Forest Service
U.S. DEPARTMENT OF AGRICULTURE

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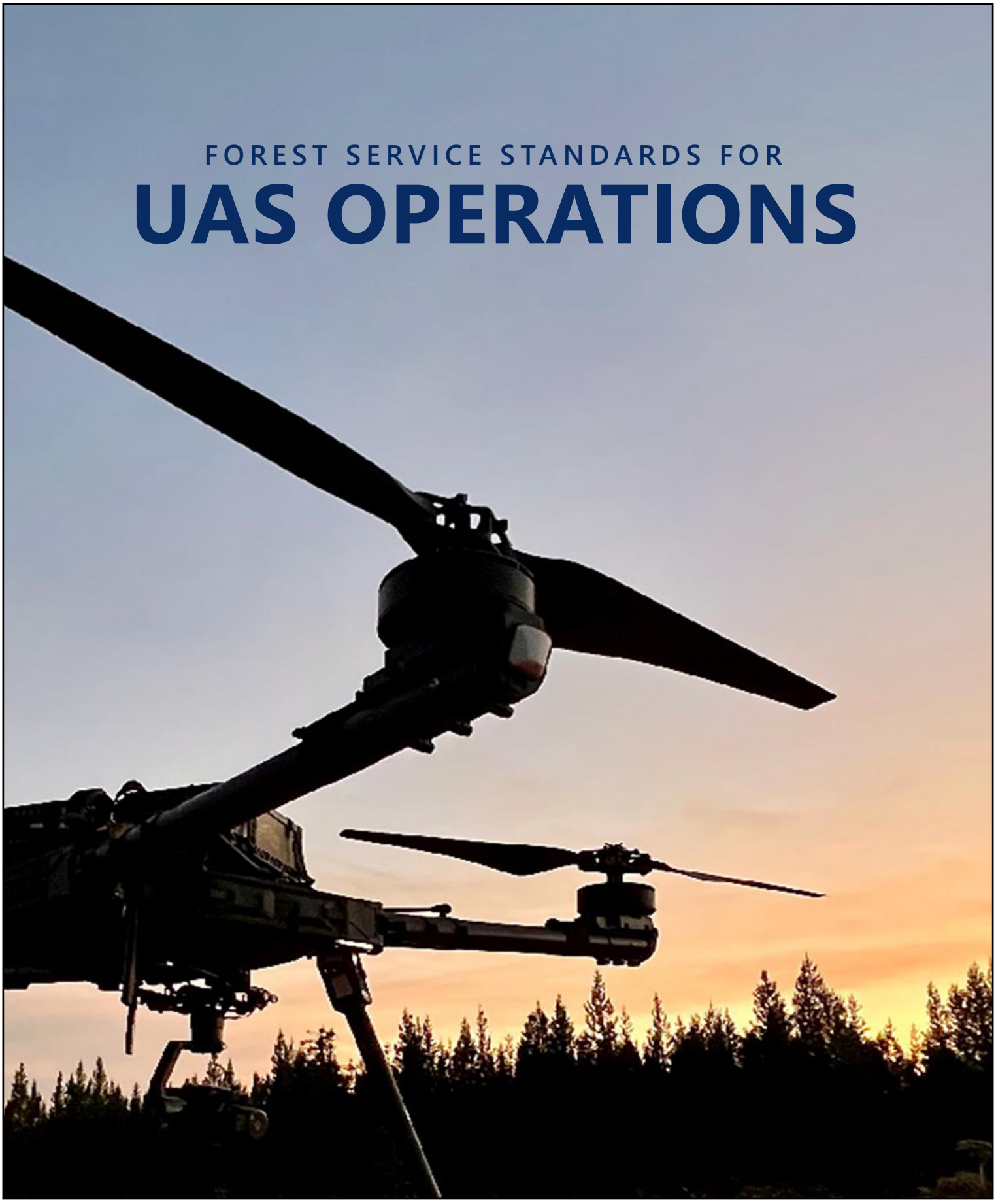
FOREST SERVICE STANDARDS FOR
UAS OPERATIONS



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Chapter 1: National UAS Operations Plan Introduction

Introduction

The procedures detailed within this document intend to promote safe, efficient, and lawful operation of Unmanned Aircraft Systems (UAS) to support the mission of the United States Department of Agriculture, Forest Service (FS), including fire and natural resource management. Regardless of the nature of the mission, **safety** is the primary concern in every operation.

Forest Service Aviation Mission

To provide safe, efficient, and coordinated aviation support for agency operations; to support partnership agreements; and to meet current and future needs through innovation and technology in order to sustain the health, diversity and productivity of the Nation's forests and grasslands.

UAS Operations

Directors of Washington Offices that conduct aviation activities must appoint, by official correspondence, a full-time or collateral duty aviation manager to coordinate aviation activities within their programs and with the appropriate Regional Aviation Officers and Regional Aviation Safety Officers.

When operating UAS, FS operators shall abide by FS policies and applicable 14 CFR Parts 91 and 107. Current policies include, but are not limited to:

1. FSM 5700 Aviation Management

2. FSH 5709.16 Aviation Management Handbook

3. The Forest Service National Aviation Safety and Management Plan (NASMP) provides information regarding Forest Service aviation organization, responsibilities, administrative procedures, policy and is intended to serve as an umbrella document to be supplemented annually by Regions, Research Stations, and Forests with an aviation program.

4. The Forest Service Standards for UAS Operations and other aviation manuals, handbooks, standards, guides, and plans referenced at: U.S. Forest Service and Interagency Aviation Publications.

The Forest Service will ensure UAS are used appropriately to further our mission with public safety, privacy and civil rights guarded. We will remain transparent in our UAS utilization. The FS will only use UAS after proper approval has been given, after risk management plans are in place, and UAS has been designated the right tool for the job.

For reference to Federal Aviation Administration (FAA) UAS policy and regulations visit: Policy Document Library.

This document provides a reference between controlling UAS policy, regulation, operational standards, operational control, and best practices necessary for conducting UAS operations. UAS pilots, managers, and users should familiarize themselves with the entire Forest Service Standards for UAS Operations and reference relevant sections for mission-specific planning purposes.

Appendix B: Resource Management, complements guidance in this document. It provides information to assist resource managers and line officers in the assessment, processing, scoping, and planning of resource management projects that utilize UAS. Other appendices provide standard operational and administrative information, checklists, and additional job aids.

Scope

This document provides guidance for all UAS operations on FS managed lands, including missions with FS operational and non-operational control. Agency UAS missions conducted under the fire management application will adhere to the NWCG Standards for Fire Unmanned Aircraft Systems Operations (PMS-515).

UAS are considered aircraft and must comply with applicable regulations, policies, and procedures required by the Forest Service policy or FAA as applicable.

UAS means, an unmanned aircraft and its associated elements related to safe operations, which may include but not limited to control stations, data communications links, support equipment, flight terminations systems and launch and recovery equipment. The unmanned aircraft is the flying component of the system flown by a pilot via a ground control system, or autonomously through the use of an on-board computer, communication links, and any additional equipment necessary for the unmanned aircraft to operate safely. The Federal Aviation Administration issues either an Airworthiness Directive (AD) or a Certificate of Authorization (COA) for the entire system, not just the flying component of the system (41 CFR Part 102.33.20).

Authority

1. The Forest Service UAS Program shall adhere to all applicable Presidential Executive Orders and public law regarding programmatic implementation.
    a. Executive Order 18355 (December 21, 2018) Promoting Active Management of America's Forests, Rangelands, and other Federal Lands to Improve Conditions and Reduce Wildfire Risk, Section 4, direct the Secretaries, in coordination with the Administrator of the Federal Aviation Administration, to maximize appropriate use of unmanned aerial systems to accelerate forest management and support firefighting and post-fire rehabilitation in forests, rangelands and other Federal lands.
    b. This standard follows the direction from S. 47 - John D. Dingell, Jr. Conservation, Management, and Recreation Act (S. 47) including:

2. This standard follows USDA Departmental Regulation 3465.002 Privacy, Civil Rights, and Civil Liberties with Unmanned Aircraft Systems (UAS), Office of the Chief Information Office, October 7, 2019.

3. FSM 5713.7 and FSH 5709.16 and Chapter 36.7 establish this document, The FS Standards for UAS Operations provide direction, and guidance for all FS UAS agency operations.

Relationship to Existing Agency Guidance

This document supplements Forest Service Manual (FSM) and Forest Service Handbook (FSH). In the event of conflicting guidance, FSM, FSH, 14 CFR, and other laws and regulations of the Federal Government take precedence.

UAS Operations in the National Airspace System

Forest Service programs and personnel have the authority to conduct UAS operations in the National Airspace System with the following stipulations:

1. When the operation adheres to the requirements, procedures, and standards within applicable FSM/FSH direction, the Forest Service Standards for UAS Operations, and the provisions of 14 CFR Part 107 (Part 107).

2. When the operation is conducted under authorizations granted using the FAA's *Low Altitude Authorization and Notification Capability* system (LAANC). Waiver requests outside of the LAANC systems shall be reviewed by the Forest Service UAS Program Manager or designee prior to submittal to the FAA.

3. When the operation is conducted utilizing the FS Blanket Area UAS Class G Certificate of Authorization.

4. When the operation is conducted under a standalone *Certificate of Waiver or Authorization* (COA) for a specific mission. Waiver requests under Part 107 will be reviewed by and coordinated with the National UAS Program Manager prior to submittal to the FAA. Standard lead time is 180 days, minimum.

5. When the operation is conducted under a *Special Government Interest Waiver* (SGI), or *Emergency Certificate of Waiver or Authorization* (ECOA) requested through the National UAS Program Manager or designee in coordination with the FAA.

In addition, all UAS operations within restricted, prohibited and warning areas must be authorized by the controlling authority. Forest Service UAS operators (Pilots), and managers must comply with any restrictions placed on the operation by the controlling authority.

