy, civil rights and civil liberties. Examples include:

- How will the data be used?
- How will the data be stored or deleted?
- Who will have access to data?
- Under what conditions will access be granted?

These questions need to be answered based on the authorities of the agency gathering the data.

Participant Notes:

Slide 5-10. Presidential Memorandum: February 15, 2015

The Presidential Memorandum, issued by President Obama on February 15, 2015, directs all Federal executive branch departments and agencies that conduct UAS operations to ensure that their policies and procedures incorporate privacy, civil rights, and civil liberties protections for information collected in the National Airspace System (NAS). This also applies to agencies that receive Federal funding. A recipient of Federal awards or funds is any non-federal entity that receives federal assistance and is part of the United States, including state governments or any agency of these governments, and local governments, including a county, parish, municipality, city, town, township, village, state-designated Indian tribal government, local public authority, etc.

Key Point: Following the progress of compliance arguments by Federal agencies that the Presidential Memorandum has directed will be important for UAS users in disaster operations in order to align methods of compliance.

Example: Because some hobbyists have tried, and may continue to try, to capture dramatic imagery during emergency situations, which could interfere with official disaster operations, public agencies and state legislatures are beginning to address this potentially serious nuisance through public awareness campaigns and proposed legislation. Several times in the summer of 2015, manned firefighting aircraft were temporarily grounded to avoid the potential of a collision with hobbyist UAS that were spotted in the area of California wildfires.

Participant Notes:

If UAS operations comply with existing rights and privacy law, then no new Federal privacy-protection laws are likely required as related to UAS. Legal level of protection may be adequate, but compliance will require a review and re-affirmation of policies and procedures. According to the Presidential Memorandum, agencies shall, prior to deployment of new UAS technology and at least every three 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.

The memorandum may offer guidance to State, Local, Tribal and Territorial (SLTT) governments as they work to ensure that any UAS program is in compliance with existing privacy laws and protects civil rights and civil liberties, but the memorandum does not directly address SLTT or civil use of UAS. There are circumstances in which the Privacy Act would apply, but the Privacy Act is not necessarily sufficient in itself to address all privacy concerns that may arise. State and local agencies should also be looking at their state and local legislative and policymaking entities for guidance.

Key Point: The Privacy Act of 1974 restricts Federal collection and dissemination of individuals' information maintained in records, including personally identifiable information. It applies only to Federal Systems of Record. There may be state privacy laws that apply if any State, Local, Tribal or Territorial (SLTT) government collects information that could be linked to an individual.

Key Point: Careful accounting and reporting on UAS usage in disaster management actions and the protection of any information generated will be an important condition of use. Careful documentation of training, certification, complaint system, and internal governance of UAS operations will be required. Data flow architecture associated with information collected by UAS will require information protection and periodic updating. Agencies using UAS should be open with the general public and participate in public outreach throughout the UAS program, and before a program is even developed, to gain public support and understanding.

Example: A Privacy/Civil Rights Civil Liberties Impact Assessment can be made public and address this requirement. Impact Assessments will be briefly discussed later in this module.

Participant Notes:
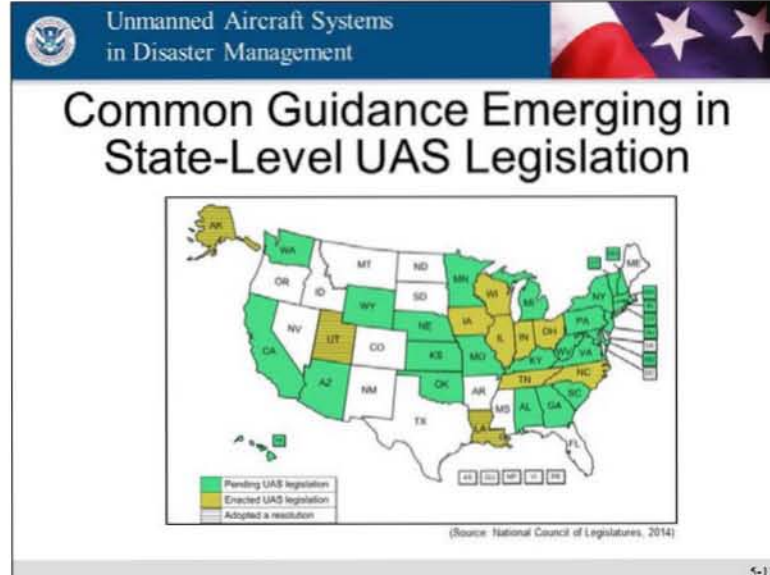
Slide 5-11. Common Guidance Emerging in State-Level UAS Legislation

Example: State-level UAS legislation through 2014 was beginning to converge on 'common guidance,' or similar constraints and operating rules, for UAS in the hands of public safety agencies, as a starting point.

State and local legislature action follows its own fiscal year and bill-approval process, not necessarily aligned with Federal lawmaking; thus the total set of operating rules or guidance for UAS will be in a process of periodic update.

Key Point: The nature of state-level guidance will have great influence on UAS capability to operate in disaster management. This is an important subject for disaster managers to observe and influence.

Participant Notes:

Unmanned Aircraft Systems in Disaster Management

Alaska Law Enforcement UAS Legislation – Common Guidance

- Alaska HB 255:
  - Police using UAS must conform:
    - FAA flight authorization in hand
    - Operators trained and certified
    - Records kept of all flights
    - Provide opportunity for community involvement in development of agencies' procedures
  - Police may use UAS under a search warrant
  - Police may retain images from UAS for training purposes or, if required, as part of investigation or prosecution

5-12

Slide 5-12. Alaska Law Enforcement UAS Legislation – Common Guidance

Example: This is an example of the types of P/CRCL issues that communities will want to see addressed in agencies' UAS program development, P/CL assessments and in their outreach. Alaska is arguably a leader in UAS operations and socialization. Alaska's legislation on UAS use by public safety organizations contains logical, reasonable constraints and information control measures.

The UAS Legislative Task Force of the 29th Alaska State Legislature prepared a document on "Drone/UAS Operator Safety Guidelines and FAQs about Privacy," which is a good example of an effective outreach tool, and can be found at the following site:

https://www.commerce.alaska.gov/web/Portals/6/pub/UAS%20Operator%20Guidelines%2010-1-15.pdf

Participant Notes:

Slide 5-13. Fair Information Practice Principles

Participants can reference the Informational Handout for more details on the FIPPs. The Fair Information Practice Principles (FIPP) are based on the Privacy Act of 1974 and address how the federal government should treat individuals and their Personally Identifiable Information (PII), as well as address the duties that Federal agencies have related to the collection, use, dissemination, and maintenance of PII. The DHS Privacy Office has a version of the FIPPs, which are a good guideline for UAS data collection for all agencies. Though these principles are specifically for DHS, the FIPP is a good model for agencies creating UAS programs to ensure that they properly and adequately address PII.

The information on FIPP comes from the U.S. Department of Homeland Security. "Privacy Impact Assessment for the Aircraft Systems." DHS/CBP/PIA-019, September 9, 2013.

Key Point:

FIPP Principle One. Transparency
Agencies should provide notice regarding PII collection, use, dissemination, and maintenance to any individuals that are involved and have their information collected.

In addition, any collection system should never be a secret. As stated in this course, it is important for any agency creating a UAS program to be open and transparent about the program as it is being created and at all stages of the program's use. The community should know how the UAS program will be developed,

Participant Notes:

what kinds of information will be collected, why it is being collected, for what purpose the information will be used, and how the information will be stored and removed when no longer needed.

In addition, the agency should publish in the Federal Register what the nature, purpose, maintenance, use, and sharing of PII will be, as required by the Privacy Act of 1974.

FIPP Principle Two. Individual Participation

When agencies collect or use PII, they should involve the individuals in the process and, to the extent practical, seek individual consent for PII collection, use, dissemination, and maintenance.

In addition, agencies should provide mechanisms so that individuals whose information is collected have a way for appropriate access, correction, and redress of use of the PII.

Information collected by use of an aircraft such as an UAS often is not subject to the Privacy Act unless that information is retrieved by using a person's name or other unique identifier.

FIPP Principle Three. Purpose Specification

Agencies should explain the authority they have that permits them to pursue the collection of PII and they should explain the purpose for which they intend to use the PII.

FIPP Principle Four. Data Minimization

Agencies should collect only PII that is directly relevant and necessary to accomplish the specified purpose that the agencies detail, and not collect extraneous PII. In addition, agencies should retain PII for only the amount of time that they needed to fulfill that specified purpose, and not keep the PII indefinitely.

Furthermore, agencies should dispose of PII as approved by the National Archives and Records Administration (NARA).

FIPP Principle Five. Use Limitation

Agencies should use PII only for purpose that was specified in the public notice of PII collection.

Participant Notes:

Furthermore, agencies should share PII with outside departments or agencies only for a purpose that is compatible with the original collection purpose, and not use the PII for a completely different purpose.

FIPP Principle Six. Data Quality and Integrity

Agencies should ensure that PII is accurate, relevant, timely, and complete. This also includes training relevant staff on correct techniques to copy recorded data and procedures to maintain a sufficient chain of custody and storage.

FIPP Principle Seven. Security

Agencies must protect PII with security safeguards against risks such as loss, unauthorized access or use, destruction, modification, or unintended or inappropriate disclosure. This may include encrypting the video and data feed from the UAS through the satellite relay to the ground control station and control information from the ground control station to the UAS.

FIPP Principle Eight. Accountability and Auditing

Agencies should be accountable for complying with the FIPP principles. Agencies should provide adequate training to employees and contractors who use PII, including privacy awareness training and ethics training. Furthermore, agencies should restrict the dissemination of video and still images, and audit PII to demonstrate compliance with these principles and all applicable privacy protection requirements.

Participant Notes:

Slide 5-14. Make Privacy and CRCL Protections Part of UAS Program

Participants can reference the Checklist Handout for more details.

This is one of the key areas of public scrutiny and can be an area of vulnerability if not handled well. Some jurisdictions have been forced to end their programs after public concerns in these areas were raised. P/CL considerations need to be included throughout an agency's UAS program development process. An agency's UAS plan, internal policies, and public outreach all need to have appropriate P/CL considerations addressed. The next slide will discuss two tools that can help your agency in this area: Privacy Impact Assessments and Civil Liberties Impact Assessments.

Participants also can refer to a document in which the U.S. Department of Homeland Security applied the FIPPs in a Privacy and Civil Liberties Impact Assessment of their UAS at the border. Certain aspects of it are unique to DHS, but the general approach and discussion will be useful to other agencies as they look at their own P/CL assessments, plans, and polices. www.dhs.gov/sites/default/files/publications/privacy-pia-cbp-aircraft-systems-20130926.pdf)

Another good resource is the DHS Best Practices for Protecting Privacy, Civil Rights & Civil Liberties in UAS Programs, a summary of which is in the Checklist Handout. www.dhs.gov/publication/best-practices-protecting-privacy-civil-rights-civil-liberties-unmanned-aircraft-systems

Participant Notes:

> **Unmanned Aircraft Systems**
> **in Disaster Management**
>
> ## P/CL Toolkit: Privacy and Civil Liberties
> ## Impact Assessments (PIA/CLIA)
>
> * What data collected? How long will it be retained? Data shared with whom, under what conditions? How will PII be managed?
> * How to secure data, what systems will prevent abuse?
> * Accountability to ensure data protection and sharing constraints tracked? How to conduct audits?
> * How to handle imagery of First Amendment protected activities?
> * How to handle complaints? Redress procedures?
> * How to handle requests from other entities?
> ➢ *Refer to Checklist Handout and Appendices for details*
>
> 5-15

Slide 5-15. P/CL Toolkit: Privacy and Civil Liberties Impact Assessments (PIA/CLIA)

🔑 **Key Point:** There are two primary tools used by the U.S. Department of Homeland Security that may help an agency to identify possible P/CL risks in its UAS planning: a Privacy Impact Assessment (PIA) and a Civil Liberties Impact Assessment (CLIA). The PIA and CLIA also give an agency a framework to mitigate those risks in its planning and policy development. The final document–called a P/CL Impact Assessment or PIA for short–can be an invaluable tool in an agency's public outreach. It will show how an agency assessed the P/CL risks of its program and how the agency addressed those concerns. A useful way to promote public transparency and participation is to conduct a PIA using the Fair Information Practice Principles (FIPPs). This can be supplemented by a CLIA. The goal for these studies is two-fold:

1. To use as a management tool while developing a UAS plan to determine what policies or practices need to be put in place to protect individual privacy and civil liberties.

