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USDA United States Department of Agriculture | Forest Service | Washington Office | 1400 Independence Avenue, SW Washington, DC 20250

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Date: DEC - 5 2016

Dear Sir:

This letter is in response to your email Freedom of Information Act (FOIA) request dated and received in the US Forest Service Washington Office FOIA Service Center, Office of Regulatory and Management Services (ORMS) on November 3, 2016. Your request was assigned FOIA Case No. 2017-FS-WO-00540-F. You requested a copy of "the Forest Service National UAS Desk Guide, dated 2016.'

We searched for hardcopy and electronic records everywhere a reasonably knowledgeable professional could expect to find responsive records. We located 52 pages of responsive records which are being released to you in their entirety.

Pursuant to Title 7, Code of Federal Regulations (CFR), Subtitle A, Part 1, Subpart A, Appendix A, there is no charge for processing this request.

This concludes the Forest Service's response to your FOIA request. The FOIA provides you the right to appeal this response. Any appeal must be made in writing, within 90 days from the date of this letter, to the Chief, USDA, Forest Service: 1) by email to wo_foia@fs.fed.us; 2) by regular mail to Mail Stop 1143, 1400 Independence Avenue, SW, Washington, DC 20250-1143; 3) by Fed Ex or UPS to 201 14th Street, SW, Washington, DC 20250-1143 and telephone (202) 205-1542. The term "FOIA APPEAL" should be placed in capital letters on the subject line of the email or on the front of the envelope. To facilitate the processing of your appeal, please include a copy of this letter and/or the FOIA case number assigned to your request.

If you need any further assistance or would like to discuss any aspect of your request please do not hesitate to contact the FOIA Public Liaison at (202) 205-1542. Additionally, you may contact the Office of Government Information Services (OGIS) National Archives and Records Administration to inquire about the FOIA mediation services they offer. The contact information

for OGIS is as follows: Office of Government Information Services, National Archives and Records Administration, 8601 Adelphi Road-OGIS, College Park, Maryland 20740-6001, e-mail at ogis@nara.gov; telephone at (202) 741-5770; toll free at 1 (877) 684-6448; or facsimile at (202) 741-5769.

Sincerely,

DON OLSEN
Director, Fire and Aviation Management

Enclosures: 52 pages

United States Department of Agriculture
Forest Service

UNMANNED AIRCRAFT SYSTEM (UAS) DESK GUIDE

Version 1.0 7 November 2016

Washington Office

Preface

The National UAS Desk Guide was developed in coordination with multiple staff areas, functions and union representation in response to a decision made by the Chief's Executive Steering Committee for Unmanned Aircraft Systems.

This is the latest version of the desk guide (DG). This DG will be updated quarterly as the Forest Service continues to develop additional policy on the operation and use of unmanned aircraft systems (UAS). This preface highlights Federal policy regarding Forest Service use of unmanned aircraft.

The Forest Service National Aviation Safety and Management Plan, Forest Service Manual 5700 Aviation Management, Interagency Standards for Fire and Fire Aviation Operations (Red Book) and the Federal Aviation Administration (FAA) are mandatory policy as noted throughout this document specifically referenced, in parentheses and (hyperlinked). Helpful information and further guidance on UAS operations are also hyperlinked but without (parentheses) throughout the DG.

Table of Contents

1.0 Introduction

Unmanned aircraft systems (UAS) have the potential to augment the Forest Services' capacity to gather information to support several resource management purposes, including wildfire management; disaster response; law enforcement support; forest health monitoring; research; critical infrastructure management including bridges and dams; and forest and range management. Use of UAS is also recognized by various external entities as a beneficial technology to accomplish their mission while using NFS lands such as commercial users and research studies conducted by universities. Recreational use of UAS has gained popularity now that unmanned aircraft (UA) with extended range, flight times and ease of use are readily available and more affordable to the hobbyist user. The demand to use UAS is increasing and the Forest Service should expect to see more use on NFS lands.

Purpose

This desk guide has been developed to provide policy references and procedural information for Forest Service use of UAS as well as commercial UAS and recreational UAS uses on National Forest System (NFS) lands. This desk guide will help aid aviation managers and local line officers in assessing and processing requests for the use of UAS. Reference appendix A: UAS Request Process Flow Chart, for guidance in determining what steps to take when UAS operations are needed and by whom—Forest Service or an external entity.

Forest Service Vision of UAS

The Forest Service is an organization that adopts new technologies such as UAS with a deliberate approach in a safe and cost-effective manner when they are the right asset to help us complete our mission. The Forest Service continues to work toward safe integration of UAS technology to accomplish agency goals and objectives. Work will continue with Federal partners, including the Federal Aviation Administration (FAA), to ensure commercial and recreational/hobbyist use of UAS on NFS lands protects public safety and respects privacy. The Forest Service will continue to integrate UAS technology responsibility and within regulations while ensuring public resources, safety and privacy are protected.

Federal Aviation Administration (FAA) Perspective

All unmanned aircraft systems are "aircraft" as defined in the FAA's authorizing statutes and are therefore subject to regulation by the FAA. The FAA's vision for fully integrating UAS into the National Airspace System (NAS) entails UAS operating harmoniously, side-by-side with manned aircraft, occupying the same airspace and by using many of the same air traffic management systems and procedures. This vision goes beyond the accommodation practices in use today, which largely rely on operational segregation to maintain systemic safety. Realizing this vision requires collaboration across industry, government, and academia.

Definitions

a. **Airworthiness—**The condition in which the UAS conforms to its type certification (or military equivalent) and is in condition for safe operation.

b. **Altitude—**The height of a level, point or object measured in feet Above Ground Level (AGL) or from Mean Sea Level (MSL).

- MSL Altitude. Altitude expressed in feet measured from mean sea level.
- AGL Altitude. Altitude expressed in feet measured above ground level.

c. **Blanket COA—**See Certificate of Waiver or Authorization.

d. **Certificate of Waiver or Authorization (COA)—**An FAA grant for a specific UA operation.

- Blanket COA. A COA issued to the proponent allowing small UAS (sUAS) (less than 55 pounds) operations during daytime visual flight rules (VFR) conditions at specific altitudes and outside of certain distances from airports and heliports.
- Standard COA. A COA issued for operation that does not fit into the parameters of the Blanket.

e. **Civil Aircraft—**Aircraft other than public aircraft.

f. **Government Aircraft—**Any aircraft owned, leased, contracted, rented or chartered, and used by a Federal Government agency.

g. **Model aircraft—**An unmanned aircraft that is, 1) capable of sustained flight in the atmosphere; 2) Flown within visual line of sight of the person operating the aircraft; and 3) Flown for hobby or recreational purposes.

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

i. **Public Aircraft—**Aircraft used in operations that are inherently governmental as defined in 49 U.S.C. § 40102, 40125, and in 14 CFR, Part 1, Definitions and Abbreviations, Section 1.1, General definitions.

j. **Recreational Aircraft—**Recreational or hobby UAS use is flying for enjoyment and not for work, business purposes, or for compensation or hire. In the FAA's Interpretation of the Special Rule for Model Aircraft, the FAA relied on the ordinary, dictionary definition of these terms. UAS use for hobby is a "pursuit outside one's regular occupation engaged in especially for relaxation." UAS use for recreation is "refreshment of strength and spirits after work; a means of refreshment or division."

k. **Segregation—**Setting apart from other activities.

l. **Standard COA—**See Certificate of Waiver or Authorization.

m. **Special Government Interest (SGI) Addendum—**A document issued to accommodate real-time application requests that will directly support emergency and law enforcement-type operations.

n. **Special Use—**All uses of National Forest System lands, improvements, and resources, except those authorized by the regulations governing sharing use of roads, grazing and livestock use; the sale and disposal of timber and special forest products, such as greens, mushrooms, and medicinal plants; and minerals are designated "special uses". Special uses are authorized by permit, term permit, lease or easement. A special use authorization is **not** required for noncommercial recreational activities or noncommercial activities involving expression of views. (36 CFR 251.50).

o. **Small Unmanned Aircraft System (sUAS)—**A small UA less than 55 pounds and its associated elements (including communication links and the components that control the small UA that are required for the safe and efficient operation of the small UA in the NAS.

p. **Unmanned Aircraft (UA)—**An aircraft operated without the possibility of direct human intervention from within or on the aircraft.

q. **Unmanned Aircraft System (UAS)—**An unmanned aircraft and associated elements (including communication links and the components that control the unmanned aircraft) that are required for the pilot in command to operate safely and efficiently in the national airspace system.

2.0 Forest Service Policy

The Forest Service has determined that unmanned aircraft systems are aircraft and the Chief has designated fire and aviation management as the point of contact responsible within the Forest Service for all UAS operations. Forest Service Manual (FSM) 5700 is where policy governing aviation can be found.

Below are the most applicable policy references:

Key Points:

- An approved agreement/memorandum of understanding (MOU) specific to UAS operations is required to utilize Federal partner/ cooperator aircraft on Forest Service system land and for Forest Service benefit
- All UAS operations, activities, concerns, or requests shall be coordinated through the Regional Aviation Officer (RAO). This includes resource (non-incident) and incident operations, any clarification of hobby or recreational use and any requests for commercial use of remote controlled aircraft on NFS lands. See appendix E: UAS Mission Request Form, for planned UAS missions
- An approved Project Aviation Safety Plan (PASP) is required for all Forest Service UAS missions
- Agreements are required for all UAS services provided to the Forest Service by other agencies, partners and cooperators
- Any Forest Service leased, contracted, or owned UAS will require a Certificate of Authorization (COA) from the FAA before operation. COAs will be coordinated through the National UAS Program Manager. See chapter 4.0 for commercial UAS operations requiring a COA
- Use of another agency's UAS which have approved COAs will require prior approval from the Washington Office Assistant Director, Aviation. Aircraft and pilot approval for cooperator UAS will adhere to existing cooperator aircraft and pilot approval policy in (FSM 5712.4) and (FSM 5713.43)
- Cooperators, pilot associations and volunteer aviation groups or individuals may offer to fly unmanned aviation missions (e.g., aerial surveys, fire reconnaissance, and infrared missions) at no charge to the agency most common to fire and all risk incident management teams. We cannot accept these services unless they meet FAA and Forest Service policy
- Under current policy, UAS are considered "mechanized" equipment and consequently cannot take off from, or land in, congressionally designated wilderness areas
- All aircraft (to include UAS) purchase, lease, or acquisition must follow Forest Service procurement policy and procedures

- UAS flights under Forest Service operational control must adhere to Forest Service policy and regulations regarding their use. Guidance can be found in (FSM 5713.7), the (Forest Service National Aviation Safety and Management Plan) and at http://www.fs.fed.us/science-technology/fire/unmanned-aircraft-systems
- Incident Management Teams **must** notify the Forest Service administrator prior to use of UAS
- Personally owned UAS or model aircraft **may not** be used by Federal agencies or their employees for interagency fire and resource (non-incident) use
- Recreational UAS users are not required to have a COA, PASP or agreements to operate on NFS lands
- Commercial UAS operators do not need a PASP or agreement but, depending on use, may need a special use authorization as required

Privacy Policy

The Forest Service maintains policies to address privacy concerns for both employees and the public. These policies will be reviewed to ensure public privacy guidelines associated with recreational UAS use in developed recreational complexes, such as campgrounds, are adequate. Forest Service privacy policies also apply to commercial UAS use authorized under any type of special use authorization. Privacy policies will also be reviewed to ensure commercial use guidelines are adequate. The Forest Service use of UAS does not inherently increase chances of personal privacy being violated, but it does raise the visibility of privacy concerns. Forest Service use of UAS will only be for authorized purposes and will be in alignment with Forest Service policy.