Chapter 2: Organizational Structure and UAS Designations

Introduction

The number of personnel required for conducting UAS missions varies according to the mission. In very simple situations, such as takeoffs and landings to maintain currency, a remote pilot may be capable of safely and effectively completing the mission alone. Some missions may be complex and require many personnel with specialized responsibilities.

Mission-specific operations plans, and risk assessments establish the staffing roles and responsibilities for those missions. This section identifies key positions at National and Regional levels needed for successful implementation of the FS UAS Program.

Primary UAS Roles and Responsibilities

FSM 5700 and FSH 5709.16 define the roles and responsibilities for all Forest Service personnel involved in aviation management.

National Aviation Management Staff

Branch Chief Airworthiness

The Branch Chief, Airworthiness has the authority to review and approve all inspections, maintenance actions, and Return-to-Service determinations for all Forest Service-owned and/or operated aircraft. This authority may be delegated to qualified MU2s or MU3s. Coordination between the National UAS Program Manager and the Branch Chief Airworthiness will be essential for safe and efficient programmatic growth.

Branch Chief Rotor Wing

The Branch Chief Rotor Wing is responsible for the programmatic oversight of the National UAS Program. In partnership with the Branch Chief Airworthiness, the Branch Chief Rotor Wing has the authority to on-ramp and grant final approval of UAS platforms satisfying the U.S. Department of Agriculture, Forest Service, UAS airworthiness standards and approval process. In addition, the position assists the program with active communication between National and Regional aviation management and stakeholders in the establishment of policy, safety standards, programmatic goals, workflows, and operational/aircraft requirements as they continue to evolve.

Branch Chief Aviation Safety

Branch Chief, Aviation Safety is responsible to provide safety oversight for all aviation programs, including the UAS program. In partnership with the Airworthiness and Rotor Wing Branches, the Branch Chief, Aviation Safety promotes the tenants of a safety management system to ensure UAS resources accomplish agency goals and objectives in a safe and efficient manner. The Aviation Safety Branch provides investigative process expertise and input for UAS mishaps investigated by vendors or the UAS specialist(s). The Branch Chief, Aviation Safety will provide primary oversight for UAS mishaps where injury, property damage, and interference with crewed aircraft occurred or had the potential to occur (incidents with potential). This position actively communicates with stakeholders in the establishment of, and adherence to, safe operating procedures, practices, and policies.

National UAS Program Manager

The National UAS Program Manager provides the overall leadership, direction, and vision for the Forest Service's UAS activities. This position coordinates across the agency to establish UAS specifications, protocols, and standards to ensure aviation safety and individual privacy, civil rights, and civil liberties protections in compliance with applicable laws, regulations, and policies.

Key internal relationships include, but not limited to:

1. Branch Chiefs in Aviation Management

2. Regional Aviation Management

3. Agency Program leadership and staff (program/project areas with UAS business cases)

4. Forest Service UAS Pilots and support staff

5. NIFC Incident Support Branch contracting (all UAS acquisitions and UAS flight service contracting is performed by NIFC ISB),

6. National Technology and Development Program UAS Project Engineers,

7. Geospatial Technology and Applications Center geospatial specialists.

Key external relationships include other Department of Agriculture Mission Area UAS Program Managers, Department of the Interior UAS Program Managers and staff, Federal Aviation Administration (FAA), Interagency Fire UAS Subcommittee members, and other Department/Agency UAS Programs.

In addition, the National UAS Program Manager is the permanent Forest Service representative to the National Wildfire Coordinating Group (NWCG), Interagency Fire UAS Subcommittee (IFUASS), The General Services Administration (GSA), Interagency Committee on Aviation Policy (ICAP) UAS Subcommittee.

National UAS Aviation Management Staff

National UAS Operations Specialist

The National UAS Operations Specialist will assist the UAS Program manager in coordinating the development of short and long-range program plans. Works with all disciplines to achieve goals consistent with UAS program direction. Provides technical advice and develops plans for the utilization and integration of UAS to accomplish Forest Service goals. Continually evaluates and analyzes current program levels and uses discretion to initiate change or make recommendations to meet changing conditions.

Develops best practices and evaluates common practices for use cases involving UAS. Provides advice and guidance to all Forest Service remote pilots continually and whenever change warrants. Takes lead role in the instruction of UAS courses and works with the National UAS Training Specialist in the development of courses, consistency of instruction, and need for updates.

National UAS Fleet Manager

The National UAS Fleet Manager is responsible for the tracking of the Forest Service Fleet and complying with all policy regarding reporting, registration, acquisition and disposal of aircraft and equipment. Develops policies, procedures and provides oversight of all fleet requests, inspections, and utilization. Completes analysis of fleet utilization and equipment along with the analysis of problems associated with fleet and recommends solutions. The fleet manager will collaborate with the Contracting Officer during award and procurement processes and coordinate with Regional UAS Specialists on acquisition processes.

The National UAS Fleet Manager will collaborate with National UAS Program Manager and Branch Chief of Aviation Business with regards to fleet budget tracking. Works directly with the Branch Chief of Airworthiness

for aircraft approval and inspection processes. Works with the National Technology and Development Program's UAS Project Engineer in the testing and evaluation of current and future aircraft, software, and technologies. The fleet manager also works with National Procurement and Property Services Staff in the tracking of UAS property along with conducting annual inventory of National UAS Program Property.

National UAS Coordinator

The National UAS Coordinator ensures an efficient flow of information to UAS personnel, leadership, the National Interagency Coordination Center (NICC), and geographic area coordination centers (GACC). The coordinator is the subject matter expert (SME) regarding questions and clarification concerning UAS capabilities and aids in determining the type of UAS (1-4) and UAS positions, Unmanned Aircraft Systems Pilot (UASP), UAS Manager (UASM), Module Leader (UASL), and Data Specialist (UASD), to order.

The UAS Coordinator is the central point of contact for ordering of agency and call-when-needed (CWN) UAS, and assist with mishap notifications, airspace, operations, and policy questions. The coordinator is responsible for filing and ensuring for accuracy of Special Government Interest (SGI) waivers and assisting with logistical concerns of UAS operations.

National UAS Data Specialist

The National UAS Data Specialist ensures all UAS program data management, governance, and storage follows USDA and Forest Service policies and regulations. Coordinates with other Forest Service programs as well as external partners who are stakeholders in UAS data (such as FS Geospatial and the DOI). Assists UAS Program Manager in coordinating with the Chief Information Office (CIO) representatives to ensure appropriate data security, data regulations, spectrum allocations and other CIO related UAS projects are within policy.

The UAS Data Specialist manages software related projects and contracts such as the Fleet Tracking Software, UAS Simulator and Data Management and Governance projects. Acts as the UAS program point of contact for the Geospatial Technology and Applications Center (GTAC). Works closely with GTAC to develop a statement of work and helps monitor and guide progress.

National UAS Training Specialist

The National UAS Training Specialist manages course coordination and instruction of UAS related courses. Works in coordination with the National Aviation Training Program Manager. Plans and implements a comprehensive, efficient, and effective training program. Establishes policy and procedures for development of training in keeping with Forest Service standards and program goals. Initiates, conducts, facilitates, or represents the UAS program in meetings with Interagency partners and regional training specialists to determine need for specific training. Works with internal and external subject matter experts to plan and develop training materials using available resources.

Evaluates and designs alternative training ideas to ensure they will increase skill/competency and retention. Participates in the development and review of UAS training courses to ensure technical accuracy and consistency with course objectives. Provides analysis, evaluation, and quality assurance of contractor-led training and provides recommendations. Initiates, manages, and oversees all contracts related to UAS training

products. Is a Forest Service UAS representative on the Interagency Aviation Training Subcommittee and works in coordination with IFUASS and needed.

National UAS Aerial Ignition Specialist

The National UAS Aerial Ignition Specialist provides oversight, direction, and management of FS aerial ignition (Ai) operations and Interagency UAS Ai Academies. Works with the other national UAS staff to establish the content and methodology of the FS UAS aerial ignition program and standards. Coordinates with the Regional UAS Specialist to recruit Forest Service remote pilots that would succeed in the training and implementation of UAS aerial ignition missions.

The National UAS Aerial Ignition Specialist provides direction to National and Regional Fire and Fuels Specialists on the capabilities and limitations of using UAS for aerial ignition. Provides technical support in the evaluation and analysis of new aircraft, payloads, and equipment. Coordinates with project managers at the National Technology Development Program for emerging platforms and payloads. Works directly with staff from the National Interagency Prescribed Fire Training Center to plan, coordinate and implement the UAS Ai academies.

National UAS Pilot Standards

The National UAS Pilot Standards reports to the National UAS Program Manager, but coordinates directly with the Branch Chief, Rotor Wing Operations for the execution of the UAS Pilot Standards Program. The National UAS Pilot Standards is responsible to provide leadership and oversight for the development and implementation of a National UAS Pilot Standardization and Training Programs.

Works with the other national UAS staff to establish the content and methodology of the UAS Pilot Training Manual and Airman Certification Standards. Initiates, leads, and conducts the National UAS Evaluator Workshop and the National UAS Standardization Workshop. Assists with quality assurance reviews of agency pilot training records. Performs ground and flight evaluations for aircraft, mission, or designation certifications.

Regional Aviation Management Staff

Regional Aviation Officer

The Regional Aviation Officer (RAO) is responsible for the oversight, coordination, and direction of aviation operations activities conducted by the Regional Office. The RAO responsibilities are located in the FSM 5704.

Regional Aviation Safety Officer

The Regional Aviation Safety Officer (RASO) reports to the Director or the Deputy Director and is responsible for implementation, fostering and promoting Safety Management Systems (SMS), including policy, risk management, assurance and promotion. Their responsibilities are located in the FSM 5704.