2. To use as a public document that shows how an agency's UAS plan protects privacy and civil liberties.

Example: Should one agency share data and imagery collected from its UAS with another agency? What if imagery collected by a fire department during a disaster also contains information on criminal activity taking place in someone's backyard, such as growing an illegal substance, and this imagery is shared with the police department?

Participant Notes:

Different agencies have different authorities: an Office of Emergency Management in a county has different authorities and different guidelines to follow in a disaster than law enforcement or the Department of Health.

Participant Notes:

Slide 5-16. Community Involvement: Socializing UAS Disaster Operations

Key Point: Consistent with the Presidential Memorandum and UAS state-level legislation, it is important for UAS user agencies, especially those involved in disaster operations, to get out in front with public outreach on intended UAS usage, then follow up with public reports as operating experience develops.

The general public needs to know the purpose of the UAS program, how the UAS will be used, and what safeguards will be in place. An agency needs to anticipate how the public will react to a UAS program and what types of questions they will have. Along with safety concerns, one of the main issues the local community will raise is how UAS will affect their privacy: how will the information collected be used, what if the UAS sees something illegal, how long will the imagery be stored, who will have access to it, etc. When setting up UAS programs, agencies need to determine how they will handle data collection, retention, management, security, oversight, and accountability. In addition, agencies need to explain these protocols to their local communities to assuage the public's fears and to gain community support.

Participant Notes:

Slide 5-17. Community Involvement: Coordination with Airspace Users

Example: Coordination of UAS operations for disaster management with other airspace users will be extremely important, as air components that have not had to deal with UAS will need coordination. These include news air operations and air ambulance; the aviation divisions of police and fire departments; the National Guard; the Civil Air Patrol; the National Park service; the US Forest Service; the Bureau of Land Management; NOAA; the Environmental Protection Agency; and the Departments of Interior, Agriculture, and Homeland Security.

Example: A challenge in a disaster situation will be coordinating unmanned aircraft with manned aircraft that are participating in the operation. What will be even more challenging will be coordinating with manned and unmanned aircraft that are not part of the operation, such as news helicopters and their UAS, as well as individuals' personal UAS that are being used to capture imagery of the scene.

Key Point: Understanding how these existing organizations operate or contract for air operations today will be essential for disaster management UAS operators. UAS operations with these operators may take the form of additional missions within the existing air operation framework or need a modified framework.

Participant Notes:

Unmanned Aircraft Systems in Disaster Management

Keeping Open Dialog While UAS Program Underway

- Demos at community preparedness events
  - Demystify UAS
  - Explain imagery value
  - Address privacy issues
- Submit periodic public reports of UAS usage (FAA requirement)
- Inform public of any changes to UAS program
- Generate positive press
- Report any problems and corrective action with UAS program
- Always listen to public

5-18

Slide 5-18. Keeping Open Dialog While UAS Program Underway

Specific methods of public outreach regarding development of a UAS program in disaster management may vary as location and experience dictate, but general approach to keeping an open dialog will include the listed items.

Key Point: Keeping the public and agencies up-to date on what your particular UAS program will entail, as well as updating on general advances in UAS science and legal codes, will lay essential groundwork.

Participant Notes:

Unmanned Aircraft Systems in Disaster Management

Department of Justice View On UAS Community Engagement

- Community trust: Ensure that community trust is upheld while incorporating UAS into operations
- No adverse affect: Ensure that procedural justice, transparency, and accountability are maintained as UAS introduced through missions dealing with people
- Community apprehensions: Stay out in front of likely apprehensions as UAS program builds up
- Pre-deployment prevention: Based on above, adjust technology or concept of operations before deployment

(Source: Dept. of Justice, COPS Newsletter, 2014)

5-19

Slide 5-19. Department of Justice View on UAS Community Engagement

Example: As a specific example, the Department of Justice has prepared general guidance for community engagement for law enforcement use of UAS. This can be readily adopted for use by disaster management teams.

Participant Notes:

Unmanned Aircraft Systems in Disaster Management

UAS Community Engagement

- Agencies should engage broader community early in UAS planning process
- Agencies should assure community that they value protections provided by U.S. Constitution
- Agencies must operate UAS in full compliance with mandates of Constitution, Federal, state and local law governing applicable authorities
- Community should have opportunity to review/comment on agency procedures; community recommendations should be considered
- As with community, news media should be brought into process early

(Source: International Association of Chiefs of Police Guidance, 2012)

5-20

Slide 5-20. UAS Community Engagement

Example: Similarly, the International Association of Chiefs of Police has adopted guidelines for community engagement by police agencies, once again based on respect for the public's concerns and common sense.

These sets of guidance reviewed here – Alaska, Department of Justice, and International Association of Chiefs of Police – have common threads and are being considered or adopted widely, beyond just these organizations.

Following these sets of guidelines, or drawing up a specific version for disaster management use of UAS, is an important task. Disaster managers should take the lead and get this started.

Participant Notes:

Unmanned Aircraft Systems
in Disaster Management

Practical Exercise Scenario 7

The local Fire and Rescue Unit wants to create a UAS program for post-disaster response and for fighting fires in a large forest area with rugged terrain. There are several camp facilities in the forest area, used by a variety of groups, and the rescue unit's jurisdiction for disaster response includes several small towns.

A. What steps should the fire department take to decide on a UAS program?
B. What steps should they take before creating a UAS program?
C. What privacy, rights, and community issues must be considered?
D. What is required for them to use UAS?

5-21

Slide 5-21. Practical Exercise Scenario 7

This exercise presents a possible scenario in which UAS could be used. Participants will apply information learned in the modules to help answer the questions.

The instructor will ask participants either to break into groups to discuss the scenario and then discuss the possible answers together as a class, or not break into groups and discuss the questions together, at the discretion of the instructor

Participant Notes:

Unmanned Aircraft Systems
in Disaster Management

UAS Technology Development: Advocate for Disaster Management Focus

- Disaster management stakeholders should collaborate and advocate to guide research and development of UAS for disaster operation design needs:
  - Information architecture, workflow, and dissemination
  - Ruggedized UAS equipment
  - Operations in bad weather, fast-paced, dynamic situations
  - Range, duration, automation
  - Operations without power grid, cell towers
  - Software and equipment for real-time and post-processing in the field
  - Information analysis and display

5-22

Slide 5-22. UAS Technology Development: Advocate for Disaster Management Focus

Beyond the issues of privacy protection, public outreach, and operational coordination, UAS operators in disaster management have the opportunity to influence the direction of product design.

Key Point: Clearly, the loud voice of the UAS disaster management user groups that begin to organize as UAS capability enters the marketplace will have a lot to do with design evolution, sensors, and analytic software. UAS user feedback is an important obligation placed on UAS disaster management as experience begins to accumulate.

Participant Notes:

Unmanned Aircraft Systems in Disaster Management

Agencies Can Influence UAS Designers

- Emergence of FAA exemptions and rules now enable UAS commercialization
  - UAS design will be heavily influenced by large UAS business opportunities
    - Agriculture
    - Movie making
    - Infrastructure inspection
    - Mapping
    - Real estate
  - Disaster management agencies need to voice their UAS needs

5-23

Slide 5-23. Agencies Can Influence UAS Designers

The UAS design community needs to hear from the broad range of disaster management UAS users to ensure that all elements of UAS meet their needs for disaster situations.

Participant Notes:

Unmanned Aircraft Systems in Disaster Management

UAS Technology: Current and Future Innovations

- Progressively simplified operation: 'cellphone simple'
- Higher power density in batteries
  - Better mission range and duration, wind tolerance, performance margins, payload capacity
- Hybrid configuration
  - Vertical launch and recovery like rotorcraft, longer endurance like fixed wing
- Increased portability, reliability, operating range, autonomy, and sensor-flight vehicle integration

5-24

Slide 5-24. UAS Technology: Current and Future Innovations

Continued development in operational simplicity, battery life, flexibility of operation, and ease of launch and recovery, as well as mission autonomy, sensor-software pairing, and mission extension to 'beyond line of sight' can be expected through efforts of FAA, NASA, and university R&D.

Key Point: These developments will improve UAS use in disaster operations. Disaster management users can help prioritize these developments by gathering user input for feedback to the design and R&D side.

Participant Notes:

Slide 5-25. UAS Technology Development Needed for Sustainable Business

UAS national development investment will be focused on that component of UAS that most enables a positive economic impact, leading to a sustainable growing business. Today that R&D direction is generally defined as beyond line of sight (BLOS) operations, with the various technical themes such as detect and avoid, radio spectrum safety, and system safety supporting BLOS. It is the sustainable business utility that is created that will drive the overall design evolution.

Key Point: It is important for UAS disaster users to express future UAS needs to the design community with recognition of these development directions, perhaps communicate in those terms.

Participant Notes:

Slide 5-26. Summary: Essential Elements for a Successful UAS Program

Key Point: Putting together a robust UAS program for disaster management requires addressing up front the challenges that we have discussed, with the full range of the public that could become involved. This must be done openly, with transparency and respect for the public.

Sharing information on successes and failures can help shape the approach that works best for all.

NDPTC will offer future courses of how to develop policies and procedures for UAS in disaster management that will provide a template for moving forward.

Participant Notes:

Unmanned Aircraft Systems
in Disaster Management

Summary: Essential Elements for a Successful UAS Program (cont.)

- Determine data collection, retention, management, and security
- Determine policy for sharing data with other entities/within agency
- Determine program accountability and audit
- Address 'first adaptor' challenges
  - Define usage, relationships, sensors, equipment for disaster ops
- Engage UAS developers for disaster management needs
- Conduct training for personnel

5-27

**Slide 5-27. Summary: Essential Elements for a Successful
UAS Program (continued)**

Moving forward with a UAS program for disaster management will require
proactive, compliant, cautious, careful, public-included development.

Many elements go into a successful UAS program, and it all begins with
how an agency first initiates the process: thinking through all these
elements at the outset, before delving too deep into a UAS program. First
of all, an agency must fully understand the mission of its intended UAS
program. Next, the agency must engage at the beginning with the
community, the FAA, UAS developers, and others who will be involved in
the operations. The agency must develop standard operating procedures
and policies for operations and privacy measures, and ensure they are
part of training before a program ever launches.

Participant Notes:

> ### Unmanned Aircraft Systems in Disaster Management
>
> ## Summary: Privacy, Civil Rights, and Civil Liberties
>
> - Understand privacy, civil rights, and civil liberties risks with UAS, importance of formal analysis of those risks, and how to mitigate them
>   - Common guidance for managing these risks represents current understanding of compliance, set against today's expectations of right to privacy
>   - UAS should not be employed if terms of common guidance cannot be met
>
> 5-28

Slide 5-28. Summary: Privacy, Civil Rights, and Civil Liberties

✔ **Knowledge Check:** Privacy, civil rights, and civil liberties protection regarding UAS are receiving a lot of attention, including from the White House. Staying with or ahead of the developing reasoning emerging from the Presidential action and from other Federal, state, and local agencies will best guide a UAS program created for disaster management.

Participant Notes:

Slide 5-29. Summary: Community Involvement

✔ **Knowledge Check:** Understanding what is needed in community outreach and confidence building with the public is important in achieving public endorsement for UAS in disaster management use.

Participant Notes:

Slide 5-30. Summary: Successful UAS Expansion into Disaster Management

There are 'moving targets' currently in getting UAS operations into frontline disaster management because of the emerging FAA formal rules, the spread of interim work-around rules, Presidential action on privacy and respect of rights, and progressive engineering development of UAS systems, all in parallel.

Key Point: Picking the right path is important for an agency or organization that wants to move forward into UAS. The path selected for disaster management should highlight the value of UAS to the public at minimum risk. Once so established in the public's mind, and based on accumulated experience and public involvement, UAS use in disaster management can be expanded.