The Forest Service is required to comply with all current applicable Federal privacy laws, regulations, and guidance and must establish and apply data safeguards. Protecting Personally Identifiable Information (PII) is one of the Forest Service's primary focuses. The Forest Service has devised, and adheres to, a Code of Fair Information Privacy Principles the agency's web policy; disclosure of data collection and minimization practices; and independent audits.

3.0 Recreational Use of UAS on National Forest System (NFS) Lands

Recreational or Hobby UAS

Recreational or hobby UAS use is flying for enjoyment and not for work, business purposes, or for compensation or hire. A special use authorization is not required for noncommercial recreational activities or noncommercial activities involving expression of views (36 CFR 251.50). Members of the public may fly UAS for hobby or recreation in many places on NFS lands. However, there are areas on NFS lands where UAS can't be flown as mandated by Federal law and in accordance with FAA guidelines. By law, the areas where UAS can't be operated from include wilderness areas and areas with temporary flight restrictions (TFRs) in place, such as wildfires. The areas where they should not be flown in accordance with FAA safety and Forest Service applicable Federal agency guidelines include:

- Developed sites to include campgrounds, and trailheads, marinas, resorts and ski areas
- Forest Service helibases, airtanker bases, and other aircraft facilities including backcountry airstrips
- Areas where aircraft are performing wildfire suppression or other natural resource management missions, such as aerial surveys for forest health protection
- Flights over or near wildlife including sensitive, threatened and endangered species. This can create stress that may cause significant harm and even death
- Areas closed to any and all entry under (36 CFR 261.53 – Special Closures)

There are two ways for recreational or hobby UAS fliers to operate in the national airspace system in accordance with the law and/or FAA regulations. Each of the two options has specific requirements that the UAS operator must follow. The decision as to which option to follow is up to the individual operator.

Option #1. Fly in accordance with the Special Rule for Model Aircraft (Public Law 112-95 Section 336). Under this rule, operators must:

- Fly for hobby or recreational purposes only
- Follow a community-based set of safety guidelines such as the Academy of Model Aeronautics (AMA)
- Fly the UAS within visual line-of-sight
- Give way to manned aircraft
- Provide prior notification to the airport and air traffic control tower, if one is present, when flying within 5 miles of an airport
- Operators who want to fly in controlled (Class B, C, D, or E airspace) will need air traffic permission. Flying in Class G airspace does not require air traffic permission. Refer to the FAA's Know before you fly website: http://www.faa.gov/tv/?mediaid=997 (figure 1)

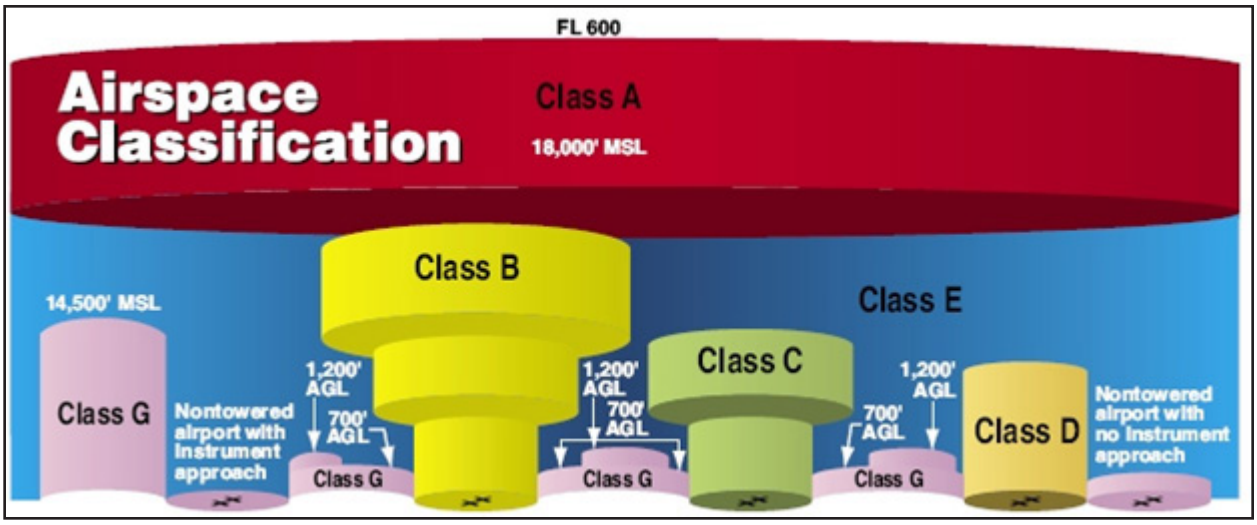

Figure 1—Federal Aviation Administration airspace classification.

- Fly UAS that weigh no more than 55 lbs. unless certified by a community-based organization
- Register the aircraft with the FAA at https://registermyuas.faa.gov/

Option #2. Fly in accordance with the FAA's sUAS (sUAS) Rule (Part 107). This requires operators to:

- Obtain a remote pilot certificate or be under the direct supervision of someone who holds such a certificate
- Register the aircraft as a non-modeler with the FAA at https://registermyuas.faa.gov/
- Follow all the operating rules in accordance with regulation in (Part 107)

Unauthorized UAS Flown by the Public

There have been multiple reports of UAS flown in areas or in situations that pose a concern to safety, for example, near airports. The Forest Service is aware UAS flown by non-participating pilots over project or fire areas is not only a possibility, but has been a reality. With unauthorized UAS flown by the public near agency missions, the potential for increased risk to manned aircraft and personnel on the ground is realized.

For Unauthorized UAS in a Non-Wildland Fire Situation:

a. Communicate to aircraft operations and project personnel, contact local law enforcement, aviation manager, line officer and/or cooperating agency manager. Document concern and check for wilderness area and to see if the activity requires a special use authorization.

b. Any UAS operator can be held accountable if unwilling to cooperate with Forest Service personnel during unauthorized UAS activity as per 36 CFR 261.3: (a) Interfering with a Forest Officer, volunteer, or human resource program enrollee or giving false report to a Forest officer.* The following are prohibited: (a) Threatening, resisting, intimidating, or interfering with any forest officer engaged in or on account of the performance of his official duties in the protection, improvement, or administration of the National Forest System (NFS) is prohibited.

* Forest officer means an employee of the FS (36 CFR 261.2); interfering is prohibited (36 CFR 261.3). Applicable inside as well as outside of Temporary Flight Restriction (TFR) and primarily enforceable on NFS lands. Violation is a class B misdemeanor with penalties of up to $5,000 for an individual; $10,000 for an organization and up to six months in jail. Reference actual CFRs for full regulatory text.

The FAA has developed additional guidance for law enforcement personnel: https://www.faa.gov/uas/resources/law_enforcement/media/FAA_UAS-PO_LEA_Guidance.pdf.

For a Non-Participating UAS Intrusion on Wildland Fire

a. Through a Memorandum, the NWCG has established a standard for mitigating the threat of UAS over wildland fire incidents. A UAS Incursion Protocol for Wildland Firefighters has been developed to assist fire line personnel when an incursion occurs.

b. Safety Alerts:

1. UAS Intrusions Affecting Incident Air Operations.

2. Conflicts with Civilian UAS and Hobbyist/ Remote Controlled Aircraft.

Key Points:

1. UAS are like any other hazard. "If you see something, say something".
2. Fire personnel should report all unauthorized UAS, or drone, activity via the SAFECOM system. http://www.safecom.gov. UAS information (color, size, altitude, flight pattern) should be reported if known. All UAS Incursions should be reported to the FAA using the Reporting Script for UAS Intrusions on Wildfires in appendix D.
3. Unless a TFR is in place, it may be possible for the unmanned aircraft (UA) activity to be "legal". If anticipating extended air operations, requesting a TFR is recommended.
4. If you encounter a person operating a UAS over your incident, a simple request for them to stop should be made. If they fail to comply, law enforcement should be notified. Safety of personnel should be assessed in any operator contact.
5. Dispatch centers should report UAS incursions to the nearest Air Traffic Control Center.
6. Safety of flight should be primary over any fire aircraft locating the operator.

Incident operations personnel make risk-based decisions on every mission. The decision to conduct any mission depends on the assessment of a variety of risk factors including (but not limited to) wind, topography, and visibility. Mitigating risks associated with a UAS intrusion is no different. Every tactical situation is unique and respective plans/procedures may require modification based on those differences. Your number one defense is to be proactive and educate the public on what they don't know. Complimentary to that is establishing procedures designed to manage it when it occurs. Implementing a TFR restricts non-participating aircraft and improves safety for flight crews and other incident personnel.

4.0 Commercial Use of UAS on National Forest System (NFS) Lands for Non-government Benefit

Commercial use of UAS on NFS land may be allowed. Individuals and organizations that want to fly a UAS on NFS lands for business purposes are covered under FAA Civil Operations Part 107 (Non-Governmental). This includes news media, film and video production companies. All commercial UAS operators need to be aware of the potential environmental impacts unmanned aircraft (UA) have on wildlife in NFS lands. Information and data has not yet been developed to fully understand the impacts of UA on wildlife and every precaution should be made by the operator to avoid flying near or over protected, sensitive, threatened and endangered species.

Commercial Use of Small Unmanned Aircraft Systems (sUAS) FAA perspective.

Any unmanned aircraft flying for work, business purposes, or for compensation or hire is considered commercial use. There are three ways to fly a UAS for work, business, or non-recreational reasons:

1. Following the requirements in the sUAS rule (Part 107).
2. Obtain Waiver(s) to the specific aspect of Part 107 to operate outside of ***OR,***
3. Obtain a separate 333 exemption with a COA (the blanket 400' Above Ground Level (AGL) or below COA could be used).