Regional UAS Aviation Management Staff

Regional UAS Specialist

Regional UAS Specialist collaborates with the National UAS Aviation Management Staff to coordinate Regional-level UAS operations plans, safety plans, and standardized mission notification and approval procedures.

Regional UAS Specialist tracks accountable UAS property, facilitates all training for pilots, trainees, and future students. Regional Specialists may also hold specific UAS designations and qualifications listed below. They are responsible for ensuring all maintenance, repairs, and inspections of UAS within their region follow established airworthiness processes.

Regional UAS Specialists will communicate with all FS staff areas within their assigned geographic boundary for their UAS needs. Regional UAS Specialist plans and conducts functional site visits and quality assurance reviews in coordination with the National UAS Aviation Management Staff. Regional UAS Specialist will ensure that UAS Pilot training and qualification records are maintained in accordance with the FSH 5709.16 Chapter 50 and formatted as per Chapter 3 of the FS Standards for UAS Operations.

UAS Designations and Qualification Standards

All pilot-in-command, flightcrew, UAS evaluator and UAS final evaluator designations must be approved in writing by the National Standardization Pilot or designee. Refer to the UAS Pilot Training Manual and Airman Certification Standards for UAS pilot and training roles and responsibilities.

UAS Pilot and Flightcrew Designation

Only flightcrew who have successfully completed the appropriate syllabi and have been designated may act as qualified flightcrew in their respective position during operational flights. Flightcrew who are gaining experience, in training or operational flights may act as pilot in command when under the direct supervision of a qualified and current evaluator/final evaluator for the respective position. NWCG UAS qualifications will follow NWCG requirements (i.e. a UASP trainee may fly under a qualified UASP).

Responsibilities

A person who holds a remote pilot certificate with a UAS rating and has the final authority and responsibility for the operation and safety of a UAS operation. All Forest Service Flight Crew Members have the responsibility to:

1. Demonstrate the highest level of performance, quality control, and proficiency with UAS operations.
2. Crew agency aircraft to meet Agency Mission objectives.
3. Maintain agency pilot training records and ensure accessibility for a Quality Assurance (QA) review.
4. Serve as an agency UAS aviation subject matter expert.
5. Communicate flightcrew standardization or training issues to the attention of the appropriate Regional UAS Specialist or National UAS Pilot Standards.
6. Brief all Visual Observers, mission crewmembers and ordering unit prior to mission.
7. Perform a preflight inspection of the UAS in accordance with the manufacturer's recommendations, Agency best practices, and ensure the aircraft is in an airworthy condition.
8. Coordinate with Forest/Unit/Zone Aviation Officers and appropriate dispatch in advance of missions to identify, assess, and de-conflict any potential airspace issues.

9. Fly in accordance with the manufacturer's specifications and established FS policy/training standards. Proposed deviations from established operational procedures (checklists, etc.), which may affect the safety of flight, shall be discussed with National UAS Standardization Pilot and Regional UAS Specialist prior to the deployment of such operations to minimize programmatic/operational risk.

10. If a procedure is required for a specific mission, and was not instructed during an approved agency training, it is the responsibility of the PIC to work with their Regional UAS Specialist and National UAS Staff for approval.

11. Understand, implement, and maintain the responsible areas of the FS Aviation Safety Management System within the scope of their duties.

Designation Standards

1. Pilots shall hold a current and valid FAA remote pilot certificate.

2. Pilots shall successfully complete the National Standardized Syllabi for the aircraft or mission.

3. Pilots shall complete the USDA/FS UAS training plan per the curriculum hosted in IAT and Forest Service Standards for UAS Operations.

Currency Standards

1. Meet the currency, flight time, and training requirements listed in Exhibit 1, UAS Pilot Flight Time and Training Requirements.

2. Meet special-use mission and aircraft currency requirements for authorized missions and aircraft.

Restrictions/Exemptions

Pilots who fail to maintain pilot in command and/or mission currency standards are restricted from pilot in command or mission authorizations until currency standards are met or under the supervision of a current UAS remote pilot.

Visual Observer Designation

Certain certificates of authorization/waiver (COA) may require that observers have completed sufficient training and/or briefings to communicate to the pilot any instructions required to remain clear of conflicting traffic. UAS Remote Pilots shall ensure that Visual Observer (VO) training/briefing requirements have been met. As applicable, refer to 14 CFR part 107, or COA/ECOA, and/or agency approved best practices.

A VO is a person acting as a UAS crewmember who will not be required to possess an Interagency Remote Pilot Card. All Forest Service Remote Pilots conducting operations under 14 CFR Part 107 must maintain visual contact with the UAS or utilize a VO. Use of VOs must comply with the provisions of Part 107.33.

The VO requirement of those authorizations must be complied with if operating under COA, ECOA. Visual Observers are required to:

1. Obtain a briefing from the PIC.

2. Have a clear view of the area of operation and the unmanned aircraft.

3. Be in constant communication with the Remote Pilot either within speaking distance, or with a portable radio/cell phone equipped to enable immediate communication.

4. Keep the Remote Pilot advised of any possible collision hazards such as power lines, birds, other aircraft, terrain, hazardous weather conditions, etc.

5. VO's may not act as a Remote Pilot unless they possess a valid FAA Remote Pilot certificate and a current Interagency UAS Pilot qualification card.

UAS Instructor Designation

An instructor's role is to provide accurate and consistent instruction of course material to ensure course objectives are met. An instructor must be Fully Qualified in the Interagency Aviation Training (IAT) system and will be designated for each course offering.

Responsibilities

1. Teach and/or provide oversight of Interagency-approved UAS courses.

2. Actively participate in Interagency UAS approved training.

3. Schedule UAS Evaluators and/or Final Evaluators as needed.

4. Provide course feedback and material updates.

Designation Standards

1. Recommended by the Regional Aviation Officer, Regional Aviation Safety Officer, or National UAS Training Specialist.

2. Successfully complete additional special-use instructor training requirements.

3. Qualified as an IAT instructor per the IAT guide.

Currency Standards

1. Maintain IAT instructor currency.

Restrictions/Exemptions

UAS Instructors are restricted from providing instruction on aircraft or missions for which they are not specifically designated or approved, or who fail to maintain pilot in command, instructor, aircraft, or mission currency standards.

UAS Evaluator Designation

UAS Evaluators assist Instructors and Final Evaluators by teaching and/or conducting flight training and/or exercises to evaluate a trainee's progress. They are selected based on their skill, teaching ability, and dedication to the FS UAS Program. Instruction conducted under the supervision of a Flight Evaluator is intended to develop knowledge, skill, and abilities needed prior to a final flight evaluation.

Responsibilities

1. Perform aircraft and special use mission flight evaluations that aligns with the UAS Pilot Training Manual and Airman Certification Standards.

2. Perform quality assurance flights of flightcrew and ensure that special mission standards are being met, intervene where standards are not being met, and escalate issues to the appropriate Regional UAS Specialist or National UAS Pilot Standards.

3. Create and provide feedback on training materials as required for the safe and effective execution of the Forest Service aviation mission in support of the National UAS Program.

Designation Standards

1. Recommended by the Regional Aviation Officer or designee and follow the process outlined within the UAS Pilot Training Manual and Airman Certification Standards.

2. Hold a current FAA remote pilot certificate.

3. Successfully complete the evaluator requirements within the national standardization syllabi for the aircraft and special-use missions that instruction/evaluation will be given.

4. Successfully complete additional special-use evaluator training requirements.

Currency Standards

1. Follow the currency requirements outlined within UAS Pilot Training Manual and Airman Certification Standards.

2. Attend aircraft and mission specific training.

3. Attend Mission Evaluator Workshops as dictated by mission specific guides and operations plans.

Restrictions/Exemptions

Evaluator pilots are restricted from providing evaluation on aircraft or missions for which they are not specifically qualified or who fail to maintain evaluator, aircraft, or mission currency standards.

UAS Final Evaluator Designation

UAS Final Evaluators are FS designated remote pilots who perform UAS final flight evaluations (check rides). Flight evaluations are required when a Remote Pilot completes the training for certain aircraft, payloads, or missions.

Responsibilities

1. Follow the currency requirements outlined within the UAS Pilot Training Manual and Airman Certification Standards.

2. Collaborate with Interagency UAS management to develop and improve training content.

3. Document and report performance deficiencies to Regional UAS Specialists, RAOs, RASOs, or National UAS Pilot Standards when/if warranted.

4. Provide recommendations on how to correct pilot deficiencies to ensure compliance with agency standards.

5. Participate in Quality Assurance, Contract Compliance, and/or UAS accident investigations when necessary.

Designation Standards

1. Recommended by the Regional Aviation Officer or designee and follow the process outlined within the UAS Pilot Training Manual and Airman Certification Standards.

2. Hold a current FAA remote pilot certificate.

3. Successfully complete the final evaluator requirements within the national standardization syllabi for the aircraft and special-use missions that instruction/evaluation will be given.

4. Successfully complete additional special-use evaluator training requirements.

Currency Standards

1. Follow the currency requirements outlined within UAS Pilot Training Manual and Airman Certification Standards.

2. Attend and support aircraft and mission specific training.

3. Attend and support Mission Evaluator Workshops as dictated by mission specific guides and operations plans.

Restrictions/Exemptions

Final Evaluator pilots are restricted from providing final flight evaluations on aircraft or missions for which they are not specifically qualified or who fail to maintain final evaluator, aircraft, or mission currency standards.

National Wildfire Coordinating Group Position Qualifications

Please note: Remote Pilot and UASP are terms that are often used interchangeably to describe pilots of UAS in the Forest Service. However, there are important differences to note between the two pilot classifications.

1. A Remote Pilot is carded to fly non-emergency (e.g., resource management) missions but not emergency (e.g., wildfire) missions. Their additional training focuses on UAS sensors, software, data products and completion of a taskbook is not required.