Participant Notes:

Unmanned Aircraft Systems in Disaster Management

Practical Exercise Scenario 8

A lava flow threatens to overflow into nearby housing developments and could last from months to years. The point-of-contact for the mission inside the ICS structure asks the local university's UAS team, which has a COA for agricultural research in another town, to help in an ongoing assessment of the wide-area situation so that residents can be informed and evacuations can be executed at the critical time. This surveillance will necessarily capture imagery of peoples' homes, businesses, possessions, and life patterns.

   A. Can the UAS team do this mission? Why or why not?
   B. What steps should be taken?
   C. What privacy, rights, and community issues must be considered?

5-31

Slide 5-31. Practical Exercise Scenario 8

The exercise at the end of Module 5 presents a possible scenario in which UAS could be used. Participants will apply information learned in the modules to help answer the questions.

The instructor will ask participants either to break into groups to discuss the scenarios and then discuss the possible answers together as a class, or not break into groups and discuss the questions together, at the discretion of the instructor.

Unmanned Aircraft Systems in Disaster Management

Module 6: Applying for UAS Authorization
Version 1.0

![U.S. Department of Homeland Security / FEMA logo]

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Module 6: Applying for UAS Authorization – Administration Page

Slide 6-1. Applying for UAS Authorization

Duration

45 minutes

Scope Statement

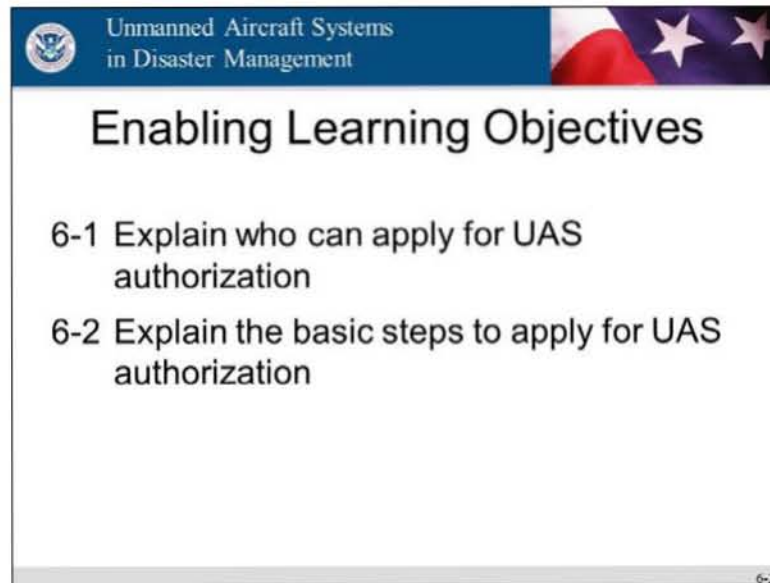In Module 6, participants will learn the basics of applying for FAA authorization to fly UAS, with a focus on Certificates of Waiver or Authorization (COA) for public use. Participants will learn the details of what information is needed to fill out a COA application.

Terminal Learning Objective (TLO)

The participant will be able to understand the basic steps in applying for UAS authorization.

Enabling Learning Objectives (ELO)

Unmanned Aircraft Systems in Disaster Management

Enabling Learning Objectives

6-1 Explain who can apply for UAS authorization

6-2 Explain the basic steps to apply for UAS authorization

6-2

Slide 6-2. Enabling Learning Objectives

At the conclusion of this module, participants will be able to.

6-1   Explain who can apply for UAS authorization

6-2   Explain the basic steps to apply for UAS authorization

Resources

- Module 6 presentation slides
- One laptop with presentation software installed and CD-ROM capability
- One audio-visual (A/V projection unit)
- One projector screen
- One laser pointer
- One per participant of the following item.
    - Participant Guide
    - Handouts

Instructor-to-Participant Ratio

2:40

Reference List

Aerospace Industries Association. "Unmanned Aircraft Systems. Perceptions & Potential." May 10, 2013. http://www.aia-aerospace.org/research_reports/unmanned_aircraft_systems_perceptions_and_potential/

Federal Aviation Administration. Online Application Website. https://ioeaaa.faa.gov/oeaaa/Welcome.jsp Accessed Oct. 2015.

Federal Aviation Administration. COA Website. https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/systemops/aaim/organizations/uas/coa/ Accessed Oct. 2015.

Federal Aviation Administration. *FAA Public COAs Approved.* https://www.faa.gov/uas/public_operations/foia_responses/ Accessed Oct. 2015.

Federal Aviation Administration. *Section 333 Exemptions Approved.* https://www.faa.gov/uas/legislative_programs/section_333/333_authorizations/ Accessed Oct. 2015.

Practical Exercise Statement

There is a practical exercise at the end of Module 6. Participants will apply information learned in the course to help answer the questions. The instructor will ask participants to break into groups to discuss the scenario here and then discuss the possible answers together as a class.

Assessment Strategy

- Instructor observation of participants' involvement in the classroom exercise and discussion.
- Instructor-led discussion to ensure participants' understanding of module lesson topics.

Unmanned Aircraft Systems in Disaster Management

Icon Map

Knowledge Check: Used when it is time to assess participant understanding.

Example: Used when there is a descriptive illustration to show or explain.

Key Points: Used to convey essential learning concepts, discussions, and introduction of supplemental material.

Participant Note: Used to indicate text that has been included as additional information for the participant. The text may not be directly addressed in the slide presentation or during class discussion.

Participant Notes:

Slide 6-3. Who Can Apply for What Type of FAA Authorization?

The two major types of COAs are for recognized public agencies and for civil or commercial operators of UAS. Public agencies are allowed to fly either their own aircraft, a leased aircraft under certain conditions, or via a qualified contracted operator under certain circumstances, which will be discussed in upcoming slides in this module.

Civil operators may operate under Blanket COA rules or under the terms of their approved standard COA.

Participant Notes:

Slide 6-4. Review: What Does a Public COA Allow?

COAs allow operations of specific UAS (or several specific UAS) for a particular purpose, in a particular area, under particular conditions, for a particular time period.

✔ **Knowledge Check:** COAs authorize public agencies and civil operators to operate UAS legally in the United States. Public agencies are those that are recognized by federal, state, or local government, and include public universities.

Public aircraft can be either owned by the public agency or be leased by the government for a period of 90 or more days. Public aircraft operations allowed under Public COAs are governed by certain regulations that define those operations, which will be discussed in more detail in a later slide.

Participant Notes:

Unmanned Aircraft Systems in Disaster Management

Step 1: Decide on Creating UAS Program

- Are UAS a good option for the agency?
  - Do UAS enhance existing operations, and/or allow new operations?
- How will agency integrate UAS operations into existing policies and procedures, or create new ones?
  - Who will operate UAS?
  - How will UAS work with other agency aircraft, personnel?
  - How will agency address issues of privacy, civil rights, and civil liberties?
  - NDPTC is developing a course on this topic

6-5

Slide 6-5. Step 1: Decide on Creating UAS Program

When deciding on embarking on a UAS program for a public agency, there are several basic questions that should be answered to make a successful decision.

The initial questions listed in this slide should be answered to gauge the needs and requirements of creating a program.

It is important to bring attention to privacy, civil rights, and civil liberties issues and how operators will address issues such as:

1. How is the data used?
2. How is the data stored or deleted?
3. Who will have access to data?
4. Under what conditions will access be granted, etc.?

This is not an exhaustive list but illustrates how sensitive the privacy, civil rights, and civil liberties issues are in the use of UAS.

Key Point: Remind participants that the Informational Handout can be used after the course is finished to refer back to some of these concepts as they decide on developing a UAS program.

Participant Notes:

Unmanned Aircraft Systems in Disaster Management

Step 2: Discuss and Develop UAS MOUs and Agreements

- When applying for COA, it's best to have operations and coordination details already determined
  - Information distribution, security, and privacy agreements for imagery collected or analysis performed
  - Landowner agreement and privacy protection
  - Air traffic coordination
  - Coordination with other agencies for operations, authorization

6-6

Slide 6-6. Step 2: Discuss and Develop UAS MOUs and Agreements

Upon deciding that a UAS program is both desired and possible, applicants need to begin addressing the substantial operations and coordination details needed for a successful COA request.

Information distribution and security, as previously mentioned, must be addressed and set into policies that comply with federal, state, and local laws. These issues must also be addressed with any landowners, whose property will be flown over, with MOUs that address potential privacy issues.

Air safety coordination must also be addressed with other agencies that may be operating in potential disaster situations.

Participant Notes:

**Unmanned Aircraft Systems
in Disaster Management**

Step 3: Checklist Prior to
COA Application

- Select unmanned aircraft and sensors
  - Discuss with manufacturer: cost, quantity, accessories, etc.
- Develop plans for operations, communications, and coordination
- Prepare MOUs and agreements
- Ensure personnel training and certifications
  - Operators, observers, data analysis staff

6-7

Slide 6-7. Step 3: Checklist Prior to COA Application

As the issues of UAS selection, information/data handling, and coordination are decided, applicants must develop plans for how these will all be addressed in operations. Work with UAS manufacturers to determine the total cost of UAS equipment and accessories. Develop UAS operations and decide how they will be integrated with an agency's existing operations, and with other agencies that will require coordination in disaster situations. It is essential to have all of this in place and agreed upon with MOUs from the beginning and not wait until a disaster is imminent. Well thought out operations and coordination will help secure COA approval from the FAA. Personnel training and certification are also critical to any COA request and should be adequately planned and documented.

Participant Notes:

Slide 6-8. Step 4: Create COA Account

Key Point: A declaration letter is required for Public COAs and an online FAA COA account cannot be opened without this declaration. Applicants must obtain the declaration letter from the applicable city, county, or state office as early as possible in this process, as it may take some time.

Participant Notes:

Slide 6-9. Step 5: Fill Out COA Application

The FAA COA application website takes applicants through the COA process. Applicants should already have their declaration letter from the applicable overseeing agency, and should have thought out most of the details of the COA application.

Participant Notes:
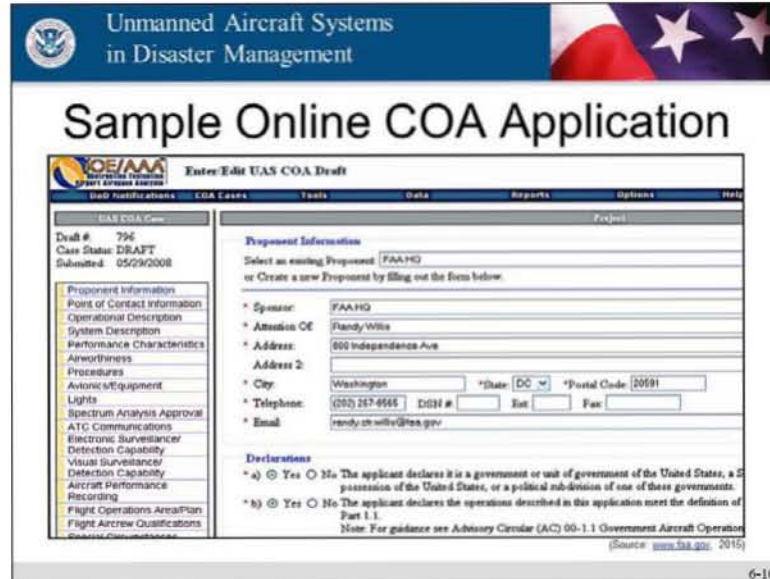
Slide 6-10. Sample Online COA Application

This slide shows a sample screenshot of the first page of the FAA's COA application website.

Example: The FAA offers a sample of a COA application in pdf (see link below), so potential applicants can see what is included in the application.

FAA sample COA

https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/systemops/aaim/organizations/uas/media/COA Sample Application v 1-1.pdf

Participant Notes:

Slide 6-11. Application: Applicant and Operations Description

This slide addresses basic information that is required of the applicant and the intended operations description.

Multiple objectives and intended operations can be included in a single application.

Multiple UAS platforms may also be included in a single application.