FAA Part 107

The FAA issued a final rule adding Part 107, effective August 29, 2016, integrating civil sUAS into the National Airspace System. Part 107 allows sUAS operations for many different non-hobby and non-recreational purposes without requiring airworthiness certification, exemption, or a Certificate of Waiver or Authorization (COA). These rules address the classification of sUAS, certification of sUAS remote pilots, and sUAS operational limitations. This advisory circular (AC), AC 107-2 provides guidance for conducting sUAS operations in the NAS in accordance with Title 14 of the Code of Federal Regulations (14 CFR).

Under Part 107, civil sUAS operators both private and commercial have two requirements to show FAA compliance:

1. Aircraft registration **and,**
2. Remote Pilot Certificate with a sUAS rating. For a complete list of rules visit FAA rules for operating Unmanned Aircraft.

However, in addition to FAAs Part 107 rules, the Forest Service has its own requirements to be met for commercial vendors operating UAS on NFS lands.

UAS Special Use Authorization

Commercial use of NFS lands requires a special use authorization. For commercial UAS operators conducting their own business not for the Forest Service, but on NFS lands, there is no UAS specific special use authorization (SUA). UAS are tools or equipment of the trade just like canoes, horses, or dozers, and would be authorized under permits such as outfitter/guide or utility line and incorporated into an Operations and Maintenance (O&M) Plan (See FSH 2709.11 CHP 10 - APPLICATION AND AUTHORIZATION PROCESSING, Exhibit 02 Appropriate Use Code Authority). The operator of a UAS for business on NFS lands will need to have a permit for the activity that requires the use of a UAS. So if they are filming and using a UAS to film, they will need a film permit in general. Reference (FSM 2700) and (FSM 2300) for wider discussions on special use.

Here are a few examples when the use of UAS could be incorporated into an O&M Plan:

- A ski resort uses UAS to provide a video service to skiers
- A power company uses UAS to inspect power lines that run through the forest
- A marina uses UAS to capture imagery of new dock and building construction
- An outfitter uses UAS to capture their client's "experience"
- A commercial film crew uses UAS to gather imagery on NFS lands for a movie

Here are a few examples of non-FS people using UAS in their work on NFS lands that **would NOT** be considered *special use*. In these cases, discussions with the appropriate contracting officers, permit administrators, Specialists and Line Officers to understand the overarching limits is warranted. There is policy in place to handle the use of aircraft in these situations:

- A timber sale contractor utilizes UAS to gather information for themselves or monitor a timber sale
- Mining inspections
- Ranchers monitoring sheep allotments
- Contractor monitoring construction of a new district office building

One of the keys is to get your permit administrators and authorizing officers involved early in determining the requirements for any given situation. The following items would show FAA compliance **within** the provisions of Part 107 if a commercial operator wishes to operate a UAS while conducting a special use activity;

1. Aircraft registration.
2. Remote pilot certificate with a sUAS rating.

The following items would show FAA compliance **outside** the provisions of Part 107 if a commercial operator wishes to operate a UAS while conducting a special use activity;

1. Aircraft registration.
2. Remote Pilot certificate with a sUAS rating.
3. Waiver(s) to the specific aspect of Part 107 to operate outside of **OR** a 333 exemption and COA (There is a 400' AGL and below blanket COA that could be used with the separate 333 exemption).

In the event of an accident or serious incident during UAS operations occurring under a special use authorization the authorizing administrator should be notified. The language in the permit identifies the permittees responsibilities for reporting any mishaps. Permit holders must reference the issued permit for additional responsibilities regarding legal requirements to recover hazardous material, equipment retrieval and liability after a UAS mishap.

5.0 Forest Service use of UAS for Government Benefit

Forest Service employees who utilize UAS for the benefit of the Agency should be aware of the policy governing UAS to ensure safe integration within regulatory bounds. The possibilities of unmanned aircraft will continue to expand and the agency will continue to explore the potential for UAS to provide safer, more cost effective methods of caring for the land and serving the people.

Forest Service policy, (FSM 5713.7) states UAS must be considered the same as manned aircraft, in terms of acquisition, approval and carding of pilots and aircraft, inspections, maintenance, avionics, training, and operations. In the context of this guide the terms Public Use aircraft and Government aircraft are the same.

Government Use of UAS FAA Perspective

Any Unmanned Aircraft owned by the United States Government, contracted or leased by the government, state/local agencies and qualifying universities are considered public use. The FAA is tasked with ensuring safety in the National Airspace System (NAS). Airspace regulations are in place for Federal agencies who conduct aviation under public aircraft operations (PAO). FAA regulations require Federal agencies to have airspace approval through their Certificate of Waiver/Authorization (COA) process.

Certificate of Waiver or Authorization (COA)

For public agencies such as the Forest Service and DOI the FAA issues a Certificate of Waiver or Authorization (COA) that permits public agencies and organizations to operate a particular aircraft, for a particular purpose, in a particular area.

For UAS operating as public aircraft operations, the authority is the COA. These COA types include:

1. Standard COA.
2. Blanket COA.
3. Class D/G Notifications Memorandum of Agreement.

The COA allows an operator to use a defined block of airspace and includes special safety provisions unique to the proposed operation. COAs usually are issued for a specific period—up to two years in many cases. In order to obtain a COA, an operator must demonstrate that the unmanned aircraft (UA) is airworthy and would not be a threat to the public or to other aircraft. The COAs enable the Forest Service to fly UA in a certain area for multiple flights without needing FAA approval for each individual flight within that area. Therefore, once the Forest Service obtains a COA, it can operate a UA multiple times within a certain geographic area. The FAA works with agencies to develop specific conditions to ensure the safety of operations, such as limiting use to low population areas. For Federal fires, the DOI or the Forest Service would be the lead agency for obtaining a COA depending on the jurisdiction of the fire. In the event of a multi-jurisdiction incident the DOI UAS specialist, the USFS UAS advisory group chair, state or local representative will determine who should obtain the COA.

Although (Part 107) has provisions that allow public aircraft operations without a COA, Forest Service policy requires one to be in place.

Memorandum of Agreement (MOA)

The first Memorandum of Agreement (MOA) between the Forest Service and the Federal Aviation Administration (FAA) sets forth provisions that will allow Forest Service-operated sUAS increased access to Class G airspace (at or below 1200 ft. AGL) for government aircraft operations. The purpose of the MOA is to allow the Forest Service to access the National Airspace System (NAS) through the COA via Notification process for sUAS operations. The policies, procedures, and operations prescribed in the MOA apply to Forest Service sUAS (55 lbs. or less) operations in Class G airspace, authorized through COA via Notification procedures. This is no set expiration date for this MOA. It will be reviewed annually by both agencies. Once the agreement is fully in place, requests for utilization of the MOA should be submitted to the National UAS Program Manager in coordination with the appropriate Regional Aviation Officer.

The second MOA will allow the Forest Service increased access to airspace within an established TFR. This agreement includes a provision for beyond visual line of sight operations under a Special Governmental Interest (SGI) Addendum (formerly called Emergency COAs). Once this agreement is fully in place, requests for utilization of the MOA should be submitted to the National UAS Program Manager in coordination with the appropriate Regional Aviation Officer and Incident Management Team.

*Although the MOAs might be in place, there are FAA requirements to be met as well as Forest Service policy. The National UAS Program Manager is the designated point of contact for all Forest Service COAs, including COA by notification and SGIs. Forest Service employees need increased awareness when flying UAS near special use areas such as a Military Operating Area and Military Training Routes.

Acquisition of UAS

As aircraft, UAS must be contracted, leased or purchased under Federal Acquisition Regulation standards. The Forest Service uses the commercial industry for a vast majority of our aviation services, with some cooperator and Forest Service fleet aircraft for specialized missions. This balance promotes commerce and innovation while providing cost efficiencies to the Forest Service. The expectation is that UAS will follow suit with the majority of UAS utilization coming from commercial industry, with some cooperator and fleet UAS for specialized missions. The Forest Service is working to develop an overarching Aviation Business Case for sUAS. When in place, local units with a proper justification will be able to work with the Washington Office Fire and Aviation Management staff on purchasing and contracting sUAS.

The following is referenced from (FSM 5718.1) Aircraft Acquisition:

All decisions to acquire or lease aircraft (including UAS) will be approved by the Washington Office, Director of Fire and Aviation Management.

1. A completed Office of Management and Budget, (OMB Circular A-11, Part 7), Aviation Business Case will be submitted to the Director, FAM, for any new aircraft acquisition or investments (including contract and leasing). The Capital Programming Guide, V2.0, Supplement to: OMB Circular A-11, Part 7 or the Aircraft Capital Asset Planning Desk Guide, may be used as a guide.
2. Aviation Business Cases will be reviewed annually by the Washington Office P&BA as part of the annual budget cycle.
3. Aviation Business Cases for all Forest Service aircraft must be formally re-validated every five years by the unit responsible for their operation and use and re-submitted to the Director, FAM for approval.

Consult with your Unit Aviation Officer or the Regional Aviation Staff to assist in selecting and ordering the aircraft best suited for the mission.

Contracting UAS for Government Benefit

The FAA established an avenue for commercial UAS operators to become certified, which will allow the Forest Service to contract for UAS services. The Aviation Contracting Desk Reference provides information on the process for contracting all aircraft, including UAS. The appropriate Regional Aviation Officer should be coordinated with in assessing project requirements and contract specifications.

Training and Certifications for Employee Pilots

The Forest Service has had a history of using FAA certifications as a baseline and increasing skills and standards through additional training and experience for pilot certification. The same philosophy can be expected for employee pilots to operate sUAS. Current policy makes no distinction between unmanned aircraft systems pilots and manned aircraft pilots. Until policy can be updated, anyone who wishes to fly any sUAS for the Forest Service must meet the pilot requirement found in (FSH 5709.16). Pilots must undergo a review of all operator credentials and may require a flight evaluation.

All aircraft and pilots employed by the USFS **shall** be approved by the WO Fire and Aviation staff in accordance with Forest Service policy. Employee pilot training and certification standards appropriate for sUAS will be developed through coordination with interagency partners, industry research, SMS principles and agency discussion. The UAS Desk Guide will be updated once new pilot training and certification standards can be established in policy.

The FAA requirement for operating a sUAS is the following:

- A person operating a sUAS must either hold a remote pilot airman certificate with a sUAS rating or be under the direct supervision of a person who does hold a remote pilot certificate (remote pilot in command)
- Pass an initial aeronautical knowledge test at an FAA-approved knowledge testing center; or Hold a part 61 pilot certificate other than student pilot, and complete a flight review within the previous 24 months, and complete a sUAS online training course provided by the FAA

- Be vetted by the Transportation Security Administration. See FAA's website on How to Become a Pilot
- Be at least 16 years old

UAS Accident and Mishap Reporting

Forest Service requirements:

As the Forest Service continues to work towards safe integration of UAS technology we must recognize and mitigate the inherent risk associated with UAS operations. Even though physical injury and impact damage will be reduced due to the small size of a UA it is important to follow up with any accident involving sUAS.