2. A UASP has additional training, qualifications, completed a taskbook, and carded to fly both non-emergency and emergency missions.

There are four Interagency Incident positions, Unmanned Aircraft Systems Pilot (UASP), UAS Manager (UASM), Module Leader (UASL), and Data Specialist (UASD). These four positions must meet training and currency requirements as documented in the National Wildland Fire Qualification System guide (PMS 310-1) and the Field Managers Course Guide (PMS-901-1). These four positions shall operate within the provisions of the Interagency Fire Unmanned Aircraft Systems Guide (PMS-515), FAA policies, and applicable agency policies.

Committees and Other Groups Supporting the Forest Service UAS Program

UAS Executive Steering Committee (UASESC)

The UAS Executive Steering Committee (ESC) will include representation from Regional executive leadership, as well as each Deputy Area and Directorate with UAS operations, policy, or acquisition interests. The ESC advises the Chief and Executive Leadership Team (ELT) on UAS matters and provides broad policy recommendations on the integration of UAS within Forest Service operations.

The ESC will coordinate efforts with State and Federal partners and develop Forest Service policy on the operation and use of UAS, to include recreational use or any other use on National Forest System lands. The Director of Fire and Aviation Management is the chair of the ESC, and the group meets annually or bi-annually to address issues associated with the UAS program.

UAS Advisory Group (UASAG)

The UAS Advisory Group (UASAG) is a representation of programs throughout the agency, including specialists in aviation, fire, law enforcement, communications, engineering, forest management, rangelands management, vegetation ecology, invasive species management, lands, minerals and geology, forest health protection, soils, remote sensing, acquisition, recreation, wilderness, information management and technology, and research and development. In addition to advising the ESC, the UASAG focuses on UAS strategic planning and operational direction, assessment of the implications of decisions on current or proposed manned aircraft programs, and on risk assessment of any proposed UAS operations. The UASAG is chaired by the National UAS Program Manager and is independent of the UASESC but receives task orders from the ESC and serves as advisors to the ESC as requested.

UAS Committee (UASC)

The UASC focuses on UAS strategic planning, operational direction, assessment, and implications of decisions on current or proposed programmatic direction. The Committee receives leader's intent from the Rotor Wing Branch Chief and National Aviation Officer Council Chair (NAOC Chair). The UASC is responsible for planning and implementing the goals and objectives outlined in the Support Mission Strategy for UAS.

Other responsibilities include reviewing UAS aviation policy, procedures and standards, and mission requirements. The Committee will make recommendations based on review and analysis to enhance and improve the Forest Service UAS program.

UAS Evaluation Committee

The UASEC will develop and oversee FS UAS evaluations and approvals in support of FSUAS mission requirements, airworthiness specifications, and operational compatibility for the National UAS Program. The purpose will include working with other federal agencies, aviation specialists, and industry to ensure compliance with Federal Aviation Regulations and agency policy. The UASEC reports to and receives direction from the Assistant Director Aviation and the Rotorcraft and Airworthiness Branch Chiefs.

The Director of Forest Service Fire and Aviation (FAM) authorizes the Chair of the UASEC to convene meetings, schedule agenda items, make contacts, negotiate work assignments, and make commitments. The committee shall follow the Forest Service Airworthiness Evaluation Standards and Approval Process, or latest revision.

State, Private and Tribal Forestry - Fire and Aviation Management

The Forest Service Fire and Aviation program within State, Private and Tribal Forestry plays a critical role in promoting, supporting, administering, and coordinating all aviation activities within the agency. The Aviation division is responsible for providing safe, efficient, and coordinated aviation support for agency operations; supporting partnership agreements; and meeting current and future needs through innovation and technology to sustain the health, diversity and productivity of the Nation's forests and grasslands.

Chapter 3: UAS Training and Qualifications

Introduction

The intent of the Forest Service's UAS Program is to maintain training and qualification for interagency commonality, thereby enabling interagency training sessions, pilot evaluation and pilot approvals (carding). The Forest Service recognizes and adopts training and qualification standards outlined in *Interagency Aviation Training* (IAT.gov). Additional training and qualification standards may apply for specialized missions and/or more complex payloads or missions. Refer to the *Unmanned Aircraft Systems Pilot Training Manual and Airman Certification Standards* and the National UAS Program SharePoint site for more information.

Overview of UAS Training Courses

The following is foundational and additional UAS training available to Remote Pilots. All courses are hosted in coordination with the National UAS Training Specialist and follow all applicable agency policy for course and instructor criteria. Any course that is not hosted in coordination with the UAS National Office or does not follow agency policy will not be recognized:

- A-450 Agency Remote Pilot Certification
    - Fundamental UAS course for individuals wanting to become qualified to operate UAS for the US Department of Agriculture Forest Service (USDA-FS).
- A-454 Small UAS Operator Add-On Course
    - These courses are for individuals who have previously attended A-450 Unmanned Aircraft System (UAS) Basic Remote Pilot Course and are intended to card individuals on each additional aircraft in the Interagency UAS fleet.
- A-454 Nonstandard operating procedures as required (NSOP)
    - Examples of operations or procedures not taught in an approved agency training include, but are not limited to, launch and recovery methods other than those taught or described during approved training or operations outside of manufacturers recommendations, and/or any deviations not instructed during approved agency training.
- A-456 Small UAS Extended Line of Sight (ELOS)/Beyond Visual Line of Sight (BVLOS) Training
    - This course is for UAS Remote Pilots whose missions require advanced beyond visual line of sight techniques. The FAA has collaborated with the Department of the Interior and the United States Forest Service to grant Extended Line of Sight (ELOS) and Beyond Visual Line of Sight (BVLOS) privileges when certain conditions are met. Refer to the current FS UAS Certificate of Waiver or Authorization (COA) for parameters and guidance on ELOS and BVLOS.
- S-373 UAS Incident Operations
    - This NWCG course is designed to meet the training needs of the Unmanned Aircraft System Pilot (UASP). The course focuses on incident flight operations, communication, coordination and deconfliction through a combination of lectures, facilitated discussions, individual/group exercises, simulations, and flight exercise. A-450 and S-373 are often combined into a 2-week course called "UAS Flight School for Incident Operations."
- Natural Resources Mapping Workshop
    - Course addresses essential components to plan and execute UAS missions for general resource management (non-fire) applications in addition to remote sensing principles, sensor considerations, as well as data processing, analysis, and management. The mapping workshop is

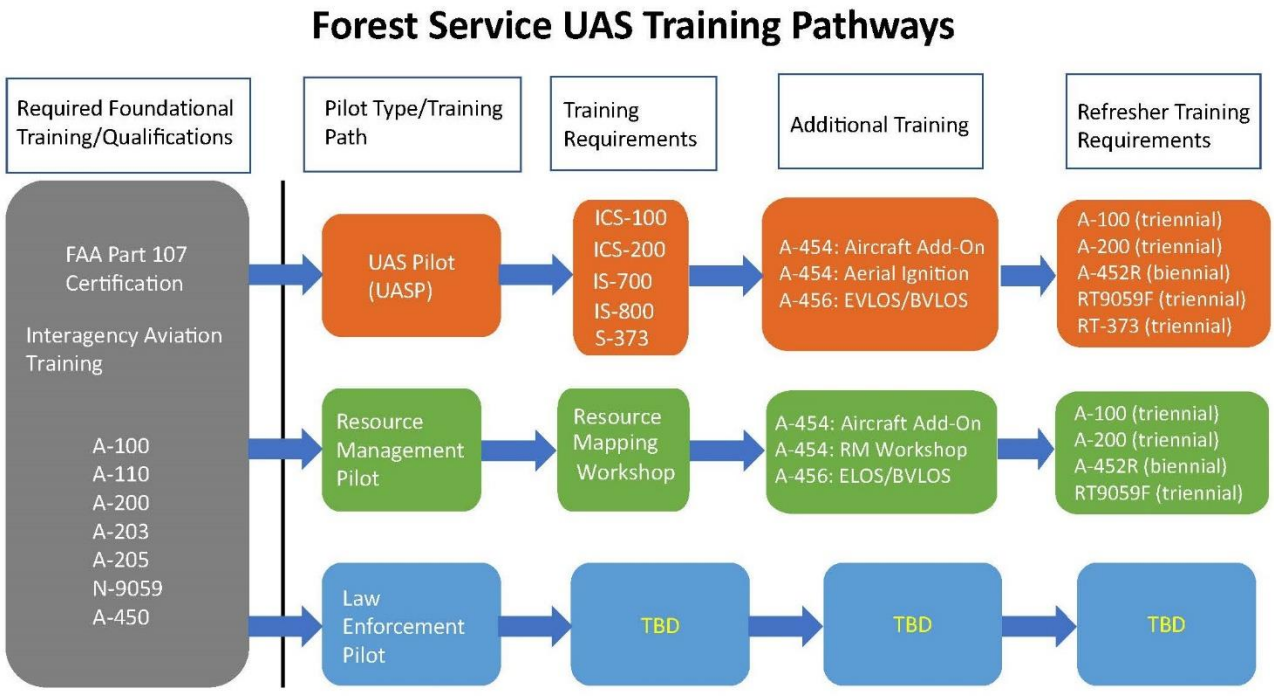
often taught as the second week of the two-week UAS Flight School for Natural Resource Management.

- Aerial Ignition Academy
    - The UAS Aerial Ignition Academy provides maximum on the job experience and advanced curriculum with both classroom instruction and performance-based flight exercises. The FS standards for attending this training and carding exceed the minimum standards established by the Interagency Fire Unmanned Aircraft Systems Subcommittee (IFUASS), and the Department of Interior.
    - For UAS Aerial Ignition Operations and additional UAS Ai training information see Appendix E: UAS Aerial Ignitions.
- Remote Sensing/Geospatial Training
    - GTAC provides several self-paced or recorded trainings and tutorials focused on remote sensing and geospatial software technologies and methods relevant to UAS.