Participant Notes:

Unmanned Aircraft Systems in Disaster Management

COA Example: Map for UH Hilo Lava Flow COA

(Source: Nick Turner, UH Hilo Spatial Data Analysis and Visualization Labs, 2015)

6-12
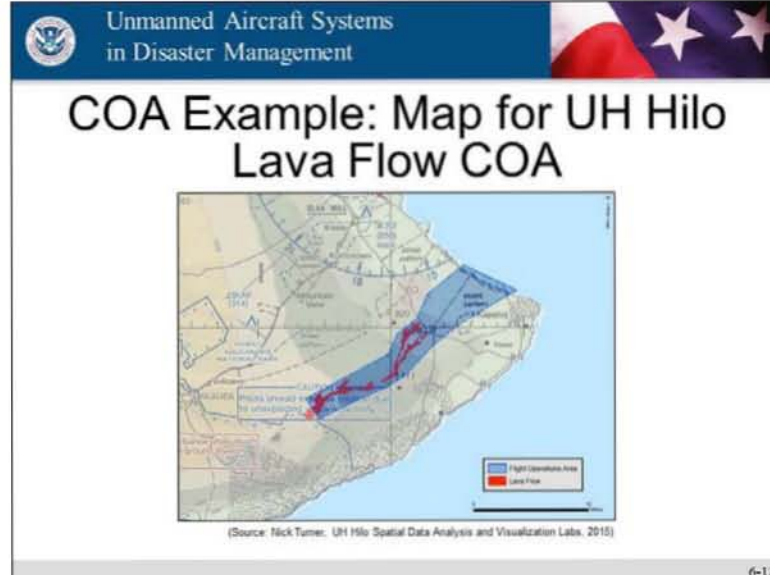
Slide 6-12. COA Example: Map for UH Hilo Lava Flow COA

When applying for a COA, the operator will need to request an area for UAS operations, and may need to work back-and-forth with the FAA to determine a suitable area, given nearby airspace, population densities, and other possible limiting factors.

Example: This slide illustrates the area of operations, in blue, that the University of Hawaii at Hilo chose for their amended COA to monitor the path of lava flow in 2014. However, the flow area widened and UH Hilo had to request another COA amendment to expand the area of operations to cover the widened lava flow area.

Lesson learned: when preparing an original COA application, an agency should try to account for the entire anticipated area of operations, within reason, to avoid the need for COA amendments. The FAA will work with the agency to adjust the requested airspace as needed for the safety of others using the airspace.

Participant Notes:

Example: Approved COA

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

CERTIFICATE OF WAIVER OR AUTHORIZATION

ISSUED TO
Hays County Emergency Service Office
111 E. San Antonio, Suite 300
San Marcos, TX 78665

This certificate is issued for the operations specifically described hereinafter. No person shall conduct any operation pursuant to the authority of this certificate except in accordance with the standard and special provisions contained in this certificate, and such other requirements of the Federal Aviation Regulations not specifically waived by this certificate.

OPERATIONS AUTHORIZED
Operation of the Spectra AP flying wing, Unmanned Aircraft System (UAS) in Class G airspace from the surface to 400 feet Above the Ground (AGL) within a one half (0.50) nautical mile radius centered at 29-58-00.00N / 98-06-37.00W under the jurisdiction of Houston Enroute Air Traffic Control Center. See special provisions.

LIST OF WAIVED REGULATIONS BY SECTION AND TITLE
N/A

STANDARD PROVISIONS

1. A copy of the application made for this certificate shall be attached and become a part hereof.
2. This certificate shall be presented for inspection upon the request of any authorized representative of the Federal Aviation Administration, or of any State or municipal official charged with the duty of enforcing local laws or regulations.
3. The holder of this certificate shall be responsible for the strict observance of the terms and provisions contained herein.

(Source: www.faa.gov, 2015)

6-13

Slide 6-13. Example: Approved COA

Example: This slide shows an abbreviated example of what an actual approved Public COA looks like. This COA is for Hays County Emergency Service Office in Texas.

Participant Notes:

Slide 6-14. COA Application: System Description

Key Point: Public agencies may self-certify their UAS, while civil operators may request exemption from requirement of a FAA type certificate via the Section 333 Exemption.

The following FAA guidance from its Public Guidance for Petitions for Exemptions Filed under Section 333 is useful for both public and civil operators:

Regarding the Unmanned Aircraft System

1. Petitioners should describe how the proposed UAS operation will be safely conducted to minimize risk to the NAS or to persons and property on the ground. Specifically, petitioners should describe the design and operational characteristics for the type(s) of UAS they intend to operate, e.g. aircraft performance and performance limitations, operating procedures, and aircraft loading information in as much detail as possible. This could be provided in the petition or in an Aircraft Flight Manual or similar document.

Participant Notes:

NOTE: The FAA will consider all information and data submitted by the petitioner that describes the UAS developmental and operational history. This could include statistical data or other documentation for the specific design and performance characteristics of the UAS, including the operational history and operational failure modes, obtained through previous research and development (R&D) and/or flight test activities, such as operations conducted under a COA, with a civil airworthiness certificate, or under other authorized operating conditions.

Participant Notes:

Slide 6-15. COA Application: Vehicle Details

This slide explains the details about the unmanned vehicle that are required in the application.

Key Point: Many approved applications are available to the public on the FAA's website, so applicants may refer to those previous applications to see the type of wording that has been used and the level of detail that is required.

Approved Public COAs
https://www.faa.gov/uas/public_operations/foia_responses/

Section 333 Exemptions
https://www.faa.gov/uas/legislative_programs/section_333/333_authorizations/

More details can be found below, which apply to both public and civil UAS applications. In its Public Guidance for Petitions for Exemptions Filed under Section 333, the FAA provides:

Participant Notes:

Regarding the Unmanned Aircraft System

3. The petitioner should describe the Radio Frequency (RF) spectrum used for control of the UAS and associated equipment that is part of the UAS (i.e., sensors, cameras, etc.), and whether it complies with Federal Communications Commission (FCC) or other appropriate government oversight agency requirements.

   NOTE. Petitioners should be able to provide the FCC approval letter or show compliance with FCC requirements upon request.

Regarding the Operation of the Unmanned Aircraft

7. Petitioners should specify the proposed maximum operating speed and altitude, and describe minimum flight visibility and distance from clouds for their intended operation(s). Petitioners should describe potential hazards and safety mitigations associated with these proposed conditions. These issues can be addressed in the petition, an Operations Manual, or similar document.

Participant Notes:

Slide 6-16. COA Application: Procedures

This slide lists procedural details that are required in the application. Applicants must prepare detailed procedures for all elements of the proposed operations, and think through unanticipated events such as lost link and communications problems and emergency issues.

In its <u>Public Guidance for Petitions for Exemptions Filed under Section 333</u>, the FAA provides:

Regarding the Unmanned Aircraft System

1. Petitioners should describe how the proposed UAS operation will be safely conducted to minimize risk to the NAS or to persons and property on the ground. Specifically, petitioners should describe the design and operational characteristics for the type(s) of UAS they intend to operate, e.g. aircraft performance and performance limitations, operating procedures, and aircraft loading information in as much detail as possible. This could be provided in the petition or in an Aircraft Flight Manual or similar document.

Participant Notes:

NOTE. The FAA will consider all information and data submitted by the petitioner that describes the UAS developmental and operational history. This could include statistical data or other documentation for the specific design and performance characteristics of the UAS, including the operational history and operational failure modes, obtained through previous research & development (R&D) and/or flight test activities, such as operations conducted under a COA, with a civil airworthiness certificate, or under other authorized operating conditions.

2. Petitioners should describe any procedures they would implement, such as pre-flight inspections, maintenance, and repair, to ensure that the UAS is in a condition for safe flight. This could be provided in the petition, an Aircraft Flight Manual, a Maintenance and Inspection Manual, or similar document.

Participant Notes:

Slide 6-17. Example: Approved COA Operational Safety

This slide is an example of the operational safety portion of a COA. It is the operator's responsibility to operate safely at all times and report any occurrences that would impact safety or operations.

Participant Notes:

Slide 6-18. Example: Approved COA Air Traffic Coordination

This slide is an example of the provisions detailing how UAS operators must coordinate and communicate with air traffic control.

Key Point: UAS operators flying in controlled airspace must notify the air traffic control tower one hour prior to flight, provide a cell phone number in the event of an emergency, and monitor the tower during operations.

Participant Notes:

Slide 6-19. Example: Approved COA Legal Compliance

This slide gives an example from the Department of Agriculture's COA, detailing the requirement of the operator to conform with state law and local ordinances in the area of operation authorized by the COA.

Key Point: As laws and regulations pertaining to UAS operations continue to develop, it is critical that operators keep current.

Participant Notes:

Slide 6-20. Application: Flight Aircrew Qualifications

The slide explains that information about the qualifications of the applicant's aircrew is required in the application. More detail can be found below.

In its Public Guidance for Petitions for Exemptions Filed under Section 333, the FAA provides:

Regarding the Unmanned Aircraft PIC

4. Petitioners should describe the qualifications required of any PIC(s) who will be directly responsible for the operation of the UAS, including information such as: the level of airman certificate held; any applicable training related to the operation; and any minimum hours of flight experience required by the PIC(s), both total flight time and the time with the particular UAS. If the operation would use visual observers, petitioners should describe their roles and qualifications.

5. Petitioners should describe the medical standards and certification of the PIC(s) directly responsible for the operation of the UAS.

Key Point: Flight aircrew qualifications are different for some Public and Civil operations.

Participant Notes:

Slide 6-21. COA Application Recommendations

🔑 **Key Point:** The instructor should encourage potential applicants to review approved COAs online to understand the level of detail required by the FAA. The more well-thought out and detailed the COA application, the better chance that an applicant will have of getting FAA approval.

Participant Notes:

Unmanned Aircraft Systems in Disaster Management

Application Recommendations

- Provide detail of contingency plans
    - Unrecoverable system failure procedures
    - Loss of link
        - Loss of link Divert/Contingency Points (DCP)
        - Flight Termination Points (FTP)
        - At least one of each DCP and FTP should be identified for each operation
        - Aircraft continues to have GPS but loss of data communications link
        - Aircraft losses communication to GPS
        - Aircraft losses both data communications and GPS

6-22

Slide 6-22. Application Recommendations

🔑 **Key Point:** This slide goes into more depth on some of the detailed items that applicants should consider when preparing a COA application. Applicants should refer to already approved COA applications on the FAA's website to see how some of these items are explained.

Participant Notes:

Unmanned Aircraft Systems
in Disaster Management

Practical Exercise 9

Individually fill out as many sections as possible on the two pages of the Planning Checklist to think through how you anticipate your agency moving forward with a UAS program.

- At the bottom of the sheet, write down the first few steps you plan to take to decide on a UAS program when you return to your agency
- Use Steps 1 and 2 in the *Information Supplement* section of the *Checklist Handout* to help.
- Ask the instructors for guidance, as needed
- Afterward, the class will discuss together some of the responses

6-23

Slide 6-23. Practical Exercise 9

The instructor will ask participants to individually fill out as many sections as possible on the two pages of the Planning Checklist to think through how they anticipate their agency will move forward with a UAS program.

At the bottom of the sheet, participants should write down the first few steps they plan to take to decide on a UAS program when they return to their agency, and use Steps 1 and 2 in the Information Supplement section of the Checklist Handout to help.

The instructor will walk around the room to see if participants need help.

Afterward, have the class discuss together some of the responses and answer any questions that participants have.

Refer to the Information Supplement section of the Checklist Handout.

Participant Notes:

Slide 6-24. Links

FAA Online Application Website
https://ioeaaa.faa.gov/oeaaa/Welcome.jsp

FAA COA Website
https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/systemops/aaim/organizations/uas/coa/

FAA COA FAQs
https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/systemops/aaim/organizations/uas/coa/faq

FAA Public COAs Approved
https://www.faa.gov/uas/public_operations/foia_responses/

Section 333 Exemptions Approved
https://www.faa.gov/uas/legislative_programs/section_333/333_authorizations/

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Unmanned Aircraft Systems in Disaster Management

Module 7: Evaluation and Conclusion
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Module 7: Evaluation and Conclusion – Administration Page

Slide 7-1. Evaluation and Conclusion

Duration

40 minutes

Scope Statement

In the final module, participants will have a final discussion and question-and-answer session on how UAS can be used in disaster management, who can use UAS and when they can be used, and how to take the next steps in being authorized to use UAS in their work to be better prepared for the future of disaster management.

Terminal Learning Objective (TLO)

The participant will join in concluding remarks, exam, and evaluation.