Any UAS accident or serious incident occurring on NFS lands under the operational control of the Forest Service must be reported to the Regional Aviation Safety Manager, local Aviation Officer, and Regional Aviation Maintenance Inspector prior to the mission continuing. Additionally, these events should be reported using the SAFECOM (http://www.safecom.gov) reporting system.

FAA Requirements for UAS Accident Reporting:

The remote pilot in command of the small UAS is required to report an accident to the FAA within 10 days if it results in at least serious injury to any person or any loss of consciousness, or if it causes damage to any property (other than the UAS) in excess of $500 to repair or replace the property (whichever is lower).

Reference (AC 107-2) for reporting information to the nearest FAA Regional Operations Center (table 1).

The RASM has the responsibility for reporting any serious aircraft accident to the National Transportation Safety Board (NTSB). In addition to the report submitted to the FAAs Regional Operations Center, and in accordance with the criteria established by the NTSB, certain sUAS accidents must also be reported to the NTSB. For more information, visit http://www.ntsb.gov.

Table 1—FAA Regional Operations Centers (USDT, FAA 2016)

Telephone List for the Federal Aviation Administration Regional Operations Centers (USDT, FAA 2016)	
Location where accident occurred:	**Telephone:**
DC, DE, MD, NJ, NY, PA, WV, and VA	404-305-5150
AL, CT, FL, GA, KY, MA, ME, MS, NC, NH, PR, RI, SC, TN, VI, and VT	404-305-5156
AK, AS, AZ, CA, CO, GU, HI, ID, MP, MT, NV, OR, UT, WA, and WY	425-227-1999
AR, IA, IL, IN, KS, LA, MI, MN, MO, ND, NE, NM, OH, OK, SD, TX, and WI	817-222-5006

6.0 Cooperator (State or other Federal Agency) Owned UAS on NFS Lands

The Forest Service will continue to work with cooperators towards assessing and leveraging the value of UAS types. Utilizing the authorities of our cooperators has provided the Forest Service with more efficient processes to move aircraft to critical fire management activities. The benefit to the Forest Service through UAS technology is not limited to the wildfire environment and the agency is moving forward with integrating into other disciplines. Examples of other cooperator owned unmanned aircraft include the National Guard, Army Core of Engineers, Customs and Border Protection, NASA and local and state universities. These aircraft may be used to conduct missions for the Forest Service provided the following criteria are met:

- The UAS Request form has been submitted to the Forest/Unit Aviation Officer. (See Appendix E)
- Cooperator agreements are required for all aviation services provided to the Forest Service by other agencies, partners and cooperators. Agreements must specify approval processes, levels of operational standards and requirements, and costs and safety standards
- A Project Aviation Safety Plan has been developed and signed by the local line officer
- Until a National Operations Plan is in place, a Project operating plan has been developed and approved
- Only FS approved cooperator UAS aircraft and pilots shall be approved by the Washington office or RAO
- See (FSM 5700) for additional Forest Service policy pertaining to cooperator UAS use

University Use of UAS on NFS Lands

Partnerships between universities and the Forest Service continue efforts to expand and enhance education and research opportunities. UAS could be used to gather a wide variety of data and images for studies, such as forest canopy condition, movements of migratory birds and bats, plant community distribution, smoke plume measurements, and ash and soil conditions. When a university (or other educational institution) proposes to collaborate with the agency on a UAS project over NFS lands:

- Ensure there is an agreement in place between the University (or other educational institution) and the Forest
- There must be a COA in place or the project must meet Part 107 requirements (remote pilot certificate and aircraft registration)
- If Universities are in collaboration or in partnership with the Forest Service for government benefit, then no special use authorization is needed
- If no collaboration or partnership exists between the University and the Forest Service then a special use authorization will be required

Airspace De-Confliction

The word 'de-conflict' is not in the dictionary. The prefix means "to free from" (e.g. decontaminate) or to remove (e.g. debug, declassify). Airspace de-confliction is a term used to describe the process of reducing the risk of a near midair collision or TFR intrusion by sharing information regarding flight activity with Department of Defence military units, general aviation and other agency aviation programs. Airspace de-confliction can occur for both emergency and non-emergency aviation activities.

Cooperators utilizing UAS will need to de-conflict airspace use with local dispatch centers prior to the project or mission taking place to avoid mid-air collisions with other aircraft.

Due to the increasing number of recreational and commercial UAS, Dispatch centers should evaluate requesting a Temporary Flight Restriction (TFR) whenever aircraft are responding to wildfires. UAS intrusions over wildland fire shall be reported to the Forest/Unit Aviation Officer immediately. The Aviation Officer or Dispatch Center shall call the local ARTCC to report the intrusion using the Interagency Reporting Form in appendix D.

Reference the Interagency Airspace Coordination Guide for further information on airspace de-confliction.

7.0 Use of UAS in Congressionally Designated Wilderness Areas and Wilderness Study Areas on NFS Lands

Government use of UAS in Wilderness

1. Prohibited if operator or device are on the ground within Wilderness boundaries, otherwise discouraged (FSM 2326.03 (3) and not recommended.

2. Administrative use requests require a minimum requirements analysis because UAS are considered to be an aircraft under FAA definitions and therefore a prohibited use in Wilderness. Additionally UAS are considered both "motorized equipment" and "mechanical transport" prohibited uses in section 4 (c) of the Wilderness Act. A Minimum Requirement Analysis using the Minimum Requirements Decision Guide (MRDG) is required. This tool is developed by the unit wilderness manager along with the proponent and signed by the Regional Forester (or Forest Supervisor if authority has been delegated in writing). MRDG tool is available on line and free training is also available at www.wilderness.net/MRA. This is used to help the Regional Forester determine whether or not an action is necessary to the administration of the area as wilderness (Step 1) AND, if so, what is the minimum activity or means of addressing the situation (Step 2).

Commercial use of UAS in Wilderness

1. Prohibited.

2. Section 4 (c) of the Wilderness Act, and subject to existing private rights, there shall be no commercial enterprise and no permanent road within any wilderness area designated by this Act and except as necessary to meet minimum requirements for the administration of the area for the purpose of the Act (including measures required in emergencies involving the health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area."

3. If it is suggested that a UAS is necessary to meet minimum requirements for the administration of the area for the purpose of the Act, then follow paragraph number (2) in Government use of UAS in Wilderness above, an MRDG must be signed by Regional Forester or Forest Supervisor if delegated.

Recreational use of UAS in Wilderness

1. Prohibited.

2. UAS are considered to be aircraft according to the FAA and both "motorized equipment" and "mechanical transport" under Section 4(c) of the Wilderness Act. As such they cannot take off from, land in, or be operated from congressionally designated Wilderness Areas.

Reference (The Wilderness Act P.L. 88-577), (36 CFR 261), (36 CFR 293) and (FSM 2320 – Wilderness management) for further policy guidance specific to designated wilderness on NFS lands. Below are specific policy excerpts covering UAS operations in the wilderness.

Forest Service Manual (FSM) 2326.03:

Discourage flights over wilderness within 2000 feet of the ground surface, except in emergencies or for essential military missions. (The Federal Aviation Administration (FAA) has agreed to and the National Oceanic and Atmospheric Administration (NOAA) has posted, for the FAA, a 2,000 foot over terrain flight advisory on appropriate aeronautical charts. Specific legislative provisions regarding overflight pertain to certain wildernesses.) Cooperate with the FAA, NOAA, military authorities, and with local pilots to promote compliance with the 2,000 foot limit, to keep aeronautical charts current, and to reduce low level flight.

The Wilderness Act (P.L. 88-577):

In summary, wilderness areas must be administered to provide for the preservation of their wilderness character, including undeveloped qualities and opportunities for solitude or a primitive and unconfined type of recreation. Section 2 (a) of the Wilderness Act identifies a National Wilderness Preservation System policy "to assure that increasing population, accompanied by expanding settlement and growing mechanization does not occupy and modify all areas." Section 4 (c) of the Wilderness Act provides, with exceptions, that "there shall be...no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area."

The Code of Federal Regulations (CFR):

Regulations specific to the prohibitions within wilderness areas are provided at 36 CFR 261.18:

"The following are prohibited in a National Forest Wilderness:

a. Possessing or using a motor vehicle, motorboat or motorized equipment except as authorized by Federal Law or regulation.

b. Possessing or using a hang glider or bicycle.

c. Landing of aircraft, or dropping or picking up of any material, supplies, or person by means of aircraft, including a helicopter."

FSM 2326 identifies the appropriate level of line officer authorized to make decisions on the use of motorized equipment or mechanical transport, and the conditions under which such use may be approved.

8.0 Data and Information Technology (IT) Management

Data and IT Management

Current regulatory guidance informs the acquisition and management of IT assets and the governance of data collected. Contractors will not retain data derived from any UAS missions. As our technical infrastructure grows to support full integration of UAS, revisions and additional protocols will be introduced. This includes new or revised policies, regulations, processes, and procedures. Special consideration is being given to address privacy concerns and the practical management of personal and sensitive information gathered through UAS operations. Aviation regulations governing airspace, certifications, acquisition, reporting and tracking will be adhered to when collecting data. Units wishing to utilize UAS must have a plan in place for how they are going to collect, process, and disseminate data gathered by a UAS.

The Geospatial Management Organization (GMO) has a portal (https://ems-team.usda.gov/sites/fs-gstc-gcp/SitePages/Home.aspx) intended for Forest Service users to facilitate conversations and to share ideas about geospatial and related information management/ IT technology issues.

The Forest Service will not purchase, lease or contract for any UAS platform where the data is not secure and can be controlled by the agency. Examples of data security include telemetry data of the aircraft, control link between pilot and aircraft, imagery captured during flight and raw data not included in the final product. Coordination with the Chief Information Office (CIO) should occur to ensure appropriate data security and data regulations are met.