For more information on training and resources, visit the training section on the National UAS Program SharePoint site.

UAS Pilot Training/Certification Process

Prior to attending Interagency UAS training, remote pilots must meet agency specific requirements. Two separate training pathways exist for pilots flying emergency missions (i.e., UASP) and non-emergency missions (i.e., resource management pilots). Specific training for law enforcement personnel does not yet exist as of the date of this document's approval. Contact your Regional UAS Specialist to discuss training options for law enforcement personnel.



Initial UAS Remote Pilot Training

Forest Service employees follow a competitive selection process to become qualified remote pilots. The process for FS UAS pilot candidate application, review, and selection include the following considerations:

1. Approval and concurrence for the application is required from the employee's direct supervisor and the Regional UAS Specialist and/or Regional Aviation Officer (RAO) and/or National UAS Training Specialist.

2. The RAO responsible for approving an employee's application is determined by the region where the employee's physical duty station is. Employees that are part of Washington Office staff but physically located within any region may be reviewed and selected by the appropriate RAO or the National UAS Training Specialist.

3. All selected candidates must be FAA Part 107 certified or have a UAS rating on their FAA Part 61 certificate prior to attending A450.

4. It's optimal that course candidates will meet all training requirements for A-450 Small Unmanned Aircraft System (sUAS) Basic Remote Pilot Course listed in the IAT Guide prior to being selected for A-450. Rare exceptions may be made, by the RAO or National UAS Training Specialist, as some required IAT courses may not be available prior to A-450. UAS pilots will attend all IAT training requirements within 6 months of A-450 attendance and prior to receiving a Remote Pilot Card (FS-5700-20B). All associated pre-course costs will not be funded by the Washington Office.

5. Forest Service employees are not authorized to manipulate the controls of any UAS unless they possess a current FS Remote Pilot card, are receiving a flight evaluation from a UAS evaluator/final evaluator or are attending an approved UAS training course.

6. A UAS pilot's direct supervisor must complete A-314 (Aviation Program Overview for Forest Service Agency Administrators). A-314 is a reoccurring course due every 3 years. Reference IAT guide for definition of supervisor.

7. All FS UAS personnel must meet the knowledge and performance standards outlined in Unmanned Aircraft Systems Pilot Training Manual and Airman Certification Standards to receive Remote Pilot Card and endorsements for all agency owned aircraft and missions.

UAS Refresher Training

Remote Pilots must complete UAS refresher training (A-452R) or approved equivalent every 24 months following the issuance of their Interagency Remote Pilot Card. Current Remote Pilots participating in either A-450 Unmanned Aircraft System (UAS) Basic Remote Pilot Course or A-452R Unmanned Aircraft System (UAS) Refresher Training, as a student or instructor, will receive credit for refresher training. This training can be completed in advance or within 30-days after the date of expiration on the Remote Pilot Card and shall be documented on the iat.gov website. UAS pilots exceeding 30 days past the end of the expiration indicated on their Remote Pilot Card must complete a flight evaluation provided by an approved UAS Final Evaluator and attend an A-452R refresher course.

Required Refresher Training Elements

1. Program and policy updates.
2. Flight exercise.
3. Mishaps, SAFECOMs and trends.
4. Airspace authorization.
5. Risk management and crew resource management review.
6. Lessons learned.
7. Aircraft/Sensor updates.
8. Identified special emphasis items.

Recommended Refresher Training Elements

1. Industry trends.
2. Emerging technology discussion.
3. Hardware/software/apps.
4. Lessons learned/case studies.
5. Training review/curriculum updates.

Remote Pilot Currency and Proficiency

Flight Currency

Prior to flying a mission, a remote pilot must have completed three takeoffs and landings (3 full battery cycles), with an agency owned UAS they are approved to operate within the preceding 90 days. Day and night currency each require three takeoffs and landings to maintain either day or night currency. Takeoffs and landings at night satisfy the requirements for day takeoffs and landings.

If the remote pilot has not completed 3 takeoffs and landings within the preceding 90 days, prior to a mission, the Remote Pilot must regain currency by performing three takeoffs and landings (3 full battery cycles) and reviewing the emergency procedures for the specific make and model or conduct their mission flight under the observation of a current UAS pilot.

Remote Pilots are required to fly a total of 12 hours in a 12-month period or complete the number of mission specific hour requirements. Each Region should identify their pilots 12-month period. If a Remote Pilot is

carded on multiple aircraft, the pilot must fly a yearly minimum of 2 hours on each carded aircraft to maintain currency on each aircraft. Remote Pilots failing to meet this requirement shall fly under the supervision of a UAS Evaluator until the 2 hours are met.

Flight Proficiency

Currency and proficiency are not the same thing. The FS UAS Program sets minimum currency requirements to help ensure proficiency, however, aircraft and/or mission proficiency is the responsibility of the Remote Pilot. Being proficient means a Remote Pilot is fully competent in all aspects of the aircraft, emergency procedures and missions to be conducted. You can be current without being a proficient pilot, but if you are proficient, most likely you have also met the flight currency standards.

Exhibit 01 UAS Pilot Flight Time and Training Requirements

Minimum Annual Requirements:	
Flight Time[1]	12 hours within a 12-month period
Preceding 90 Day Minimum Requirements[2]	
Day Currency Night Currency	3 Takeoffs/Landings (3 Full Battery Cycles) 3 Takeoffs/Landings (3 Full Battery Cycles)
Mission Requirements:	
Aerial Ignitions	3 hours within the preceding 12 months
Other Requirements:	
Each carded aircraft[3]	2 hours PIC in the preceding 12 months
USDA/FS UAS training plan per IAT	Varies
A-452R (UAS refresher)	Every 24 calendar months
RT9059F Crew Resource Management (CRM)	Every 36 calendar months
RT-373 (Incident UAS Operations Refresher)	Every 36 calendar months

[1] UAS Pilots unable to meet currency requirements must request an AMOC (Alternative Methods of Compliance) through National UAS Pilot Standards. AMOC is only to be used in extenuating circumstances such as seasonal employees or slow fire-seasons. An AMOC should be the exception to the rule, not a tool used to reduce training flight hour requirements. Flight time may be accrued as PIC or Evaluator/Final Evaluator.

[2] A pilot who has failed to meet the 90-day takeoff/landing requirement, may not fly an operational mission without first performing the basic flight maneuvers and emergency procedures for the specific make and model during a currency flight. Alternatively, the remote pilot must conduct their mission flight under the observation of a current remote pilot.

[3] UAS Pilots carded on multiple aircraft must fly 2 hours on each platform. Those 2 hours can be included in the 12 annual hours. A pilot who has failed to fly 2 hours per aircraft must fly under the supervision of a current/carded UAS pilot for the aircraft until currency is met.

Pilot Training and Qualification Records

All agency pilot competency records must be maintained in the pilot's training and qualification record and must contain the elements listed within FSH 5709.16 Chapter 50.

The UAS Program developed the following folder structure and contents to ensure the elements listed within FSH 5709.16 Chapter 50 are included:

1. UAS Pilot Current Year Designations and Training (FS-5700-20B)
    a. UAS Current Year Training Requirements
    b. UAS Pilot Card

2. UAS Pilot Previous Year Designations and Training (FS-5700-20B)
    a. UAS Previous Year Training Requirements
    b. UAS Previous Year Pilot Card(s)

3. Federal Aviation Administration
    a. FAA Part 107 Certificate
    b. FAA Part 107 Recurrency Training Certificate
    c. Other FAA Certificates

4. Agency Certifications and Qualifications
    a. IAT Couse Transcript
    b. IAT USDA-FS Remote Pilot (UAS) Compliance Record

5. Record of Flight Time and Evaluations
    a. Annual Flight Use Report
        i. Total Flight Time
        ii. Flight Time per Aircraft
        iii. Flight Time per Mission
    b. Record of Flight Evaluations
    c. Record of Final Flight Evaluations
    d. Record of Mission Qualification Evaluations

6. Workshop and Training Certificates
    a. NWCG Training Certifications
    b. Workshop Certificates
    c. Miscellaneous Training Certificates

7. Instructor/Evaluator/Final Evaluator Designations
    a. Letters of Designation
    b. Requests of Designation
    c. OAS-105 (Interagency Aviation Training Instructor Evaluation)
    d. OAS-107 (Designated IAT Instructor Evaluation)

8. Miscellaneous
    a. Pilot Agreements
    b. AMOC Requests
    c. Miscellaneous Forms

The official pilot training and qualification record must contain at least two years of the above information, older information may be archived.

Pilot training and qualification records shall not contain Personally Identifiable Information (PII) but must be secured against unauthorized access. The Regional Aviation Officer must designate an employee to maintain pilot training and qualification records for the Region. It is the individual pilot's responsibility to ensure that all records are kept up to date within the appropriate approved location.

National UAS Aviation staff will conduct quality assurance visits to the regions to review pilot training and qualification records at least every 3 years. Employee training and qualification records must meet the requirements stated in the FSH 5109.17 for all National Wildfire Coordinating Group qualifications.

Chapter 4: Operational Planning, Coordination and Procedures

Introduction

The Forest Service defines operational control as "with respect to a flight, the exercise of authority over initiating, conducting, or terminating a flight" (FSM 5700 Zero Code; 5705.1 - Definitions). As discussed in Chapter 5 and 6, the use of UAS on National Forest System (NFS) lands can be classified into two main categories:

1. The Forest Service has operational control of the UAS missions, and

2. The Forest Service does not have operational control of the UAS missions.

Operational planning requirements vary depending on the nature of and authority under which the mission will be conducted. Prior notification and early involvement of local aviation management, Regional Aviation staff, and National UAS Aviation Management Staff can help streamline the planning process and reduce the time required. See the National UAS Program SharePoint for additional Mission Planning Tools.