Enabling Learning Objectives (ELO)

Slide 7-2. Enabling Learning Objectives

At the conclusion of this module, participants will be able to:

7-1	Summarize the course and discuss "lessons learned"
7-2	Identify additional resources and training opportunities
7-3	Provide feedback on course evaluation form
7-4	Complete a post test

Resources

- Instructor Guide (IG)
- Module 7 presentation slides
- Laptop with presentation software installed and CD-ROM capability
- Audio-visual (A/V projection unit)
- Projector screen
- Chalkboard (and chalk), whiteboard (and dry erase markers), or easel and easel paper (and permanent markers)
- One of each of the following items per participant:
  - Participant Guide (PG) available for download from http://ndptc.hawaii.edu/
  - Participant Handout
  - Course Evaluation Forms
  - Post-Test Answer Sheet corresponding to post-test version

Instructor-to-Participant Ratio

2:40

Reference List

None

Practical Exercise Statement

Not Applicable

Assessment Strategy

- Instructor observation of participant involvement in the classroom discussion.
- Instructor-led discussion to ensure that participants understand both how their performance will be evaluated and how that evaluation will impact participants' outcomes.
- Instructor administration of objectives-based post-test to assess participants' knowledge of course content.

Unmanned Aircraft Systems in Disaster Management

Icon Map

Knowledge Check: Used when it is time to assess participant understanding.

Example: Used when there is a descriptive illustration to show or explain.

Key Points: Used to convey essential learning concepts, discussions, and introduction of supplemental material.

Participant Note: Used to indicate text that has been included as additional information for the participant. The text may not be directly addressed in the slide presentation or during class discussion.

Participant Notes:

**Unmanned Aircraft Systems
in Disaster Management**

Course Summary

- This course is intended to help participants:
  - Know steps to building successful UAS program for an agency
  - Prepare for and benefit from emergent capabilities of UAS
  - Identify when UAS would enhance a disaster mission
  - Select UAS type and sensors, based on information needed
  - Know importance of engaging local community
  - Ensure that privacy issues, civil rights, and civil liberties are thoroughly addressed
  - Incorporate UAS into existing disaster management framework

7-3

Slide 7-3. Course Summary

The goal of the course is to give participants a general, introductory understanding of unmanned aircraft systems and help participants think through whether a UAS program is right for their agency. The course aims to:

- Explain many of the steps involved in deciding on a UAS program
- Elaborate on the steps to building successful UAS program
- Detail the types of unmanned aircraft and sensors available and how they could be used in disaster management
- Emphasize the importance of engaging the local community and ensuring that privacy issues, civil rights, and civil liberties are thoroughly addressed
- Explain the current FAA regulations of UAS
- Walk participants through the steps of applying for FAA authorization
- Discuss some of the challenges facing UAS

Participant Notes:

Slide 7-4. Additional Resources

This slide shows several websites where participants can locate more information on UAS. The FAA's website has extensive information on UAS regulations.

Participant Notes:

Slide 7-5. Daily Email UAS Newsletters

This slide shows two websites where participants can sign up for email newsletters that are an excellent resource for providing daily news on UAS and keeping participants up-to-date on the latest UAS changes and happenings. The newsletters pull articles and press releases from around the United States and the world on news about public and commercial UAS operations, regulations, incidents, and other information.

Participant Notes:
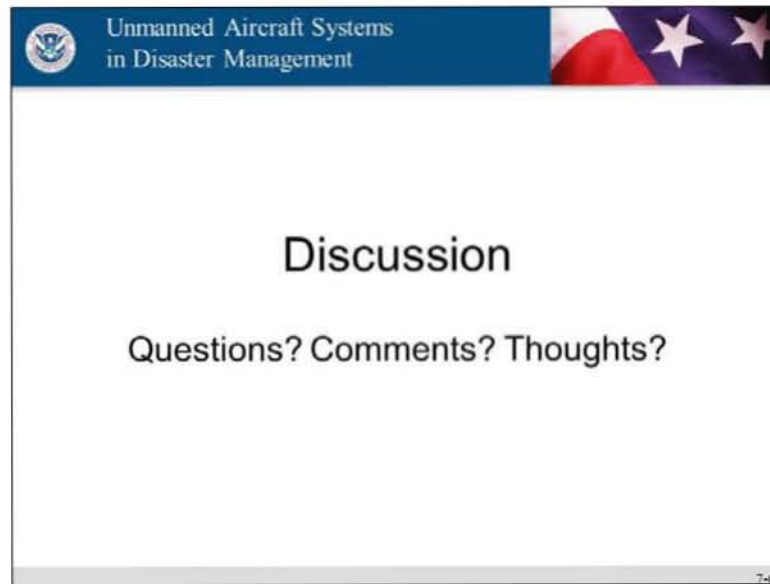
Slide 7-6. Discussion

Participant Notes:
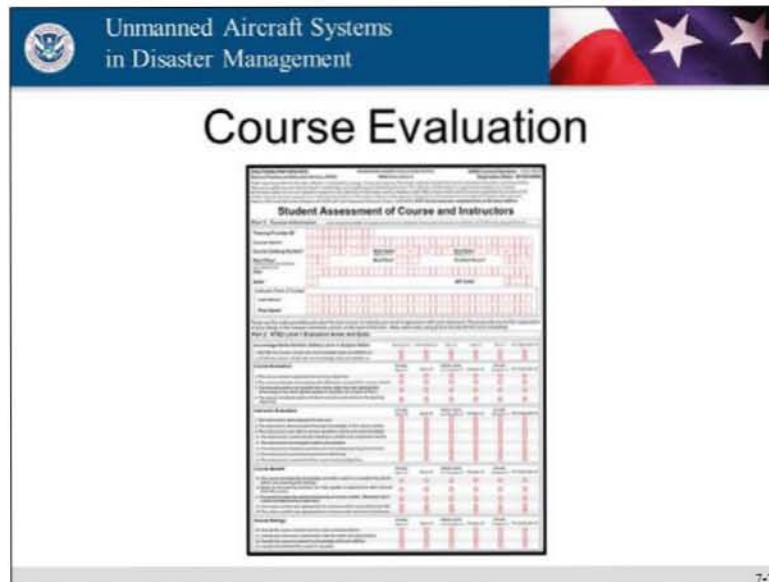
Slide 7-7. Course Evaluation

The instructor will distribute a Course Evaluation Form to participants and ask them to provide constructive feedback on the course material and instruction. Participants have 15 minutes to complete the form.

Participant Notes:
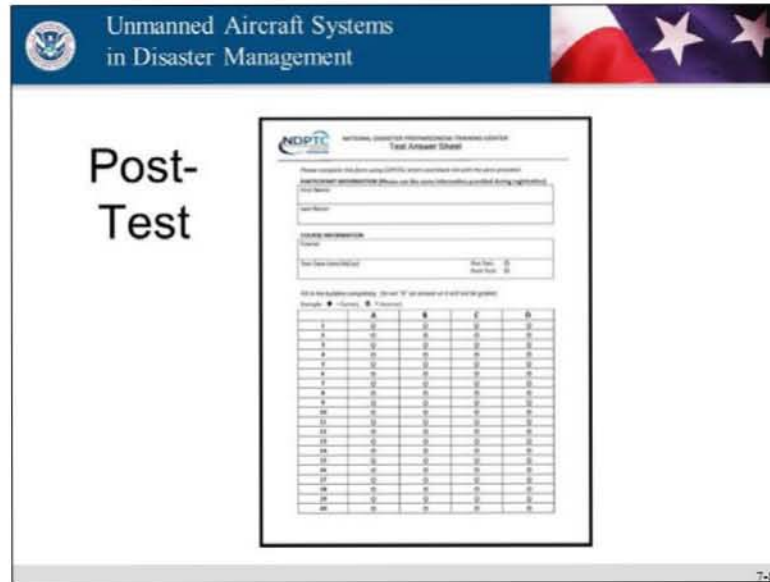
Slide 7-8. Post-Test

This course concludes with a post-test, which allows the instructor to evaluate participant knowledge on the topics addressed in the course. The post-test provides participants with an opportunity to demonstrate mastery of the Terminal Learning Objectives, and is similar in design and content to the pre-test that participants completed at the beginning of the course. Participants' pre-test and post-test scores will be compared to measure the benefit of the course and identify the knowledge and skills participants gained during their attendance.

Unlike the pre-test, every question should be answered. Participants must not leave any answers blank on the answer sheet. Participants will have 20 minutes to complete the post-test, and should work independently to complete the answers.

Participant Notes:
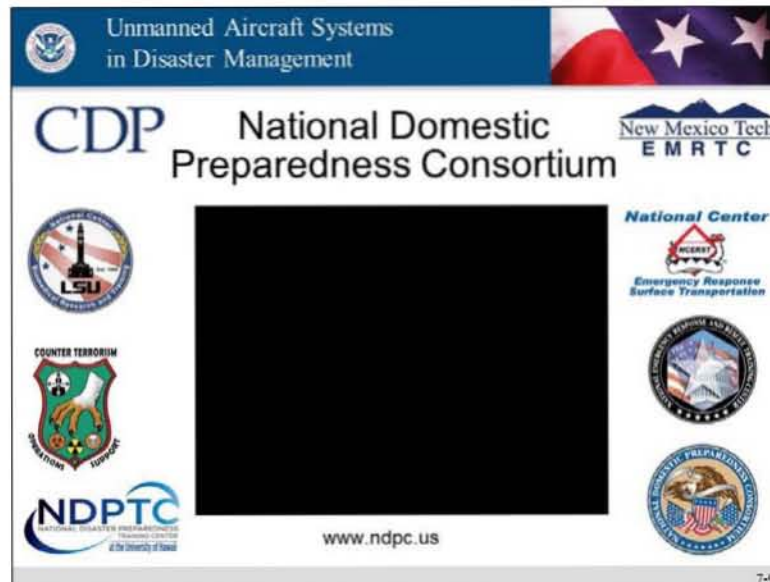
Slide 7-9. National Domestic Preparedness Consortium

NDPTC is part of The National Domestic Preparedness Consortium (NDPC), which is a professional alliance sponsored through the Department of Homeland Security/FEMA National Preparedness Directorate.

The NDPC membership includes.

- University of Hawaii. National Disaster Preparedness Training Center (NDPTC)
- Louisiana State University's Academy of Counter-Terrorist Education. National Center for Biomedical Research and Training
- Texas A&M. National Emergency Response and Rescue Center
- The New Mexico Institute of Mining and Technology. Energetic Materials Research and Testing Center
- Center for Domestic Preparedness (CDP)
- US Department of Energy Nevada Test Site. Counter-Terrorism Operations Support
- Transportation Technology Center, Inc./National Center for Emergency Response in Surface Transportation

Unofficial Video Transcript
The National Domestic Preparedness Consortium or NDPC is a national homeland security resource and DHS/FEMA training partner that has supported the preparedness needs of the country since 1998. It is a partnership of several nationally recognized public universities, and private and government organizations. The NDPC's mission is to develop and deliver advanced all-hazards training to prepare the nation. The

Participant Notes:

seven NDPC members and their core competencies are: CDP –
DHS/FEMA's Center for Domestic preparedness in Anniston, AL with
core competencies in chemical, biological and nuclear attacks involving
HazMat; NCBRT – LSU's National Center for Biomedical Research and
Training in Baton Rouge LA whose core competencies are law
enforcement and biological and agricultural terrorism; EMRTC – New
Mexico Tech's Energetic Materials Research and Testing Center in
Socorro, NM with core competencies in explosive and incendiary attacks;
NCERST – The Transportation Technology Center's National Center for
Emergency Response in Surface Transportation in Pueblo, CO, whose
core competencies are surface transportation security and specialized
highway and rail emergency response; NNSA/NSO/CTOS – The National
Nuclear Security Administration's Nevada Site Office Center for
Radiological/Nuclear training at the Nevada National Security site in Las
Vegas, NV whose core competencies include radiological and nuclear
WMD attacks, prevention, and response training; NDPTC – University of
Hawai'i's National Disaster Preparedness Training Center in Honolulu, HI
whose core competencies are natural hazards, risks to urban populations,
and planning for urban areas following a disaster; NERRTC – TEEX's
Nation Emergency Response and Rescue Training Center at Texas A&M
University in College Station, TX with core competencies in incident
management, health and medical services, critical infrastructure
protection, disaster preparedness and response, executive leadership
and management, and cyber security. For more information on the
NDPC, contact us at www.ndpc.us.