9.0 Useful Links

Forest Service

Interagency fire use of UAS: 2016 Interagency Standards for Fire and Aviation Operations (Redbook), Chapter 16

UAS Forest Service policy: http://www.fs.fed.us/science-technology/fire/unmanned-aircraft-systems

Tools and policy guidance: http://fsweb.wo.fs.fed.us/fire/fam/aviation/uas/index.htm

Placer Bridge Project video: https://www.youtube.com/watch?v=lxM7deKSkgc

US Department of Interior/ BLM/ NPS

Information on DOI's UAS policy, privacy, agreements, training and contacts: https://www.doi.gov/aviation/uas

Information on BLM's UAS policy: http://www.blm.gov/nifc/st/en/prog/fire/Aviation/uas.html

Information on NPS's UAS policy: https://www.nps.gov/fire/aviation/safety/unmanned-aerial-systems.cfm

Federal Aviation Administration (FAA)

Information on UAS: https://www.faa.gov/uas/

Information on current TFRs: http://tfr.faa.gov/tfr2/list.html

FAA Safety Hotline: http://www.faa.gov/contact/safety_hotline or call 1-866-835-5322, Option 4

Public Education Campaigns

External FS website for the public: http://www.fs.fed.us/fire/aviation/uas.html

Tips for recreational UAS users: http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3845678.pdf

Tips for Responsible UAS use: http://ordvac.com/soro/library/Aviation/UAS/TipsforResponsibleUse.pdf

BLM public outreach and PSA: http://www.nifc.gov/drones/

FAA's "Know Before you Fly": http://www.faa.gov/tv/?mediaid=997

Protect the wildlife and environment: http://www.fs.fed.us/science-technology/fire/unmanned-aircraft-systems/responsible-use

10.0 Acronyms

AGL—Above Ground Level

AMA—Academy of Model Aeronautics

BLM—Bureau of Land Management

COA—Certificate of Authorization

DOI—Department of Interior

FAA—Federal Aviation Administration

MOA—Memorandum of Agreement

MOU—Memorandum of Understanding

NAS—National Airspace System

NASMP—National Aviation Safety Management Plan

NFS—National Forest System Lands

NIFC—National Interagency Fire Center

PAO—Public Aircraft Operations

RAO—Regional Aviation Officer

RASM—Regional Aviation Safety Manager

SGI—Special Government Interest

sUAS—Small Unmanned Aircraft System

SUA—Special Use Authorization

TFR—Temporary Flight Restriction

UA—Unmanned Aircraft

UAO – Unit Aviation Officer

UAS—Unmanned Aircraft System

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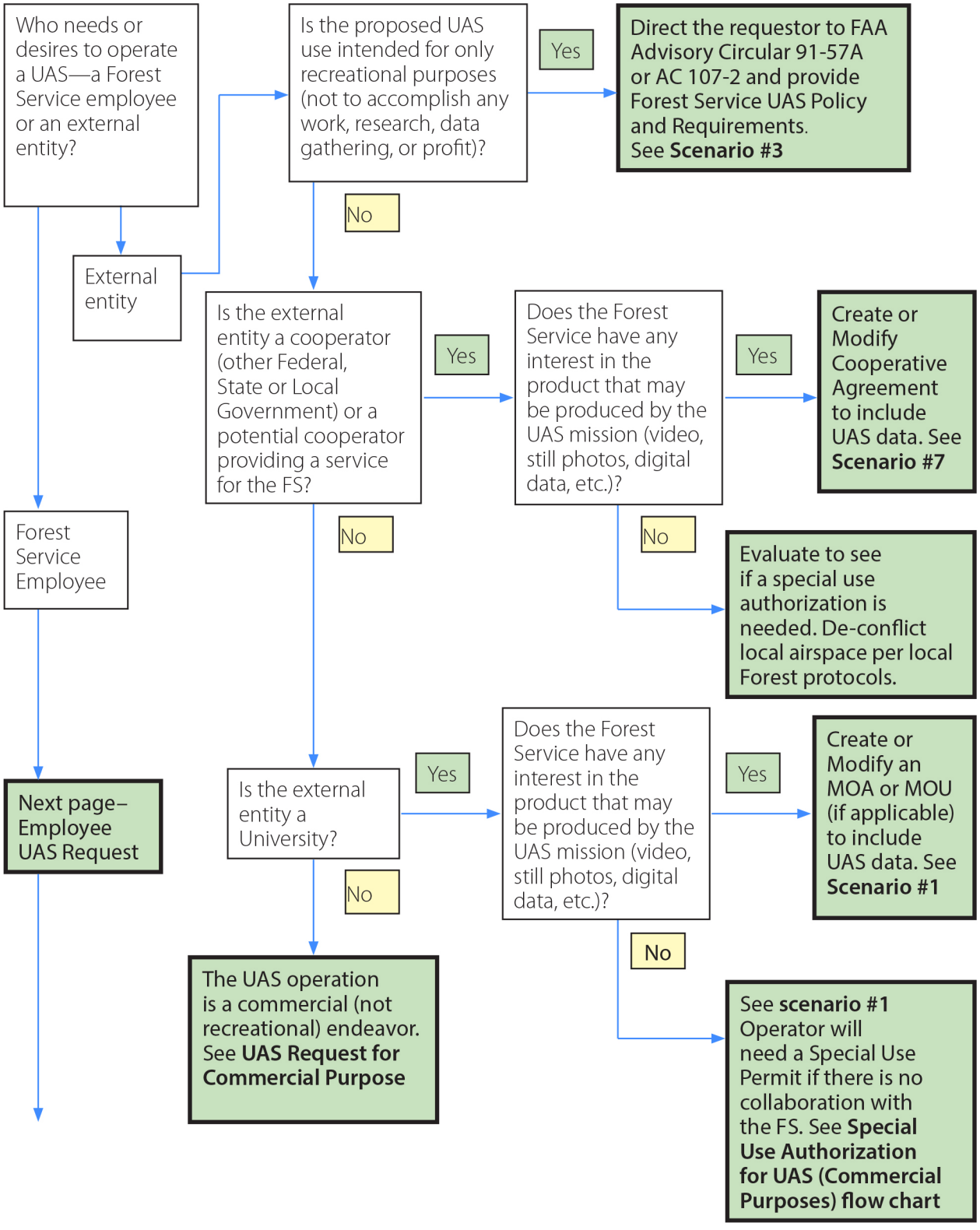
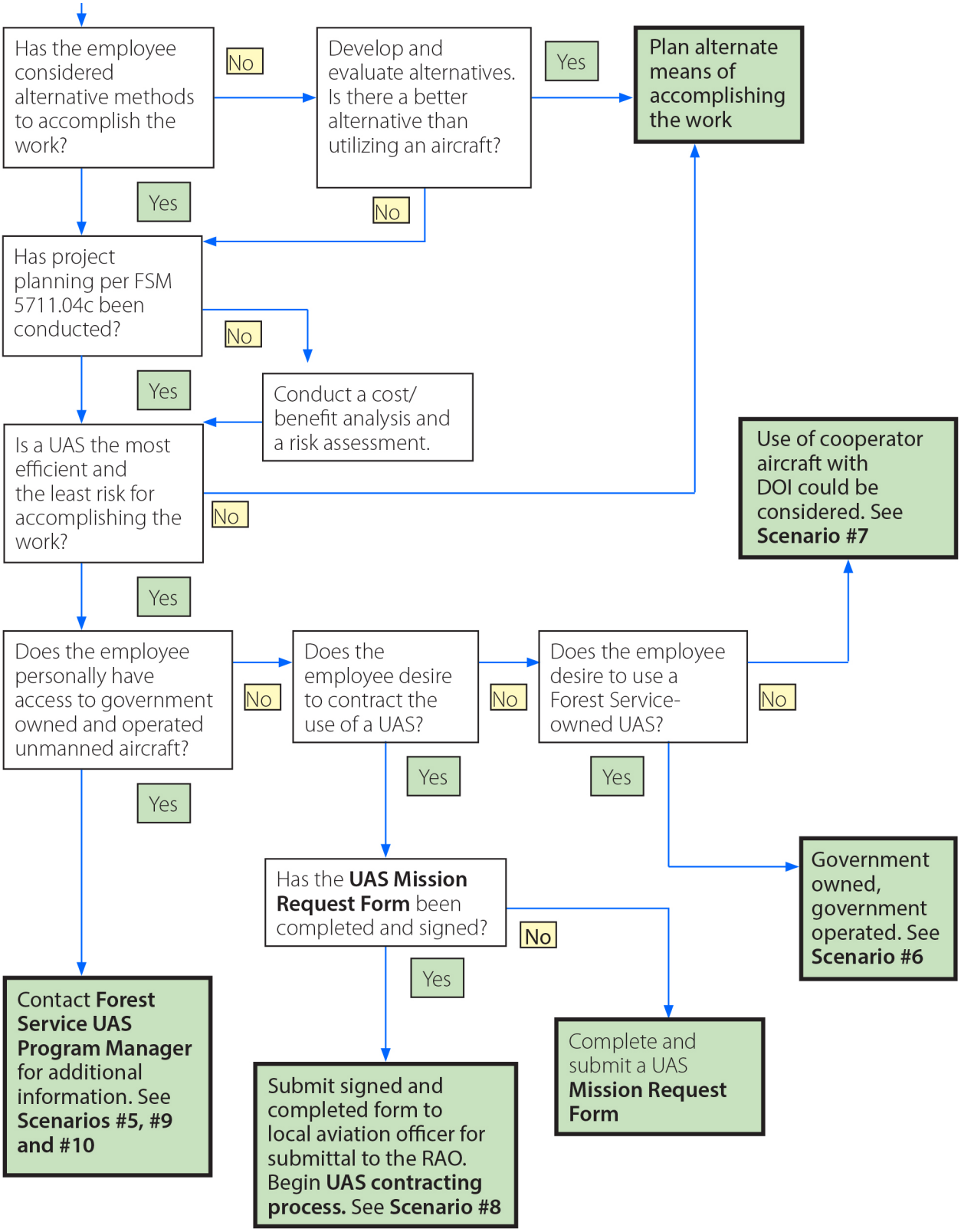
Appendix A: UAS Request Process Flow Chart

A UAS Request Process Flow Chart follows which direct the user to various UAS scenarios containing website links and additional information. Enter the Flow Chart at the upper left of page 1 and answer the question "Who needs or desires to operate a UAS – A Forest Service employee or an external entity?" Follow the path, answering each question in turn, until you reach a terminus and a scenario reference. The scenario references are located on the following pages after the last flow chart. Use the website links contained within the scenario reference for further information relevant to that given terminus and scenario.