New mission types, payloads and non-standard operating procedures are prohibited and must be conveyed to Regional UAS Specialists who will coordinate with the National UAS Program and UASEC for approval.

General UAS Operational Provisions

Mission Aviation Safety Plans (MASP)

A Mission Aviation Safety Plan (MASP) will be developed for all UAS FS operational control missions not covered by an NWCG publication. MASP minimum requirements can be found within the National Aviation Safety and Management Plan (5709.16; 12.2).

For UAS missions on a recurring or routine basis, the required MASP can be included within a research station/unit aviation plan that shall be reviewed by the FS Regional UAS Specialist or designee annually.

Contact your Forest Aviation Officer (FAO), Unit Aviation Officer (UAO), Zone Aviation Officer, Regional Aviation Safety Officer (RASO) or Regional UAS Specialist for questions regarding MASP templates available.

Flight by Notification Criteria/Mission Planning Worksheet

Flight by notification provides a streamlined process to conduct UAS flights through notification of pertinent information to appropriate personnel of an upcoming UAS mission.

The elements of a flight by notification document are often interchangeable with a mission planning worksheet given the similarity in content. In practical terms, the flight by notification works in conjunction with a blanket MASP approval to cover the day of flight details required for properly planning a mission.

In regions that implement it, it is used to reduce the number of MASP approvals required, ensure relevant project details are covered when planning a mission, and provide notification to the appropriate aviation staff before the project occurs. Each region could have their own unique version of a flight by notification. The Fight by Notification will either be managed by the regional coordinators or the local forest aviation office.

The crew leader of the mission is tasked with conducting flight by notification and the Regional UAS Specialist should be contacted for questions regarding flight by notification.

The table below should be used as a reference when developing the key elements of a flight by notification process. It is recommended that notification be made a minimum of 24 hours prior to the mission.

Table: 1

Key Elements of a Flight by Notification		
Crew Leader and Contact Info	Flight Dates	Mission Identifier
Flight Type	Related MASP	Forest Mission is On
Land Status (land ownership)	Project location (lat/long)	Project Size (acres or length)
Remote Pilot name(s) and Contact	Visual Observers/other crewmembers	UAS FAA # and Make and Model
Airspace Class	MTR, MOA, Special Use Deconfliction	TFR Information (if applicable)
Airspace Authorization Type	Radio Frequencies	Emergency information
Notifications Required in Flight by Notification		
Forest Aviation Officer	Dispatch	UAS Coordinator
Regional Aviation Officer	Regional Aviation Safety Officer	Local Airport/ATCC (if applicable)
Notification Recommended in Flight by Notification		
Forest Supervisor	District Ranger	Neighboring Landowner

UAS Remote Pilot and Crew - Flight Time and Duty Day

Remote Pilots are limited to 8 hours of flight time during any duty day. For non-incident operations, a duty day should not exceed 12 hours except in emergencies or when extenuating circumstances warrant, with supervisory approval. All incident operations shall comply with the NWCG Standards for Fire Unmanned Aircraft Systems Operations (PMS-515) and the NWCG Standards for Fire and Fire Aviation Operations.

Operational Coordination:

1. Forests and Regions are responsible for coordinating with adjacent jurisdictional landowners for overlapping Forest Service UAS operations.

2. For operations taking off and landing on non-NFS lands, Forests and Regions will receive authorization from the appropriate authority prior to operations. This shall include anticipated periods of operation, purpose of the flights, and contact information for the responsible unit if/should questions or issues arise.

3. For flights over private land, Forest Service UAS pilots shall make every effort to notify landowners of the anticipated periods of operation, purpose of the flights, and contact information for the responsible unit if/should questions or issues arise.

4. Launch and recovery of UAS during emergency or nonemergency operations may be restricted by state and local regulation. A Remote Pilot (RP) in command shall work with local forest leadership and/or the Incident Management Team (IMT) for appropriate approvals.

5. Project areas will be evaluated in advance using best available data/information and pilots should conduct a site survey, when possible, prior to conducting UAS missions to assess topography and vegetation.

6. Flights will be planned to avoid sustained/repeated overflight of heavily trafficked roads or highways but may briefly cross over an active road if necessary for safety reasons and to accomplish the mission. Such actions will be noted on the risk assessment.

7. Forest Service pilots should always anticipate, consider, and mitigate issues due to mission site conditions (i.e., daily wind conditions, variable terrain, tree heights, density altitude, etc.)

Certificate of Waiver or Authorization (COA)

For public agencies such as the Forest Service 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. Forest Service UAS are considered public use aircraft. For UAS operating as public use aircraft operation, the authority is the COA.

These COA types include:

- Blanket COA
- Emergency COA - (Special Government Interest Waiver (SGI))

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. 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 COA's enable the Forest Service to fly UAS in a certain area for multiple flights without needing FAA approval for each individual flight within that area.

Once the Forest Service obtains a COA, it can operate a UAS 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 Forest Service or DOI would be the lead agency for obtaining an Emergency Certificate of Waiver or Authorization or a Special Government Interest Waiver depending on the jurisdiction of the fire.

All uses of the blanket COA issued to the FS must be documented in the approved agency reporting systems no later than the fifth day of the calendar month after use, for reporting to the FAA. For example, if a mission under FS blanket COA authority was flown in May, use must be reported by June 5th.

The National UAS Program Manager will be the point of contact for all COA requests for the FS.

Notice to Air Mission (NOTAM)

1. Flights conducted under 14 CFR Part 107 do not require a NOTAM.

2. Flights conducted under FS/FAA COA's will adhere to the terms of the COA's for filing of a NOTAM. NOTAM's may be filed online at https://www.1800wxbrief.com/.

3. Beyond Visual Line of Sight (BVLOS) must be conducted with an FAA Part 91 waiver or under the terms of the FS/FAA COA for flights within a Temporary Flight Restriction (TFR). If flying under a COA, follow the provisions. TFRs have an associated NOTAM.

4. Flights above 400 feet AGL must be conducted with an FAA Part 107 waiver, under the FS/FAA blanket COA, or with permission by the controlling agency when operating in restricted airspace.

5. NOTAMs filed under Part 107 flights are considered a best practice and assist with furthering airspace deconfliction.

Fleet Aircraft and Pilot Flight Time Reporting

The system of record for tracking fleet aircraft and agency pilots is AlarisPro: https://www.alarispro.com. Access to the system is available upon request to a Regional UAS Specialist or the National Data Specialist. AlarisPro is the authoritative documentation of the remote pilot's total flight time and 90-day currency.

Pilots who do not maintain a pilot card (FS5700-20B/OAS-30U) will be removed from the reporting system.

1. The agency remote pilot shall record UAS flight time using AlarisPro.
    - FS employee operating FS UAS - use AlarisPro.
    - FS employee operating DOI UAS - use OAS-2U and AlarisPro with the "External Flight Time – Rotor" aircraft selected.
    - DOI employee operating FS UAS – use AlarisPro logged in as "External Pilot".
        - Login credentials available from the National UAS Coordinator or Regional UAS Specialist.

2. Reports must be submitted monthly or at the conclusion of a project, whichever occurs first.

3. Remote Pilots will track aircraft battery use in the *New Flight Log Entry* screen utilizing the Battery drop down menus. Remote Pilots will track battery charges added to batteries utilizing the *Manage Battery Charges* button located in the *Batteries* tab.

4. Remote Pilots will track payload usage in the *New Flight Log Entry* screen utilizing the Payload drop down menu.

5. Remote Pilots will report any flight issues encountered via the *New Flight Log Entry* screen, utilizing the *Issues Encountered* drop down and provide a description of the flight issue in the *Remarks* area.
    - Any flight issue that compromises the flight safety or effective use of the aircraft requires a "Discrepancy" be added to the aircraft. AlarisPro will prompt the pilot when using the *Issues Encountered* drop down.

6. All aircraft maintenance and resolution of aircraft discrepancies shall be documented under the *Maintenance* tab. This includes but is not limited to all Preventative Maintenance, Inspections, Repairs, Functional Check Flights (FCF), and Software/Firmware updates to Aircraft or GCS.

Flight Service Contract Reporting

Flight use reporting will follow the reporting process outlined in the contract and in accordance with agency policy.

UAS and FAIRS Reporting

UAS program will work with the Branch Chief of Aviation Business Operations to ensure that quarterly and/or annual data is provided to meet Federal Aviation Interactive Reporting System (FAIRS) reporting requirements.

UAS Mishap Response

UAS pilots will follow the notification procedures outlined in Appendix D: UAS Aviation Mishap Response for UAS Flyaways and UAS Mishaps/Accidents. Certain UAS mishaps may not meet the reporting criteria below, however the National and Regional Aviation Safety staff may choose to investigate or review any UAS mishap.

*** Notifications can be delegated as needed. The local Forest/Unit/Zone Aviation Officer should be one of the first notifications made.**

UAS Flyaway:

A loss of link is the loss of command-and-control between the UAS and the ground control station (GCS), resulting in the UAS automatically returning to the home location via GPS assistance. A UAS flyaway occurs when there is a loss of link between the aircraft and the controller in addition to the aircraft losing GPS signal. The UAS should descend at a predetermined speed and drift with the wind, potentially causing unintended flight outside of the established operational boundaries or into controlled airspace. In a flyaway scenario, the Pilot in Command (PIC) does not have control of the UAS, creating an emergency situation.

UAS Mishaps/Accidents:

Federal Aviation Administration (FAA) and National Transportation Safety Board (NTSB) reporting criteria for UAS differ from piloted aircraft. The Aircraft Accident Checklist located in the NWCG Aviation Mishap Response Guide (PMS-503) will be completed by the PIC for any mishap/accident that requires repairs that are not contained in the aircrafts operating manual or been deemed field repairable.