Additional training opportunities can be found on FEMA's National
Training and Education Division (NTED) website at
www.firstrespondertraining.gov.

Participant Notes:

Slide 7-10. Thank You

The instructor may close the course with a summary of NDPTC and upcoming courses.

Key Point: NDPTC works collaboratively to develop and deliver training and education in the areas of disaster preparedness, response, and recovery to governmental, private, tribal, and non-profit entities, and under-represented/under-served communities.

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Unmanned Aircraft Systems in Disaster Management

Appendices
Version 1.0

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Unmanned Aircraft Systems in Disaster Management

Appendix A: Planning Checklist
Version 1.0

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Appendix A: Planning Checklist

This planning checklist will help you think about how the concepts discussed in today's course on Unmanned Aircraft Systems in Disaster Management apply to your agency. As the course progresses, you should write down your ideas on how certain topics relate to your agency. The packet will help guide you and your agency through the initial steps needed to plan an unmanned aircraft program.

1. UAS Mission	Information Applicable to Your Agency
POTENTIAL UAS USES (EMERGENCY AND NON-EMERGENCY SITUATIONS)	
MISSION LOCATIONS AND PARAMETERS	
2. UAS Imagery Collection	
IMAGERY RESOLUTION NEEDS	
UAS SENSOR NEEDS	
3. UAS Operations and Regulations Framework	
UAS CRAFT (TYPE, AIRWORTHINESS CERTIFICATE, REGISTRATION, MAINTENANCE REQUIREMENTS)	
AUTHORIZATION NEEDED FROM FAA	
APPLICABLE REGULATIONS (FAA, FEDERAL, STATE, LOCAL)	
PERMISSION WITHIN YOUR JURISDICTION, WITHIN YOUR AGENCY, ABOVE YOUR AGENCY	
POSSIBLE MOUS WITH VARIOUS GROUPS	
PROCEDURES AND POLICIES	

4. UAS Post-Flight Framework	Information Applicable to Your Agency
INFORMATION MANAGEMENT. ACCURACY, LATENCY, CHANGE DETECTION, ETC.	
IMAGERY PROCESSING NEEDS	
WORKFLOW ARCHITECTURE. GETTING INFORMATION OUT WITHIN AGENCY, BETWEEN AGENCIES, TO POINT-OF-CONTACT FOR MISSION INSIDE ICS STRUCTURE	
DATABASE MANAGEMENT AND ARCHIVING	
INFORMATION SECURITY	
5. UAS Program Elements	
COST/BUDGET	
STAFF NEEDS	
TRAINING NEEDS	
ENSURE PRIVACY, CIVIL RIGHTS, AND CIVIL LIBERTIES PROTECTIONS IN PLACE IN UAS PLAN, P/CRCL IMPACT ASSESSMENT COMPLETED	
COMMUNICATION WITH THE PUBLIC. WHO? HOW? WHEN?	
OPERATOR CERTIFICATION	
LIABILITY, SAFETY, LEGAL ISSUES	
FAA-REQUIRED REPORTING	

Unmanned Aircraft Systems in Disaster Management

Appendix B: Information Supplement
Version 1.0

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Appendix B: Information Supplement

Elements of a Successful UAS Program

Step 1. Decide Whether to Create a UAS Program
1. Are UAS a good option for the agency?
2. Do UAS enhance existing operations, and/or allow new operations?
3. How exactly will the agency use UAS?
4. Is there funding for a UAS program?
5. Is there community support for a UAS program?
6. Does the FAA allow the type of UAS flights the agency needs?
7. Who will operate UAS?

Step 2. Discuss and Develop Basics of UAS Program
1. Communicate with local FAA office for guidance on program feasibility and assistance
2. Comply with federal, state and local laws on UAS use
3. Understand agency rules on UAS use
4. Involve community throughout UAS program development
   a. Hold community meetings, seek input, listen to concerns
   b. Explain capabilities, limits, operations of UAS - list what UAS will/will not do
   c. Define agency plans for UAS
   d. Involve key stakeholder in the development of agency's P/CRCL Impact Assessment and publicly post the resulting analysis
   e. Describe compliance with privacy, data collection, and distribution policies
   f. Generate positive press on how UAS help in disaster situations
5. Determine appropriate UAS aircraft, sensors, equipment, software, etc. needed
   a. Discuss with manufacturer: cost, quantity, accessories, etc.
6. Determine what personnel are needed: pilots, observers, imagery processors
   a. Determine their pilot certification and training
7. Create MOUs and agreements with other airspace users, public agencies, and landowners
8. Information distribution, security, and privacy agreements for imagery and analysis
9. Establish air traffic coordination
10. Coordinate with agency's other aircraft, personnel
11. Coordinate with outside agencies for operations, authorization
12. Establish and follow privacy, civil rights, civil liberties policies and procedures
13. Integrate UAS operations into existing agency policies and procedures
14. Integrate UAS into existing inter-agency disaster procedures
15. Establish new policies and procedures as needed
16. Seek advice from other agencies already using UAS

Step 3. Checklist Prior to COA Application

1. Select unmanned aircraft, sensors, other equipment
2. Develop plans for operations, communications, and coordination
3. Prepare MOUs and agreements
4. If pursuing a COA to conduct public aircraft operations, obtain "declaration letter" from city, county, or state attorney's office
   a. States that applicant recognized as a subdivision of government, or
   b. Contractor will operate UAS in accordance with public agency
   c. Agency cannot self-certify itself as a public agency
5. Review sample COA application online to gather information ahead of time
   a. www.faa.gov/about/office_org/headquarters_offices/ato/service_units/systemops/aaim/organizations/uas/media/COA Sample Application v 1-1.pdf
6. If pursuing authorization under Part 107, review information at: www.faa.gov/uas
7. If pursuing a Section 333 Exemption, review information at:
   a. www.faa.gov/uas/getting_started/fly_for_work_business/beyond_the_basics/section_333/

Step 4. If Pursuing a COA for Public Aircraft Operations

1. Agency opens FAA COA website account
   a. Application completed on-line at https://ioeaaa.faa.gov/oeaaa/Welcome.jsp
2. Applicant information
   a. Public agency identification, address, point of contact, contact information
3. UAS program summary – why, when, where
   a. Type of aircraft, altitudes, launch/recovery areas, operation timing, class of airspace
4. Airworthiness certification of UAS or statement of airworthiness for public aircraft
5. Equipment description
   a. Description of ground control station, communication system, components
   b. Specific details of the vehicle: performance statistics (speeds, weight), GPS, collision avoidance, lights, data and control links, radios, flight data recording, forward or side looking cameras, image of vehicle
6. Procedures
   a. Lost link procedures, mission procedures, pre-takeoff briefing and UAS checks, lost communication procedures, emergency procedures, visual observation procedures, maximum distance (vertical, horizontal) number of observers, maps of area
7. Aircrew Qualifications
   a. FAA or DOD qualifications of pilots and observers, medical certification

Recommendations for COA Application

1. Attach detailed operations procedures in application to avoid possible delays
2. Provide detailed plans to mitigate risk of collision with other aircraft, risk posed to persons and property on ground
3. Contingency Planning:

a. Unrecoverable system failure procedures, Loss of link, Loss of link Divert/Contingency Points (DCP), Flight Termination Points (FTP)

b. At least one of each DCP and FTP should be identified for each operation

c. Aircraft continues to have GPS but loss of data communications link, or aircraft losses communication to GPS, or aircraft losses data communications and GPS

Recommendations throughout UAS Program

1. Always listen to public, keep open dialog

2. Demonstrate UAS at community preparedness events to demystify UAS

3. Integrate P/CRCL best practices and protections throughout all planning and policy development

4. Submit periodic public reports of UAS usage (FAA requirement)

5. Inform public of any changes to UAS program

6. Report any problems and corrective action with UAS program

UAS Regulations

Note: UAS regulations are rapidly evolving. Always consult the FAA website for the most current updates to regulations: http://www.faa.gov/uas/

Public (Government) Use

Public agencies have several paths for FAA authorization:

Public Aircraft Operations With COA	Part 107	Section 333
For public agencies conducting public aircraft ops	Commercial operations (but can be a public agency)	Commercial operations (but can be a public agency)
COAs: Blanket Area Public Safety, Jurisdictional, Blanket Area, or Site Specific	Class G airspace, and with permission other airspace	Blanket COA for most of U.S., request COA for specific changes to limitations
Class G, or variety of airspace, depending on COA	Class G	Class G for blanket, other airspace for specific COA
Self-certify pilots	Need remote pilot certificate	Need airman certificate
Need declaration letter from city, county, or state office	Pass aeronautical knowledge test	Apply for this if operations do not fit into first two options

Public Aircraft Operations

- Public aircraft: owned and operated by federal or state government, or political subdivision, or leased for 90 or more days
- Or aircraft owned by government, but operated by any person for crew training, equipment development, or demonstration
- Non-public aircraft qualifies as public aircraft if FAA determines that there are extraordinary circumstances
- Government may contract civil operators for public operations
  - Refer to FAA Advisory Circular AC No. 00-1.1A for detailed explanation
  - http://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_00-1_1A.pdf
  - Sharing responsibility between public and civil entities for PAO qualification, ensuring that each flight meets PAO requirements, providing written declaration of public aircraft status for designated, qualified flights, submitting declaration to FAA Flight Standards District Office (FSDO)
  - UAS must be exclusively leased for at least 90 continuous days to public agency
- Attorney General must provide 'Declaration Letter' qualifying the public agency

Blanket Area Public Safety COA, for Public Safety Agencies

- COA approval gives operator "Blanket" COA for public aircraft operations
- 400 feet or below in Class G airspace, daylight, Visual Flight Rules with visual line of sight
- Aircraft under 55 lb, two to five miles from airports (depending on type of airport)
- Operator must conduct training via Part 107 or Blanket COA before actual operations

Training COA, followed by Jurisdictional COA, for Public Safety Agencies

- First get a Training COA to train and demonstrate ability to handle flight operations
- Once training is satisfactory, apply for a Jurisdictional COA
- Jurisdictional COA is for wide area (entire city, county) that may include Class C, D, E, and G airspace, which is both controlled and uncontrolled airspace

Blanket COA

- For non-emergency/first responder agencies, similar rules and restrictions as the Blanket Area Public Safety COA, including flight only in Class G airspace

Site Specific COA

- Specific UAS payload, location, activity, time of day, safety measures, limitations, etc.

Amended COA

- To change any aspect of COA (new UAS, new location, etc.) need Amended COA

Emergency COA

- Disaster relief, search and rescue, other life-threatening situations
- COA valid for short time, very specific purpose, FAA response within 24 hours
- When possible loss of life is great, manned flight not possible or practicable due to a hazard, or manned aircraft not available
- Usually applicant and UAS under a current COA for Public Safety Agencies

Commercial Use

Part 107
- As of August 29, 2016
- Commercial operations, non-recreational users: companies, public agencies, universities
- Max altitude 400 feet UAS under 55 lb
- Not over people not involved in operation, daylight, must maintain line-of-sight
- Class G uncontrolled airspace, request air traffic control permission for other airspace
- Operator at least 16 years old
- Pass aeronautical knowledge test, pass TSA vetting, obtain a remote pilot certificate
- All UAS must be registered
- May seek waiver from FAA to many Part 107 stipulations

Section 333 Exemption
- Available only when operation cannot meet limits of Part 107 or waivers to Part 107
- Commercial operations in low-risk, controlled environments
- Receive automatic "Blanket" COA
  - Below 400 ft anywhere in U.S. (with exceptions, not in cities)
  - Aircraft under 55 lb
  - Daylight, must maintain visual line of sight
  - 2 to 5 miles from airports
  - Airman certificate (pilot's license) required, no medical certificate required
- If outside blanket COA limits, need separate COA for those operations

Special Airworthiness Certificate
- Less common; for research and development, crew training, production flight testing

Recreational/Model Aircraft Use

- Refer to FAA Advisory Circular 91-57A
- Altitude below 400 ft, UAS under 55 lb
- At least 5 mi from airports, or contact control tower before flight
- Line of sight of operator
- Cannot fly near people, stadiums, manned aircraft, cannot be careless or reckless
- Cannot be paid for flight or have flight benefit a business
- Must follow community-based safety guidelines (Academy of Model Aeronautics, etc.)
- Does not require FAA approval or authorization
- Educational institutions may fly under these rules for certain student operations

Ensuring Privacy, Civil Rights, and Civil Liberties

Conduct a Privacy and Civil Liberties Impact Assessment

- What data will be collected? How long will it be retained? With whom will it be shared, under what conditions? How will personally identifiable information (PII) be managed?
- How will agency secure data, what systems will prevent abuse?
- What will be the accountability to ensure data protection and sharing constraints tracked? How will agency conduct audits?
- How will agency handle imagery of First Amendment protected activities?
  - Such as, protests or demonstrations
- How will agency handle complaints? What are the redress procedures?
- How will agency handle requests from other entities?
- Could data collected for one purpose be used for another purpose?