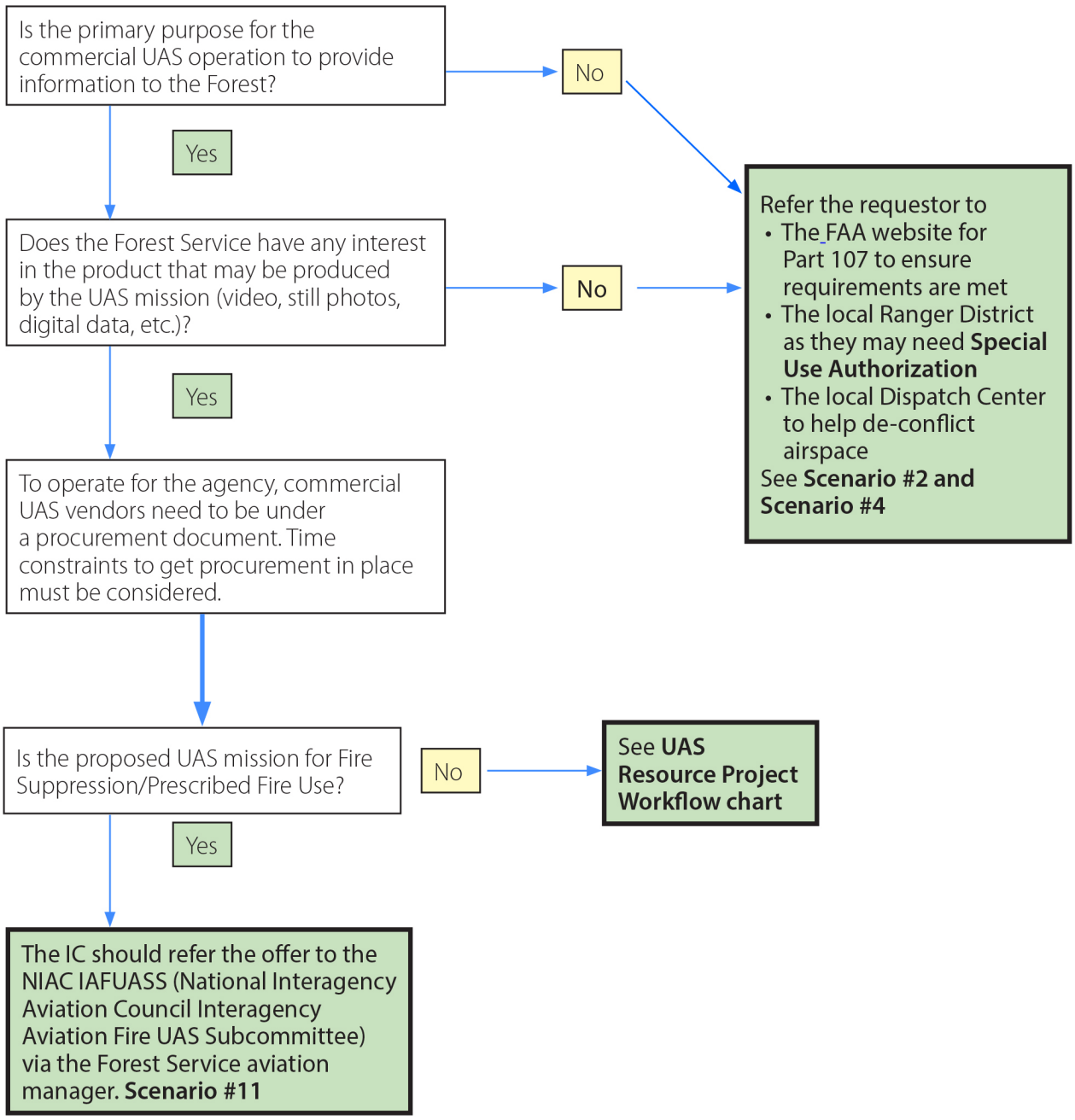
UAS Request Processing Flow



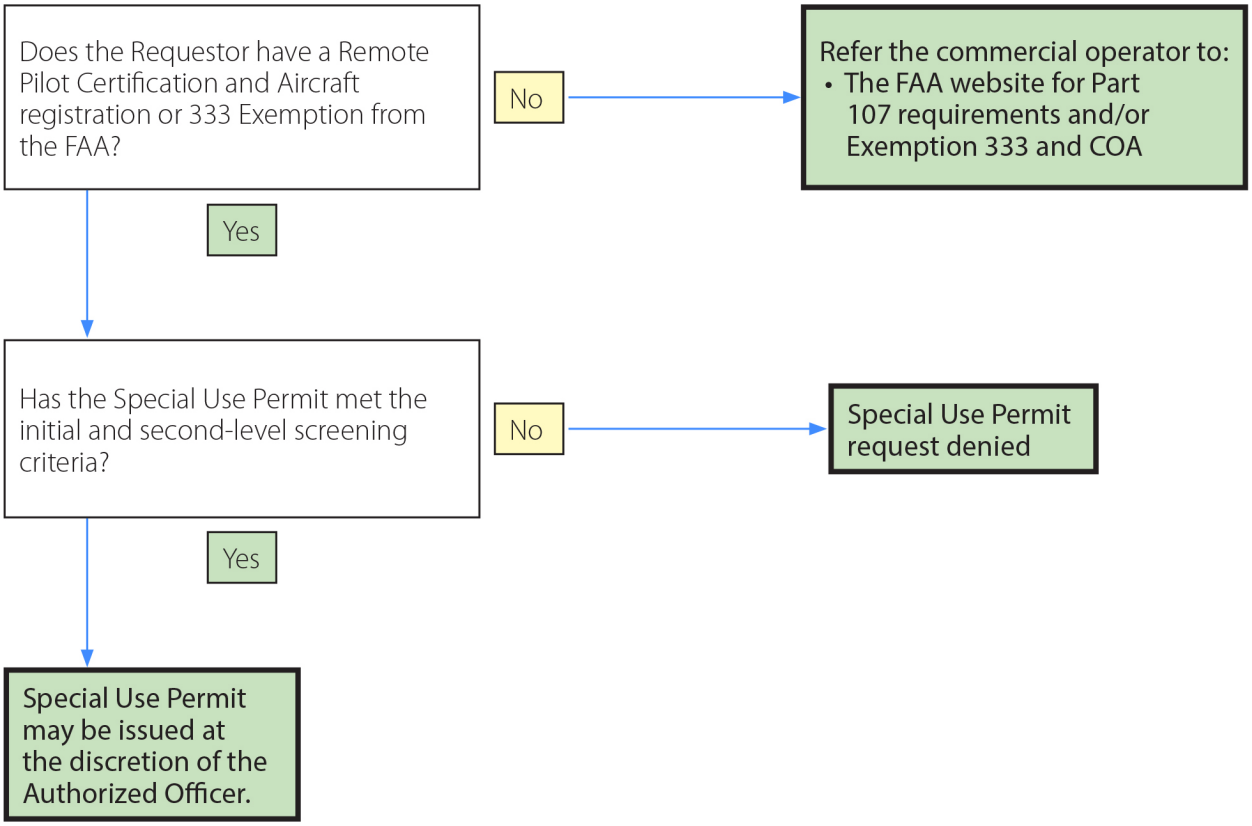
Employee UAS Request



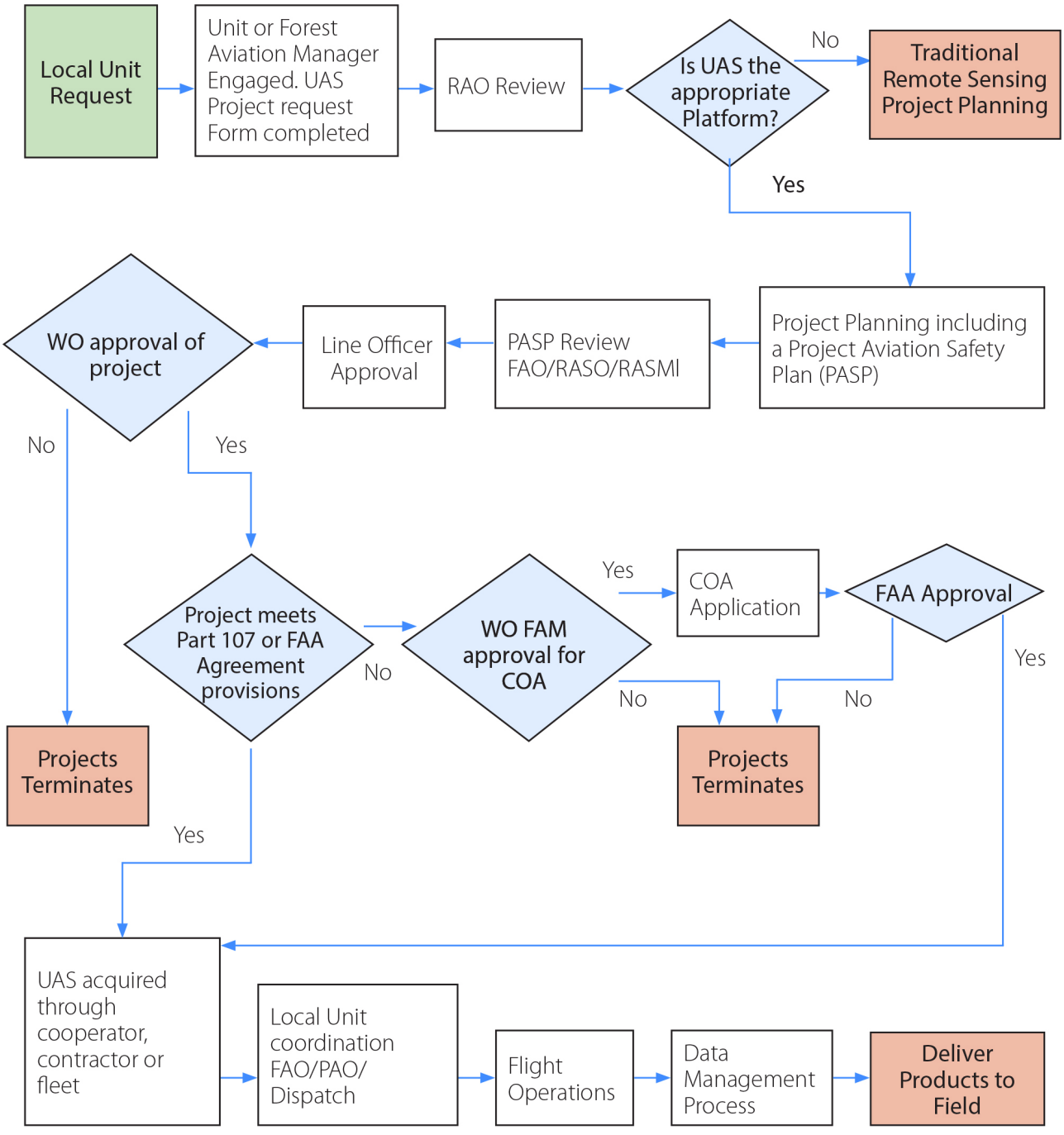
UAS Request for Commercial Purpose



Special Use Authorization for UAS (Commercial Purposes)



UAS Resource Project Flow



UAS Request Desk Guide Scenarios

Scenario #1

A university and the Forest Service have an agreement in place to conduct tree health monitoring through a Forest Service grant with the data collected from the project to be used by the Forest Service. The university calls the unit manager and proposes to conduct the monitoring with a UAS. They have a COA in place and they own their own UAS.

Forest Service outcome—This is allowed if supported by the existing Agreement referenced in this scenario to ensure it addresses the Forest Service/departmental requirements of a UAS mission and defines/declares that the University shall maintain operational control. A special use authorization is not required since the activity is controlled by the Forest Service and there is a COA in place.