Any UAS mishap may be investigated at the discretion of the USDA/FS National UAS Program Manager or designee. Implementing an FLA or RLS does not change the accident reporting requirements established in Appendix D: UAS Mishap Response.

UAS Mishap/Accidents often require additional information to fully understand the mishap. Aircraft flight logs, telemetry files, or flight use reports may be requested. UAS pilots involved in a mishap shall work with regional and national aviation staff to ensure proper documentation.

Supplemental information routinely collected following a mishap includes:

- Incident
- Date-time of incident
- Pilot, V.O.
- Pilot Agency
- Operational Control Agency
- Land Ownership
- Number of Injuries
- Make and model of A/C
- FAA # and Owner of A/C
- Payload
- Damage (Aircraft/Property)
- General mishap description
- Pictures if available
- Flight logs if applicable

Aviation Safety Communiqué–SAFECOM

The SAFECOM reports any condition, observance, act, maintenance problem, or circumstance which has the potential to cause an aviation-related mishap (FSM 5720). The SAFECOM system is not intended for initiating punitive actions. Submitting a SAFECOM is not a substitute for "on-the-spot" correction(s) to a safety concern. It is a tool used to identify, document, track, and correct safety related issues.

UAS Mishap/Accident Reporting to the Federal Aviation Administration (FAA) and National Transportation Safety Board (NTSB)

The FAA and NTSB have different rules to ensure proper oversight of certain UAS operations, and different rules mean that some events may have to be reported to one agency but not the other. Prior to reporting to either the FAA or the NTSB, National and Regional Aviation staff shall be notified to ensure proper documentation and criteria are met, e.g., minimum group BC Safety, National UAS Program Manager, National UAS Operations Specialist, RASO, and Regional UAS Specialist.

FAA Reporting Criteria

For operations conducted under Part 107, a remote pilot is required to report an accident to the FAA within 10 days if the event meets the criteria of 14 CFR 107.9: Accident Reporting. The regulation requires reporting of any event involving:

- Serious injury to any person or any loss of consciousness.
- Damage to property (other than the unmanned aircraft) unless the cost of repair (including labor and materials) does not exceed $500, or the fair market value of the property does not exceed $500 in the event of a total loss.

NTSB Reporting Criteria

NTSB rules, which require public and civil UAS operators to provide immediate notification to the nearest NTSB office in the event of an unmanned aircraft accident anytime between the time the UAS is activated with the intention of flight and the completion of the mission.

Under the NTSB rules, an unmanned aircraft accident/serious incident is when the operation of a UAS results in any of the events or conditions noted in 49 CFR 830.5 occur, such as:

- Any person suffering serious injury or death.
- The unmanned aircraft holds an airworthiness certificate and sustained substantial damage.
- Flight control system malfunction or failure: For a UAS, a true "fly-away" would qualify. A lost link that behaves as expected does not qualify.
- Inflight fire, which is expected to be generally associated with batteries.
- Aircraft collision in flight.
- More than $25,000 in damage to objects other than the UAS.

If the UAS Accident meets NTSB criteria for a reportable accident (not fly-aways), the WO Safety Branch will be involved to interface with the NTSB.

UAS Pilot Standdown and Return to Flight Following a Mishap/Accident

Following any mishap, the RPIC will cease UAS operations until notifications procedures are met, and appropriate Regional and National Aviation management determine the next steps. A Remote Pilot or flightcrew evaluation may need to be conducted following a mishap/accident. An authorized evaluator/final evaluator pilot must determine competency in the applicable standards required by the agency. This evaluation may consist of an oral evaluation, check ride, performance plan or a combination of each.

Removal or Suspension of a UAS Designation

Removal or Suspension of a UAS designations will follow the process outlined in FSH 5709.16 Chapter 50 for "Suspension and Revocation of Flight Qualifications," a qualification may be suspended for the following reasons:

1. Consistent failure to meet minimum aviation performance standards in ground or flight.

2. Intentional violation of agency aviation policy and/or FAA regulations.

3. Repetitive demonstration of aviation-related behaviors that are not consistent with a safety or professional aviation culture.

4. Lack of judgment in performing pilot duties.

5. Pilot exhibits habits, traits of character, or personality characteristics that make it undesirable to continue their flying duties.

Chapter 5: Forest Service Operational Control of UAS

Introduction

The U.S. Forest Service is in Operational Control of a UAS flight when it has the authority to initiate, conduct, or terminate a UAS flight. Refer to Exhibit 1 in FSH 5709.16, 14.4 for examples of agency staff actions that would result in operational control of a flight. Consult your FAO/UAO/ZAO and/or Regional UAS Specialist for any questions regarding operational control of a flight.

Non-Emergency Missions

Non-emergency missions (e.g., resource management, training, and proficiency flights) can be conducted if:

1. The aircraft being used is carded.
    a. Forest Service UAS Pilots may fly other Federal agencies approved aircraft if carded on specific make and model.

2. The pilot is a carded UAS Pilot.

3. The airspace is authorized.

4. Provisions are followed in a signed and approved Mission Aviation Safety Plan.
    a. Forest Service UAS Pilots may fly in a different geographic area utilizing the local units' MASP if approved for multi-pilot use including Interagency PASPs.

Wildland Fire Missions

The Forest Service adopts the NWCG Standards for Fire Unmanned Aircraft Systems Operations (PMS 515) in its entirety.

UAS use for Reviews and Investigations:

UAS missions requested as part of a review or investigation must be coordinated through the National UAS Coordinator. The National UAS Coordinator with assistance from regional aviation staff will determine the level of experience and equipment needed to complete the request.

**If UAS is currently assigned to an incident that is requesting such missions, this process will take place to ensure quality and experience meets the intent.*

Cooperator UAS

All cooperator flight operations under Forest Service operational control on federal lands, including federal lands protected by state agencies, shall be conducted in accordance with Forest Service policy, applicable 14 CFRs, and aircraft flight manual/pilot operating handbooks. Requests for approval of cooperator/affiliate UAS under the operational control of Forest Service must follow the process outlined in:

- NFES 2724 (Interagency Standards for Fire and Aviation Operations)
- Forest Service Standards for UAS Operations.
- FSH 5709.16 Ch. 40 – Aircraft airworthiness
- FSH 5709.16 Ch 46 – Standards for Forest Service Cooperator Aircraft

- FSH 5709.16 Ch. 50 – Aircrew Standardization
- Cooperator approval letter.

UAS Cooperator approval letters will be issued by the Regional Aviation Officer and in coordination with the National UAS Program Manager. Current policy when issuing a cooperator letter only addresses federally managed fires and does not address natural resource missions to include RX.

Good Neighbor Authority

Section Reserved: The standards and processes for the use of Cooperator UAS on NFS lands is currently not finalized. A future update of this document will provide specific guidance. Cooperator UAS use for resource management missions on NFS lands should be avoided until that guidance is formalized.

Wilderness and Wild & Scenic River Missions

There is no law, regulation, or agency policy specific to the use of UAS in wilderness areas administered by the Forest Service. See 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. However, UAS meet the definition of "motorized equipment" and/or "mechanical transport" and are therefore subject to prohibitions in law, regulation, and agency policy. Additionally, UAS use in wilderness, including the sight and sound of these aircraft in wilderness, is incompatible with preserving wilderness character, may negatively influence the natural processes of wildlife and may reduce opportunities for primitive and unconfined recreation within wilderness.

The launch and recovery of UAS, or their operation/piloting, from the ground within a designated wilderness boundaries are prohibited. UAS in the airspace over wilderness, if operated/piloted from outside wilderness, is not clearly prohibited but is generally discouraged and not recommended (FSM 2326.03 (3)). Additionally, conducting landings within wilderness or dropping or picking up anything from within wilderness while operating/piloting a UAS from outside the wilderness boundaries is prohibited. UAS launch, recovery, or operation/piloting from the ground within certain wild and scenic river corridor boundaries may also be prohibited. Always consult with the local wilderness manager/decision maker before conducting UAS operations in any special designated area.

Government Use of UAS in Wilderness Areas

- Use of UAS is prohibited if the operator or device are on the ground within wilderness boundaries; otherwise, it is discouraged (FSM 2326.03 (3)) and not recommended.
- Potential application of UAS in wilderness areas by the Government to support administrative use requires completion of a Minimum Requirements Analysis (MRA). Execution of an MRA with the support of the local administrative Forest Service unit is essential. The initial step of an MRA focused on the proposed use of UAS to support administrative actions in a wilderness area requires early engagement with the wilderness manager for the administrative Forest Service unit. Guidance for completing an MRA is provided at Wilderness Connect. The Regional Forester, or Forest Supervisor if authority has been delegated, determines if the proposed action may be necessary to administer the area as wilderness, and if so, what is the minimum amount of a prohibited activity necessary to address the issue. The results of the MRA process inform this final decision.

Emergency Support Function (ESF)/Search and Rescue (S&R)/All-Hazard Response Missions

Although Emergency Support Function, Search and Rescue and All-Hazard Response are identified in FSH 5709.16 Chapter 30 the role of the UAS Program and operational training has not yet evolved to meet these missions. Close coordination with the Forest/Unit/Zone Aviation Officer, Regional UAS Specialist, Regional Aviation Officer, and the National UAS Program Manager and case-by-case basis approvals with select UAS Remote Pilots will assist with development of best practices within these mission areas.

Law Enforcement Missions

LEI personnel shall follow the FSH 5309.11:Chapter 50, FSM 5700 and FSH 5709.16 for all aviation operations.

Law Enforcement UAS Operations

LEI (Pilot in Command) or LEI supervisory personnel that are going to utilize UAS aircraft to support aviation operations should discuss all non-law enforcement sensitive information pertaining to the operation with the Regional UAS Specialist, Regional Aviation Officer and National UAS Program Manager in advance of operations unless exigent circumstances exist; the Regional UAS Specialist, Regional Aviation Officer and National UAS Program Manager will also be briefed as soon as practical after the operation(s).