Existing Federal-Level Guidelines, Best Practices, and Examples

Presidential Memorandum "Promoting Economic Competitiveness While Safeguarding Privacy, Civil Rights, and Civil Liberties in Domestic Use of Unmanned Aircraft Systems"

1. Issued February 15, 2015
2. Federal government will ensure UAS integration is consistent with economic competitiveness, public safety, privacy, civil rights, and civil liberties
3. UAS similar to other information collection systems
   a. Laws exist, compliance and enforcement to follow
   b. UAS are merely tools; unauthorized surveillance itself is the issue
4. Federal agencies must report on privacy accountability, transparency, and compliance
   a. By August 15, 2015 (status), February 15, 2016 (implementation)
5. Dept. of Commerce National Telecommunications & Information Administration has to initiate UAS stakeholder roundtable with 45 participating UAS organizations
   a. To create voluntary standards for responsible, compliant civil and commercial UAS use (not government use)
6. Constitution, Federal law, and other regulations and policies
   a. Privacy, civil rights, and civil liberties, no violation of First Amendment
   b. No discrimination against any group of people
   c. Privacy Act of 1974
      i. Restricts Federal collection and dissemination of individuals' information maintained in records, including personally identifiable information (State privacy laws may also apply)
      ii. Allows individuals to seek access to, and amendment of, records
7. Agencies must:
   a. Have procedures to receive, investigate, and address privacy, civil rights, and civil liberties complaints

    b. Verify rules of conduct and training for Federal personnel and contractors who work on UAS programs

    c. Have procedures for reporting suspected cases of misuse

8. UAS-collected information shall not be disseminated outside of agency unless:

    a. Dissemination required by law, or fulfills authorized purpose and complies with agency requirements

    b. If not maintained in records system covered by Privacy Act

9. Policies must be in place before UAS use, and reexamined every three years

10. To promote transparency, agency must give public:

    a. Notice of where agency's UAS authorized to operate

    b. Information on agency's UAS program

    c. Changes in program affecting privacy, civil rights, or civil liberties

    d. Annual general summary of agency's UAS operations during previous fiscal year

Existing Federal-Level Guidelines and Requirements

Department of Homeland Security Fair Information Practice Principles

DHS Privacy Office has version of Fair Information Practice Principles, which is based on the Privacy Act of 1974 and is a good guideline for UAS data collection for all agencies. The FIPPs address how the federal government should treat individuals and their Personally Identifiable Information (PII). As well as agency duties on collection, use, dissemination, and maintenance of PII.

1. Transparenc

    a. Provide notice to involved individuals regarding PII collection, use, dissemination, and maintenance

    b. Never have a collection system be a secret

    c. Publish in Federal Register the nature, purpose, maintenance, use, and sharing of PII, as required by Privacy Act

2. Individual Participation

    a. Involve individual in process of using PII and seek individual consent for PII collection, use, dissemination, and maintenance, to extent practical

    b. Provide mechanisms for appropriate access, correction, and redress on use of PII

3. Purpose Specification

    a. Explain authority that permits collection of PII and purpose for intended use

4. Data Minimization

    a. Collect only PII directly relevant and necessary to accomplish specified purpose

    b. Retain PII only as long as needed to fulfill specified purpose

    c. Dispose of PII per National Archives and Records Administration (NARA)

5. Use Limitation

    a. Use PII solely for purpose specified in notice

    b. Share PII outside department only for purpose compatible with collection purpose

6. Data Quality and Integrity
   a. Ensure PII is accurate, relevant, timely, and complete
7. Security
   a. Protect PII with security safeguards against risks such as loss, unauthorized access or use, destruction, modification, or unintended or inappropriate disclosure
8. Accountability and Auditing
   a. Be accountable for complying with these principles, provide training to employees and contractors who use PII, audit PII to demonstrate compliance with these principles and all applicable privacy protection requirements

DHS Best Practices for Protecting Privacy, Civil Rights & Civil Liberties In UAS Programs
1. Consult legal counsel, privacy, civil rights, and civil liberties (CRCL) experts to confirm legal authority to operate UAS for the intended purpose and whether it is permissible to fly UAS in the area, and continue consultation throughout lifecycle of UAS program.
2. Clearly state the purpose of UAS program to the public so they can appreciate an agency's reasons for the program, e.g. what prompted agency to create UAS program?
3. Stay focused on purpose of UAS program, inform public of program changes.
4. Designate an individual with knowledge of the relevant privacy and CRCL laws and regulations to be responsible for privacy and CRCL compliance.
5. Conduct a privacy impact assessment and document privacy compliance.
6. Limit collection, use, dissemination, and retention of data recorded by UAS, and make sure it is legally acquired and relevant to the entity's operations.
7. Respect constitutionally protected activities that may occur near UAS operations.
8. Have a redress program for individuals that covers UAS activities.
9. Ensure accountability in management of UAS program, and record access and use of UAS-recorded data to identify and resolve problems.
10. Properly secure and store UAS-recorded data to prevent or mitigate data loss, unauthorized access, use and disclosure of data.
11. Determine if specific UAS technology impacts individual rights, like being able to observe non-public activities.
12. Ensure transparency and outreach: public support is essential for program success.
13. Require that UAS staff receive privacy and CRCL training applicable to UAS operations.
14. Develop procedures to address when other agencies request UAS support.

Resources

FAA UAS website (Public, Commercial, and Recreational Links)
http://www.faa.gov/uas/

Know Before You Fly Website
http://knowbeforeyoufly.org/

FAA AC_00-1_1A
http://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_00-1_1A.pdf

FAA Online Application Website
https://ioeaaa.faa.gov/oeaaa/Welcome.jsp

FAA COA Website
http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/systemops/aaim/organizations/uas/coa/

FAA Sample Public COA
http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/systemops/aaim/organizations/uas/media/COA%20Sample%20Application%20v%201-1.pdf

FAA Airman Certification Information
http://fsims.faa.gov/PICDetail.aspx?docId=8900.1,Vol.16,Ch4,Sec1

Department of Homeland Security Best Practices for Protecting Privacy, Civil Rights & Civil Liberties In UAS Programs
https://www.dhs.gov/publication/best-practices-protecting-privacy-civil-rights-civil-liberties-unmanned-aircraft-systems

Department of Justice Report on UAS
http://www.justice.gov/oig/reports/2013/a1337.pdf

UAS Videos on UAViators Humanitarian Network
http://map.uaviators.org/uaviators/

SUAS Email Newsletter
http://www.suasnews.com

UAS Vision Email Newsletter
http://www.uasvision.com

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Unmanned Aircraft Systems in Disaster Management

Appendix C: Fair Information Practice Principles (FIPPs)
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Appendix C: Fair Information Practice Principles (FIPPs)

The Fair Information Practice Principles (FIPPs) are a set of eight internationally recognized principles that inform individual information privacy policies both within government and the private sector. The FIPPs are the framework for a Privacy Impact Assessment (PIA).

Although specific articulations of the FIPPs vary and have evolved since their genesis in the 1970s, core elements are consistent among nations, states, and economic sectors. The FIPPs are at the core of the Privacy Act of 1974, which applies these principles to U.S. Federal agencies. The FIPPs are mirrored in the laws of many U.S. states, as well as many foreign nations and international organizations. The following formulation of the FIPPs is based upon those used by the Department of Homeland Security (DHS) Privacy Office. It may serve as a background for State, Local, Tribal, and Territorial (SLATT) partners.

Purpose Specification

Agencies should specifically articulate the authority that permits the collection of Personally Identifiable Information (PII). The purpose(s) for which PII is collected should be specified at the time of data collection. Subsequent use of this data should be limited to the original purpose for which the PII was collected (or other purposes compatible with the original collection purpose).

Implementing the Purpose Specification Principle in relation to UAS – Agencies are bound by specific constitutional and statutory authorities that circumscribe their ability to collect PII. When creating policies and procedures consider the following:

- Is your agency authorized to collect pictures, video, other signals information, and data using aircraft in support of its mission? Is there also a valid lawful specific purpose for that collection? Is there documentation for all possible PII at the time it is collected?
- Should data you collected be shared with other agencies? If so, what types of agencies? State, local, federal, tribal, private organizations or foreign law enforcement agencies? How is your policy documented?
- Is the data, images, and video collected stored by your agency? How are these storage policies documented?
- Since UAS can hover for extended periods of time, have you examined their increased risk for privacy protections? Have recent changes in technical capabilities affected your agency's mission or policy assumptions related to privacy and PII?

Data Quality/Integrity

PII collected should be relevant to the purposes identified for its use and should be accurate, complete, and up-to-date.

Implementing the Data Quality / Integrity Principle in relation to UAS –One important way to minimize potential downstream civil liberties concerns is to ensure that any information collected, stored, and disseminated is accurate. This includes ensuring that the information provides sufficient context for any PII. Questions to consider include:

- Is the information collected still timely? Should it be retained?
- Are all video, still images, signals information, and/or radar images associated with specific individuals of interest or case files?
- Has all relevant additional data been stored (timestamps, geographical coordinates)?
- Has proper training been issued to those operating recording equipment so that data is not co-mingled with other data, edited, labeled incorrectly, or improperly stored?

Data Minimization

PII should be collected only if the data is directly relevant and necessary to accomplish a specified purpose. PII should only be retained for as long as is necessary to fulfill the specified purpose. At the appropriate time, PII should be disposed of in accordance your policies. PII should only be obtained by lawful and fair means.

Implementing the Data Minimization Principle in relation to UAS – Consider the following:

- What data will be collected? How long will it be retained? Under what conditions and with whom will it be shared? How will any PII be managed? Do you have policies for all of these considerations?
- When collecting data with aircraft, are they being used in such a way to ensure they are only capturing images and information necessary to support your specified mission?
- Can responding to disasters change standard privacy operating procedures? Can safety concerns change standard privacy operating procedures?
- Have you worked the FAA to construct a Certificate of Authorization (COA) in order to operate a particular aircraft, for a particular purpose, in a particular area? The COA allows an operator to use a defined block of airspace and includes special safety provisions unique to the proposed operation; do those previsions take into consideration privacy concerns?
- Are your aircraft following your established guidelines? How does your fight plan and mission affect PII? For example, how does your aircraft's altitude affect PII when used in conjunction with forms of facial recognition or other PII defining characteristics?
- If you are sharing live data with others, have you instituted policies to limit what is shared and saved?

Use Limitation

PII should be used for purposes specified. It should only be shared (a) with the consent of the individual or (b) by the authority of law.

Implementing the Use Limitation Principle in relation to UAS – Sharing information broadly should be tempered by adherence to key principles such as "need-to-know." You may want to consider the following:

- Are you collecting images, video, radar data, and/or signals information via aircraft pursuant to your authority? Is it part of your particular mission? Are those involved anywhere in the collection or processing of data "need to know?"
- Are you flying a mission in support of another agency? Does that agency have authority to have that information? Do they have policies in place to limit their use of data collected? Has proper custody of the data been maintained?
- Are there procedures in place for sharing data collected by UAS? Have you considered role based controls for accessing data obtained by aircraft?
- What is the length of time that collected information will be retained? How is data disposed of? Are there procedures in place for destroying data properly?

Security

Agencies should institute reasonable security safeguards to protect PII against risks such as loss, unauthorized access or use, destruction, misuse, modification, or unintended or inappropriate disclosure.