Scenario #2

Someone wants to conduct a commercial film project over National Forest System Land that involves a UAS. The Forest Service has no involvement in the operation.

Forest Service outcome—A special use authorization would be required. The UAS operator would submit their request through the permit administrator. The company would need to provide documentation that all FAA requirements are met before a film permit is issued. The film company utilizing UAS may operate under Part 107 after August 29, 2016 or continue to operate under pre-existing 333 Exemptions or COA's established prior to August 29, 2016 up to their expiration date. Refer the requestor to the FAA website for Part 107 to ensure requirements are met.

Scenario #3

A private individual contacts the Unit Manager with a request to operate a recreational/ hobby/personal use UAS on National Forest System Land.

Forest Service outcome—This is allowed under recreational use or under Part 107 – see chapter 3.0 Recreational use of UAS. Direct the requestor to FAA Advisory Circular 91-57A and provide Forest Service UAS policy and requirements.

Scenario #4

A company which has a contract with the Forest Service to conduct land reclamation on National Forest System land, wants to use a recreational UAS to gather data on the site to accomplish the contract.

Forest Service outcome—The use of UAS by this contractor would need to be addressed in the contract for land reclamation as would any use of aircraft. The use of UAS would need to be reviewed and authorized by the Regional Aviation Officer. Refer the requestor to the FAA website for Part 107 to ensure requirements are met.

Scenario #5

A Forest Service employee has a personally owned UAS which they want to use in their job. They do not want payment or reimbursement for the use of their UAS.

Forest Service outcome—This does not meet the definition of Recreational Purpose and therefore the operation cannot be conducted under FAA recreational UAS standards. Under current Forest Service policy, this operation is not authorized. Contact Forest Service UAS Program Manager for additional information.

Scenario #6

A Forest Service employee needs to conduct an aerial inspection for Forest Service use. A Forest Service-owned UAS is available.

Forest Service outcome—Government owned, government operated is not currently available—use of cooperator aircraft with DOI could be considered.

Scenario #7

A Forest Service employee needs to conduct an aerial inspection for Forest Service use. A UAS is available from a government cooperator.

Forest Service outcome—An agreement needs to be in place to use the government cooperator's aircraft and pilot. Proper planning and approvals internal to the Forest Service will be required prior to implementation.

Scenario #8

A Forest Service employee wants to set up a contract to gather data with a contractor owned and operated UAS.

Forest Service outcome—Once the UAS Aviation Business Case is finalized, the aircraft contracting process should be followed as provided in the Aviation Contracting Desk Reference document. Submit signed and completed Mission Request Form to local aviation officer for submittal to the RAO.

Scenario #9

A Forest Service employee wants to purchase (buy, possess, and hold title to) a UAS with Forest Service funds to use in conducting their job.

Forest Service outcome—Once the UAS Aviation Business Case is finalized, employees need to contact their Regional Aviation Officer to begin the discussion. A process for approving and purchasing UAS at the local levels has not been developed, but is expected before the ABC is finalized. Contact Forest Service UAS Program Manager for additional information.

Scenario #10

A Forest Service employee has purchased (bought, possesses, and holds title to) a UAS with Forest Service funds to use in conducting their job.

Forest Service outcome—All UAS purchases must be approved by the Washington Office, Director of Fire and Aviation Management. Refer to Acquisition of UAS. Return UAS immediately for a refund. If this is not possible, contact your Regional Aviation Officer (RAO/SAM) for procedures to sequester the UAS. Do not operate the UAS. Contact Forest Service UAS Program Manager for additional information.

Scenario #11

An incident commander is approached by a UAS operator offering to use a UAS to gather fire information. The information may be useful in managing the fire.

Forest Service outcome—The IC should refer the offer to the UAS NIAC subcommittee (National Interagency Aviation Council UAS Subcommittee) via the Forest Service aviation manager.

Appendix B: Contacts

Washington Office Contacts

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Southwest Region (R3):

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Cell (414) 208-7570

Appendix C: UAS Classifications

Generally Accepted UAS Classifications

Classification of UAS platforms for civil scientific uses has generally followed existing military descriptions of the platforms based upon characteristics such as size, flight endurance, and capabilities (figure 2 and 3). The generally accepted class nomenclature in the civilian realm is as follows:

MAV (Micro (or Miniature) or NAV (Nano) Air Vehicles)

These are so called because of their size, which typically enables military versions of these aircraft to be transported within individual soldiers' backpacks. These aircraft tend to operate at very low altitudes <330 m (1082 ft.), with size limitations on battery capacity leading to short flight times in the vicinity of ca. 5–30 minutes.

VTOL (Vertical Take-Off & Landing)

These aircraft require no takeoff or landing run, and are therefore typically chosen in situations where limitations of terrain require this specialized capability. Aircraft of this type operate at varying altitudes depending on their mission profile, but predominantly fly at low altitudes. High power requirements for hovering flight limit the flight durations for VTOLs, except in the largest sizes where increased lifting capabilities accommodate large fuel capacity.

LASE (Low Altitude, Short-Endurance)

These systems, also known as sUAS, small unmanned aircraft systems, also obviate the need for runways with aircraft optimized for easy field deployment/recovery and transport. The aircraft component of these systems typically weighs *ca*. 2–5 kg (4.5-11 lbs.), with wingspans <3 m (10 ft.) to enable launching from miniature catapult systems, or by hand. Compromises between weight and capability tend to reduce endurance and communication ranges to 1–2 hours and within a few miles of ground stations.

LASE Close

This category describes sUAS whose aircraft do require runways, but whose larger size and weight confer increased capabilities. These systems operate at up to ca. 1,500 m (5000 ft.) altitude and may remain aloft for multiple hours, although these limits have been substantially exceeded by specially-modified "record-breaker" aircraft.

LALE (Low Altitude, Long Endurance)

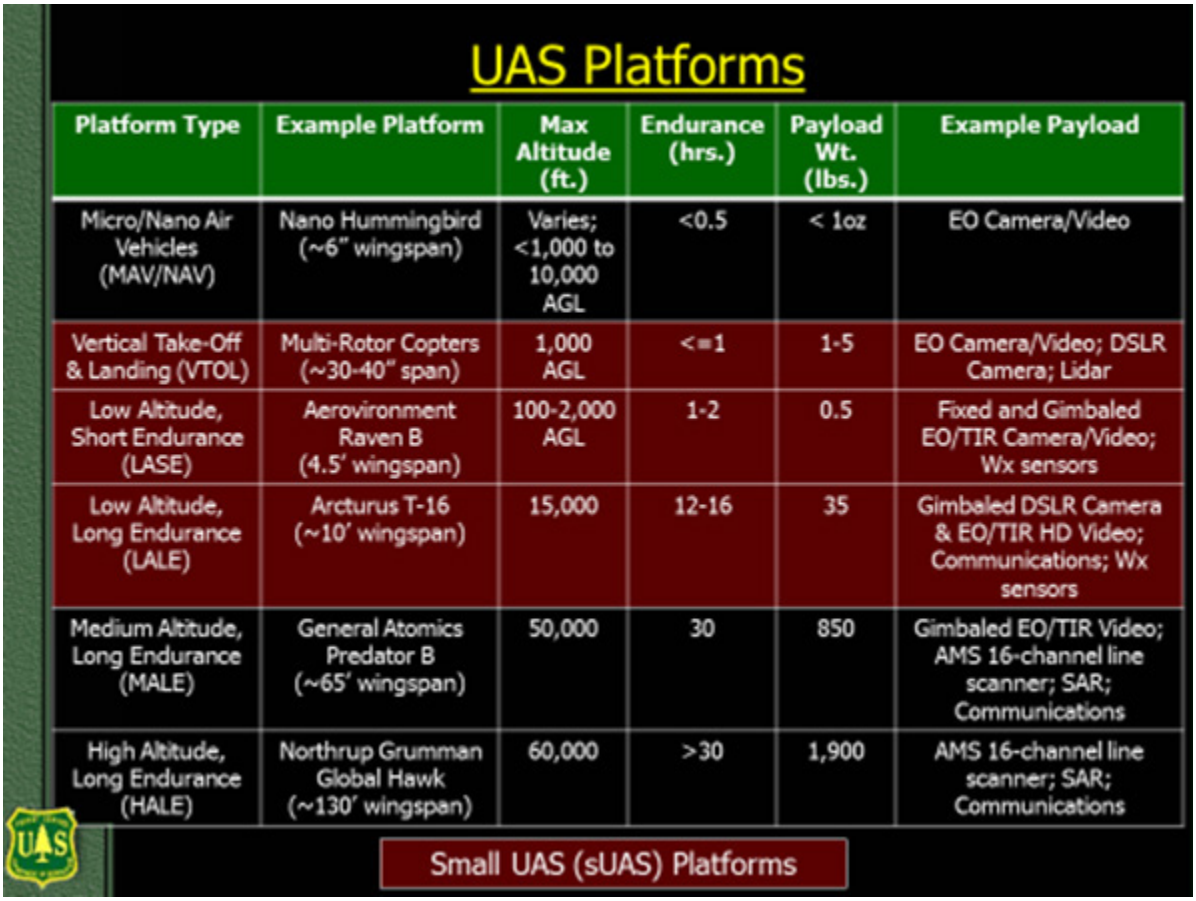
Typically at the upper end of the "sUAS" weight designation by the United States Federal Aviation Administration (FAA; see below), these UAS may carry payloads of several pounds at altitudes of a few thousand feet for extended periods.

MALE (Medium Altitude, Long Endurance)

These aircraft are typically much larger than low-altitude classes of UAVs, operating at altitudes up to *ca*. 9,000 m (29,520 ft.) on flights hundreds of miles from their ground stations lasting many hours.

HALE (High Altitude, Long Endurance)

These are the largest and most complex of the UAS, with aircraft larger than many general-aviation manned aircraft. These UAVs may fly at altitudes of 20,000 m (65,600 ft.) or more on missions that extend thousands of miles. Some HALE aircraft have flight durations over 30 hours, and have set records for altitude and flight duration.



UAS Platforms

Platform Type	Example Platform	Max Altitude (ft.)	Endurance (hrs.)	Payload Wt. (lbs.)	Example Payload
Micro/Nano Air Vehicles (MAV/NAV)	Nano Hummingbird (~6" wingspan)	Varies; <1,000 to 10,000 AGL	<0.5	< 1oz	EO Camera/Video
Vertical Take-Off & Landing (VTOL)	Multi-Rotor Copters (~30-40" span)	1,000 AGL	<=1	1-5	EO Camera/Video; DSLR Camera; Lidar
Low Altitude, Short Endurance (LASE)	Aerovironment Raven B (4.5' wingspan)	100-2,000 AGL	1-2	0.5	Fixed and Gimbaled EO/TIR Camera/Video; Wx sensors
Low Altitude, Long Endurance (LALE)	Arcturus T-16 (~10' wingspan)	15,000	12-16	35	Gimbaled DSLR Camera & EO/TIR HD Video; Communications; Wx sensors
Medium Altitude, Long Endurance (MALE)	General Atomics Predator B (~65' wingspan)	50,000	30	850	Gimbaled EO/TIR Video; AMS 16-channel line scanner; SAR; Communications
High Altitude, Long Endurance (HALE)	Northrup Grumman Global Hawk (~130' wingspan)	60,000	>30	1,900	AMS 16-channel line scanner; SAR; Communications

Small UAS (sUAS) Platforms

Figure 2—Unmanned Aircraft System Platforms. Image courtesy of the U.S. Forest Service.

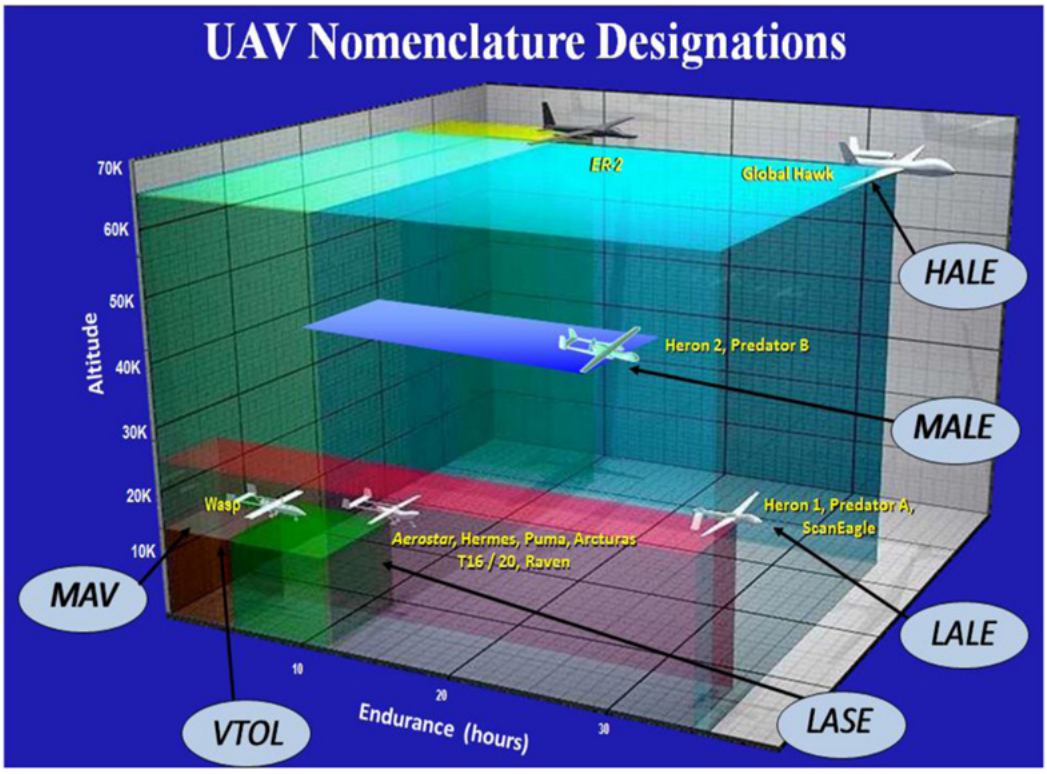


Figure 3—Unmanned aircraft system nomenclature designations. Image courtesy of U.S. Department of Homeland Security (Polski 2004).

Appendix D: Reporting Script for UAS Intrusions on Wildfires

Script for Reporting a UAS situation to the FAA's ARTCC

Place call as soon as possible to the appropriate Air Route Traffic Control Center (ARTCC) to the Area Managers Desk. See phone numbers below.

Reporting Party: _____

Name/phone number:_____

Date/Time of UAS Situation:_____

General Information

- This is _____(name) from _____ (agency).
- We are currently responding to a wildfire in the_____(Geographic location).
- This situation has occurred at _____(description of location such as 23 miles NW of Placerville airport or within the TFR.)
- I would like to officially report an Unmanned Aircraft (drone) situation. (use the word "intrusion" if there is a TFR).

Drone information

- There are _____ (provide the number of known drones) flying a_____ (altitude if known) _____direction of flight (if known).
- The drone(s) is a _____ (describe color, size and if it is a fixed wing, quad copter, etc.).

Law Enforcement Information

We have/have not notified Law Enforcement.

- (Name of Law Enforcement such as Highway Patrol, BLM LE, USFS LE, Sherriff's Department, etc.) _____is responding.

Operator information

- We have/have not located the operator (or) Law Enforcement has located the operator and is talking to them.
- We are/are not grounding our aircraft (or)we have grounded our fixed wing aircraft.

TFR information

- There is (or is not) a TFR. The TFR number is 5/xxxx.
- Please report this on the Defense Event Network (DEN).

- If needed – here is the latitude and longitude _____.
- My phone number is and my e-mail is _____:

Reporting documentation

Date/time call made to ARTCC_____

Person reported to: _____

Agency Point of contact for follow-up questions: _____

ARTCC WATCH Desk Phone numbers:

Albuquerque	505-856-4500
Denver	303-651-4248
Ft Worth	817-858-7503
LA Center	661-265-8205
Salt Lake	801-320-2560
Seattle	253-351-3500

Appendix E: UAS Mission Request Form

Forest Service Unmanned Aircraft System (UAS) Request Form

This form documents essential information to be considered for review and approval of planned UAS missions conducted and/or contracted by the Forest Service***. Note: A completed project aviation safety plan (PASP) and risk assessment are required to accompany this form.***

Administrative Information	
Requestor Name:	
Title:	
District/Forest/Region or Research Station:	
Email:	
Phone number(s):	
Forest Aviation Officer Name:	
Forest Supervisor Name or Research Station Director Name:	
Regional Aviation Officer Name:	

Initial Mission Information	Yes	No
Will the mission be flown within 5 nautical miles of an airport?		
Will the mission be flown over an urban or relatively dense populated area?		
Will a manned aircraft be flown at the same time as the UAS as part of this mission?		
Will the mission be flown beyond the line of sight (BVLOS) of the UAS operator?		
Does the UAS weigh more than 55 lbs.?		
If the answer to any of the above is "yes", then a manned aircraft will be required to conduct this mission. Please coordinate with your Regional Aviation Officer.		

Flight Justification

Provide documentation describing why this mission can't be done without aviation support.

Explanation:

Planning and Mission Specific Information	Yes	No
Is there a management code or agreement in place to pay for the mission?		
Have you contacted your Unit/Forest Aviation Officer with the specifics of your operation?		
Is there an Operations Plan in place? If you answer "Yes" provide the plan with this document. If "No"provide the name of the person(s) that will be responsible for writing the plan:		
Specially qualified aviation personnel needed? IE.UASM, HMGB, HECM?		
Identify what positions		
Specially qualified contracting personnel? (i.e. Contracting Officers Representative)		
Do you have a clearly defined project lead? Provide project lead's name and position title:		
Will this affect interagency cooperators/partners? If yes, explain in what scope? Have they been contacted?		
Will this affect other permittee's? In what scope? Have they been contacted? Explain:		
Does this mission require NEPA or any other public involvement? If you answered "Yes" provide information regarding the timeline for NEPA completion:		
Does the scope of the mission necessitate having a Public Affairs contact?		

Project Area Information *Note: Other relevant technical information regarding the project and mission will be documented in the PASP*
Project Location: (i.e. Horse Creek drainage, Jackson District, Smoky National Forest) *Attach project map as an Appendix to this document. Utilize WGS 84 for GPS Datum*
Identify Military Training Routes (MTRs) and Military Operational Areas (MOAs) within 5 miles of the project area (include route numbers).
Will the mission take place in or near a Wilderness Area or other type of Special Designated Area (SDA)?
Project Description: (i.e. survey flood damage in the Horse Creek drainage from the campground to the paved road)

Sensor Requirements	Yes	No	Comments (fixed or gimbal mounted, nadir or off-nadir imagery, near real-time availability requirements, etc.)
Electro-optical (EO)/Infrared (IR) Video			
Visible/RGB Camera (visible)			
Multispectral Camera (visible and near infrared)			
Hyperspectral Camera (visible, near infrared and shortwave infrared)			
Thermal Infrared Camera			
Lidar			
Synthetic Aperture Radar			
Meteorology Sensors (temperature, humidity, barometric pressure, wind)			
Chemical/Air Quality Sensors (CO, CO2, O3, NO2, VOCs, etc.)			
Other			

Records Management

Imagery/data collected using UAS and derived products are legally considered agency records. Please specify the planned method to be used to retain these records:

THIS SECTION TO BE COMPLETED BY THE LINE OFFICER

Requested flight is: APPROVED DISAPPROVED MODIFIED

Comments:

_____ _____

Line Officer Signature Date

Signatures and Concurrence

_____ _____

Signature of Preparer Date

_____ _____

Signature of Aviation Officer Date

_____ _____

Signature of Approver Date

Appendix F: FAA Requirements for Commercial and Recreational UAS Pilots

The FAA rules for operating an unmanned aircraft		
	Recreational	**Commercial**
Pilot Requirements	No pilot requirements	Must have Remote Pilot Airman Certificate Must be 16 years old Must pass TSA vetting
Aircraft Requirements	Must be registered if over 0.55 lbs.	Must be less than 55 lbs. Must be registered if over 0.55 lbs. (online) Must undergo pre-flight check to ensure UAS is in condition for safe operation
Location Requirements	5 miles from airports without prior notification to airport and air traffic control	Class G airspace*
Operating Rules	Must ALWAYS yield right of way to manned aircraft Must keep the aircraft in sight (visual line-of-sight) UAS must be under 55 lbs. Must follow community-based safety guidelines Must notify airport and air traffic control tower before flying within 5 miles of an airport	Must keep the aircraft in sight (visual line-of-sight)* Must fly under 400 feet* Must fly during the day* Must fly at or below 100 mph* Must yield right of way to manned aircraft* Must NOT fly over people* Must NOT fly from a moving vehicle*
Example Applications	Educational or recreational flying only	Flying for commercial use (e.g. providing aerial surveying or photography services) Flying incidental to a business (e.g. doing roof inspections or real estate photography)
Legal or Regulatory Basis	Public Law 112-95, Section 336 – Special Rule for Model Aircraft FAA Interpretation of the Special Rule for Model Aircraft	Title 14 of the Code of Federal Regulation (14 CFR) Part 107 *These rules are subject to waiver.

Appendix G: Regional/Station/Area UAS Desk Guide Supplement