Implementing the Security Principle in relation to UAS – Items to consider:

- Has your security technology been maintained? Are you using up-to-date technology for network security?
- Has your security staff been adequately trained? Is their training up-to-date?
- Have you put into place any systems to prevent abuse by those who have accesses to collected information? How will staff be audited to ensure compliance?
- Have you taken steps to protect live video feeds, signals information, and recorded video, radar, and/or still pictures captured by your aircraft? Are all live feeds encrypted?
- Are aircraft controls encrypted and otherwise protected from hijacking?
- Do you have physical security in place to restrict tampering of your aircraft? Is there security in place to restrict access to stored data?
- Are the people who do have access to PII containing equipment and data "need to know"?
- Has the chain of custody been maintained throughout the course of processing data collected?

Accountability/Audit

Agency personnel and contractors are accountable for complying with measures implementing the FIPPs, for providing training to all employees and contractors who use PII, and for auditing the actual use and storage of PII.

Implementing the Accountability/Audit Principle in relation to UAS – When developing strong policies to implement accountability you should consider the following:

- While using UAS pursuant to your stated purpose have you considered possible impacts on an individual's privacy? Have you taken steps to mitigate possible impacts on an individual's privacy?

- Have those who have access to your UAS, both physical and technological, as well as those who have access to the associated collected data/images, or those who are in place to ensure only authorized access to the aircraft systems, been trained on your agency's mission, core values statements, other key documents and/or the Constitution with regards to privacy and civil liberties protections?

- Have employees had training on techniques to copy collected recorded data to portable digital media? Are they required to follow procedures to ensure that such data is not co-mingled with data from other activities? Have employees followed procedures to maintain an adequate chain of custody of data?

- Will there be a process in place for restricting the dissemination of video, still images, and radar images and keep logs of all disclosures?

Transparency

Provide notice to involve individuals regarding PII collection, use, dissemination, and maintenance. Never have a collection be a secret.

Implementing the Transparency Principle in relation to UAS – Consider the following:

Have you stated any P/CRCL protections in your UAS plan or policy? Do those protections contain redress procedures?

- Have you allowed non-profit advocacy and /or civil liberties groups to participate and provide input during periodic revision of the agency's policies or through the creation of an oversight board?

- Have you met with community groups and listened to their privacy concerns?

- Have you considered making a Privacy Impact Assessments (PIA)? PIAs provide a level of transparency to the public about the current surveillance programs undertaken by your agency. It is one way to facilitate openness and transparency. Your PIA could contain specific details to build trust with you comminute such as:
  - What data will be collected? How that data will be used?
  - How long will it be retained?
  - Under what conditions and with whom will it be shared?
  - How will any personally identifiable information be managed?
  - How will the data be secured and what systems put into place to prevent abuse by operators?
  - How will accountability for ensuring any data protection and sharing constraints are tracked?

- o How will audits be conducted?
- o How will the data, images, and video captured of First Amendment protected activities be handled? (e.g. protests or demonstrations)
- o How will any complaints be handled? Any redress procedures?

Individual Participation

To the extent practicable, involve the individual in the process of using PII and seek individual consent for the collection, use, dissemination, and maintenance of PII. Agencies should also provide mechanisms for appropriate access, correction, and redress regarding the agency's use of PII.

Implementing the Individual Participation Principle in relation to UAS – Individual participation provides complementary benefits for the public and the government. In involving individuals, the government is able to maintain the most accurate information about the public, and the public is given greater access to the amount and uses of the information maintained by the government. While it is impractical for certain missions involving UAS or even whole agencies to follow a standard path towards individual participation you may want to consider the following:

- Does your P/CRCL policy and redress procedures take into account video, pictures, and collected data from UAS?
- If individuals cannot participate in the initial collection of this information, can they contest or seek redress through any resulting proceedings brought against them.

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Unmanned Aircraft Systems in Disaster Management

Appendix D: Civil Liberties Impact Statement Assessment (CLIA) Template
Version 1.0

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Appendix D: Civil Liberties Impact Assessment (CLIA) Template

Modified for Use by State and Local Government Agencies

Sample questions considered by the DHS/Office for Civil Rights and Civil Liberties when conducting a civil liberties impact assessment of a particular programs and/or activity.

Impact on Particular Groups or Individuals

- Is the program intended to have a direct impact on certain racial or ethnic groups?
- If no, might the program have an effect on certain racial or ethnic groups that might reasonably be perceived to be intentional?
- Generally, an agency creating a program that singles out one or more racial or ethnic groups must show that is has narrowly tailored its program to further a compelling government interest. When government treats certain categories of people differently than other categories, it generally must do so according to categories other than race or ethnicity.
- Would the program further the Constitutional principle of race-neutral government action, or would it encourage or depend upon a government official categorizing people by race?
- State and local should be aware that Title IV of the Civil Rights Act of 1964 prohibits discrimination based on national origin by recipients of federal funds.
- How would the program affect people with disabilities?
- How would the program affect those attempting to exercise a particular religion?
- State and local should consider whether [its] programs affect the exercise of religion and whether they could make reasonable accommodations to avoid a negative effect.

Influence of Government

- Would the program increase the authority, control, or influence of government in its relationship with private citizens? Specifically:
- Would the program require or authorize the collection of more information about private citizens?
- Would the program require or authorize the centralization of information collection that was previously dispersed?
- The collection of data on law-abiding citizens reduces their control over personal information and thereby reduces their liberty. Ensure that state or local has a sound basis for concluding that the collection of the additional information is necessary to effectively carry out an important agency function.
- Would the program increase the authority, control, or influence of the state or local government in its relationship with the private sector?

- Would the program require or authorize the government to share information about private citizens with third parties outside the government?
- If so, the legal authorities permitting the information to be shared need to be identified.
- Does the program include an intelligence or surveillance component?
- Which federal, state, and/or local authorities might apply and now does the proposed intelligence gathering or surveillance program comply with their requirements?
- Will the program include a modification or a new criminal intelligence database governed by 28 CFR Part 23? (law enforcement)

Notice and Redress

- Does the public receive notice of the program, and have the ability to file comments on it?
- Are procedures in place for redress of alleged violations of civil rights and civil liberties?
- Is the redress procedure easily available to the public and written in plain language?

Alternatives

- Is the program the least burdensome alternative with respect to civil liberties? Could the agency formulate other alternatives to accomplish the same goal while minimizing the impacts on civil liberties?
- Could the agency alter the program to enhance civil liberties?
- Will any impositions on liberty created by the program be voluntarily incurred?
- Is any imposition on civil rights and civil liberties equally distributed, randomly distributed, or focused on identifiable groups?
- Will any imposition on civil rights and civil liberties be brief or extended?

Safeguards

- Would effective implementation of the program be dependent, in whole or in part, on state or local government employees having a heightened awareness of Constitutional rights, federal, state and/or laws or regulations, or agency policies as they carry out their duties?
- Would the program increase or decrease the discretion of those employees or agents implementing the program?
- Was the program developed with input from legal counsel?
- Are reports to oversight entities or audits required, and if so are they one-time or periodic in nature?
- Will audits be conducted by external parties?
- Do you conduct an annual audit of civil rights and civil liberties issues?

Other Rights

- Could the program limit protected political or religious expression?

- Could the program implicitly chill open discourse or a person's ability to express their beliefs in writing that does not threaten or amount to "shouting fire in a theater?"

- Could the program lead to some restriction on property ownership, such as real, personal or intellectual property, firearms, or would it grant an unfair advantage to a particular business entity?

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Unmanned Aircraft Systems in Disaster Management

Appendix E: Activity Handout
Version 1.0

FEMA

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Appendix E: Activity Handout

UAS in Disaster Scenarios

UAS in Disaster Scenarios: These exercises present possible UAS scenarios. During most of the modules in the course, the instructors will ask participants to discuss a scenario in groups or together as a class. Participants will apply information learned in the modules to help answer the questions.

1. A flash flood has occurred threatening a bridge plugged with debris. Rescue personnel need immediate situational awareness downstream of the bridge to plan the extraction of residents and animals, but are prevented from entering the area by the flood. It is still raining, and conventional aircraft are grounded due to low clouds. The UAS team receives a request for assistance from the incident command post.*[Module 2]*
    a. How might UAS be used in the given situation?
    b. Which type of UAS would be best: rotorcraft or fixed wing?
    c. Which sensors should be used?
    d. What other factors should be considered?

2. A large school with multiple buildings has partially collapsed in an earthquake. First responders are mobilizing to get people out. There is a threat of further damage, debris scattered about, and people may be trapped. The point-of-contact for the mission inside the ICS structure is seeking your UAS team's assistance. The skies are clear and news helicopters are in the area.*[Module 3]*
    a. How might UAS be used?
    b. Which type of UAS would be best: rotorcraft or fixed wing?
    c. Which sensors should be used?
    d. What other factors should be considered?

3. The new mayor of your small southeastern seaside city has made disaster risk reduction a cornerstone of her term. The mayor has asked you—the head of the city's department of planning—to create a UAS program to provide information and imagery on possible risks that need to be addressed. Your historic city has many old buildings downtown, a long stretch of homes built close to the coastline, several historic bridges spanning causeways, a river running through town, and an old dam along the lake on the edge of the city.*[Module 3]*
    a. How might UAS be used in the given situation?
    b. Which type of UAS would be best: rotorcraft or fixed wing?
    c. Which sensors should be used?
    d. What other factors should be considered?

4. The Fire Department battalion chief asked your fire department UAS team to help manage the evacuation of summer camps in mountainous ravines, as a fire in the lowlands threatens to move up the ravine. There is one road serving all traffic, smoke and fire-induced winds, and water bombers are working the perimeter of the fire.*[Module 3]*
    a. How might UAS be used in the given situation?

    b.   Which type of UAS and sensors would be best?

    c.   What other factors should you consider?

5.   The Office of Emergency Management received word that a river breach due to unprecedented rainfall has left people stranded throughout a widespread area. A recreational UAS user living nearby is out flying her UAS. The county fire department's helicopter is deployed in another area of the flooding, so the department wants to ask her to fly her UAS up the valley to determine where people are stranded.*[Module 4]*

    a.   Can she accept the fire department's request? Why or why not?

    b.   Could she do this search on her own? Why or why not?

6.   A tornado has caused a train crash that scattered locomotives and passengers over a long stretch of track several miles outside of a city. The point-of-contact for the mission inside the ICS structure needs information immediately on the status of injuries, the train's condition, and the topography so that access can be designed. A commercial helicopter has been called but is two hours away. The city's police department has a Jurisdictional COA to fly UAS within its city limits, but this accident occurred outside of that COA area.*[Module 4]*

    a.   Can the police department use its UAS to help? Why or why not?

    b.   What steps would need to be taken?

7.   The local Fire and Rescue Unit wants to create a UAS program for post-disaster response and for fighting fires in a large forest area with rugged terrain. There are several camp facilities in the forest area, used by a variety of groups, and the rescue unit's jurisdiction for disaster response includes several small towns.*[Module 5]*

    a.   What steps should the fire department take to decide on a UAS program?

    b.   What steps should they take before creating a UAS program?

    c.   What privacy, rights, and community issues must be considered?

    d.   What is required for them to use UAS?

8.   A lava flow threatens to overflow into nearby housing developments and could last from months to years. The point-of-contact for the mission inside the ICS structure asks the local university's UAS team, which has a COA for agricultural research in another town, to help in an ongoing assessment of the wide-area situation so that residents can be informed and evacuations can be executed at the critical time. This surveillance will necessarily capture imagery of peoples' homes, businesses, possessions, and life patterns.*[Module 5]*

    a.   Can the UAS team do this mission? Why or why not?

    b.   What steps should be taken?

    c.   What privacy, rights, and community issues must be considered?

9.   Individually fill out as many sections as possible on the two-page Planning Checklist to think through how you anticipate your agency moving forward with a UAS program.*[Module 6]*

    a.   At the bottom of the sheet, write down the first few steps you plan to take to decide on a UAS program when you return to your agency. Use Steps 1 and 2 in the Information Supplement section of the Checklist Handout to help. Ask the instructors for guidance, as needed. Afterwards, the class will discuss together some of the responses.