The responsible individual will prepare a MASP and submit the plan for review and approval. All LEI operations will have a MASP prior to commencing operations. Line officers should be informed of law enforcement and investigations non-covert aviation activities. Aviation operations involving Forest Service law enforcement personnel must be communicated to the responsible Forest Service dispatch service, where available. For Unmanned Aircraft System Operations refer to FSM 5713.7 and FSH 5709.16.

If any proposed flights are not covered by an appropriately established aviation plan, then a modified MASP will be prepared. The responsible LEI personnel will prepare a MASP and submit the plan for review and approval if exigent circumstances do not exist. In most cases, LEI operations will have a MASP prior to commencing operations. Line officers should be informed of LEI non-covert aviation activities.

Routine Law Enforcement Operations

All Forest Service law enforcement operations will utilize carded and approved UAS aircraft and pilots. Law enforcement operations on or over National Forest System lands will notify the local Supervisory Special Agent or Supervisory Law Enforcement Officer prior to the mission(s) taking place. All non-emergency operations will require a MASP.

Emergency or Special Law Enforcement Operations

These situations usually involve search and rescue, or medical evacuation operations. Special law enforcement situations exist where an LEI employee may become engaged in an activity while operating within the normal scope of employment, law enforcement operations will utilize carded and approved UAS aircraft and pilots. The following policies must govern emergency situations:

Follow all Forest Service internal law enforcement policies and procedures, including:

1. Operations Plan
2. Aircraft Card
3. Flight Crew Card

4. Airspace Authorization

Flight Following During Emergency Law Enforcement Operations

Adhere to the flight following check-in procedures (FSH 5709.16, sec. 32) except when conducting covert operations where the need for secure communications is essential. In these situations, utilize the following procedures:

1. Grid map reference check-ins. The flight plan must be inserted into a sealed envelope and must be opened by the dispatcher only in the event of an aircraft emergency or failure to check-in with normal specified timeframes. Flight check-ins are performed utilizing coded grid references rather than geographical location descriptors.

2. Flight following through another agency. Flight following may be performed by another agency (for example, Department of Defense, National Guard facility or Sheriff's office).

Chapter 6: Forest Service Non-Operational Control of UAS

Introduction

The U.S. Forest Service is not in Operational Control of UAS flights when it has no authority or requirement to initiate, conduct, or terminate a UAS flight to an external entity. Consult your FAO/UAO/ZAO and/or Regional UAS Specialist for any questions regarding operational control of a flight. Formalized documentation establishing a relationship between the FS and an external entity (e.g., contract, SUP, grant, or agreement) should be completed. Please ensure your Grants and Agreements Specialist includes the UAS Agreement in section of the Appendix B.

Hobbyists and Recreationalists

Individuals and organizations that fly UAS for hobby or recreational purposes are encouraged to visit the Tips for Responsible Recreational Use of Unmanned Aircraft Systems (UAS) on National Forest Systems Lands | US Forest Service (usda.gov) page for further guidance on National Forest lands. There is federal legislation (law) that describes how, when, and where individuals can fly UAS for recreational purposes. All persons are considered a recreational UAS user if they fly the aircraft for fun. The FAAs, Recreational Flyers & Modeler Community-Based Organizations link provides with the most up to date guidance, to assist communicating with hobbyists.

Recreational use of UAS in Wilderness is prohibited. UAS are 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.

University or Non-profit UAS use on NFS lands.

When a University (Private, Public, or State Controlled Institution of Higher Education) or other educational institution (HBCU or TCCU) or non-profit with or without 501C3 status proposes to collaborate with the Forest Service on a project that contemplates the use of UAS on or affecting NFS lands:

1. Remote Pilots conducting the UAS flights must meet all applicable federal, state, and local requirements (Example: 14 CFR 107).

2. Local Forest Service point of contact (e.g., Forest natural resource manager or Forest FMO) shall verify with their Grants and Agreement Specialist that legal authority to conduct activities on or affecting NFS land is available and formalized documentation establishing the relationship with the University or the non-profit entity exists.

3. The local Forest Service point of contact may also consider contracting if an agreement is not the appropriate tool.
    a. If no formalized documentation exists, local Forest Service point of contact will coordinate with their Grants and Agreement Specialist and the University/non-profit entity to draft documentation formalizing the relationship prior to the commencement of activities.
    b. If the documentation has objectives where UAS is required to meet objectives specified and determined by the Forest Service, the Forest Service assumes operational control of the flights. If the Forest Service assumes operational control, then the University/non-profit may not be the correct method for completing the UAS mission.
    c. If the agreement provisions define the project deliverables (e.g., data, imagery) but does not specifically define how the project is to be accomplished (e.g., data/imagery collection method),

the decision to use UAS is up to the cooperator and removes the Forest Service from having operational control. In this situation, accountability for any aircraft accident rests with the University/Non-Profit.

Considerations:

If Universities are working on a project through a Partnership Agreement with the Forest Service where there is mutual interest and mutual benefit (FSH1580 Ch70), then no special use authorization is needed. However, supplemental documentation (e.g., statement of work, financial plan, map with boundaries, or letter from District Ranger) is required. See Appendix B: Resource Management, 10.0 UAS Agreement Language.

If no mutual interest or mutual benefit exists between the University and the Forest Service, then a special use authorization or contract may be required. For more info on Special Use, see the section below titled "Commercial UAS Use and Special Use Authorization Requirements."

Contractors

End-Product Contracts

An end-product contract is intended to accomplish certain projects efficiently and effectively with no internal operational controls or specifications from the Forest Service. An end product contract requires the project be completed but does not specifically define how the project is to be accomplished. The decision to use an end-product contract removes the Forest Service from having operational control, thereby placing accountability for any aircraft accident with the operator/contractor.

Reference the FSH 5709.16 Chapter 10 for more information regarding the use of aviation with end-product contracts.

Service Contracts

Section Reserved: The standards and processes for the use of UAS service contracts on NFS lands is currently not finalized. A future update of this document will provide specific guidance. UAS service-based contracts for missions on NFS lands shall be avoided until guidance is formalized.

Commercial UAS Use and Special Use Authorization Requirements

Use of National Forest System (NFS) lands often requires a special use authorization (SUA). Regulations at 36 CFR 251 Subpart B states the following: (a) All uses of National Forest System lands, improvements, and resources, except those authorized by the regulations governing sharing use of roads (§ 212.9); grazing and livestock use (part 222); the sale and disposal of timber and special forest products, such as greens, mushrooms, and medicinal plants (part 223); and minerals (part 228) are designated ''special uses.''

A SUA is a written permit, term permit, lease, or easement that authorizes use or occupancy of National Forest System (NFS) lands and specifies the terms and conditions under which the use or occupancy may occur (36 CFR § 251.51). The authorization is granted for a specific use of the land for a specific period of time.

There is no UAS-specific SUA. UAS are tools of the trade just like canoes, horses, hand-held video cameras, or dozers. If approved, use of a UAS would be authorized as ancillary to a primary use (e.g., outfitter/guide or

utility authorizations) and any conditions for UAS operations would be incorporated into an Operations and Maintenance (O&M) Plan. See Exhibit 2 in FSH 2709.11, 10 for a description of the uses that require a SUA, including the following examples:

- Utility company or concessionaire inspection of their improvements on NFS lands.
- Support to recreation events, such as races, contests, club activities.
- Any kind of commercial filming or still photography operations except for news media filming ongoing news events or background video which do not require an SUA.

No commercial use of UAS in the Wilderness will be authorized. See The Wilderness Act P.L. 88-577, Section 4 (c) and *Wilderness and Wild & Scenic River Missions* in this chapter.

Individuals or entities considering use of commercial UAS operations on NFS lands under a SUA need to coordinate with the special-use program manager or designee on the local FS unit to determine if an SUA is required. An SUA applicant will need to successfully obtain a SUA that addresses the following requirements:

- All applicable federal, state, and local requirements (Example: 14 CFR 107) that pertain to remote pilots and aircraft conducting the UAS flights.
- "Notification of Flight" criteria and requirements
- Documentation of planned UAS use in the SUA O&M plan.
- SUA review and approval by the Forest Line Officer
- Prohibition of drone use in Congressionally Designated Wilderness or Wildlife Closure Areas.
- Avoidance of flying drone near or over wildlife and other visitors (drone shall be kept a minimum distance of 100 yards from wildlife)

Commercial UAS operations for UAS and end product contract activities on NFS lands require successful notification of the Forest/Unit/Zone Aviation Officer preferably two weeks in advance of, but no less than 24 hours before, planned UAS operations allowed under an SUA or end product contract.

Wilderness and Wild & Scenic River Missions

Non-FS operational control UAS missions occurring within these areas follow the same policy requirements listed in Chapter 5: Wilderness and Wild & Scenic River Missions.

Other Federal Agencies

The use of another federal agency's (e.g., Department of Interior, Environmental Protection Agency, US Army Corps, or U.S. Department of Transportation) UAS and pilot to fly resource management missions on NFS land is permitted if the below stipulations are met:

1. Confirm with the partnering federal agency that their aviation policy permits them to fly resource management missions on NFS lands.

2. If partnering Federal Agency is permitted to fly:
    a. Local Forest Service point of contact (e.g., Forest natural resource manager or Forest FMO) shall verify with their Grants and Agreement Specialist that documentation establishing the

relationship with the other federal agency exists. This documentation can exist in the form of either a Memorandum of Understanding (MOU) or an Agreement.

3. If no formalized documentation exists, local Forest Service point of contact will coordinate with their Grants and Agreement specialist and the other federal agency to draft documentation formalizing the relationship.

Chapter 7: UAS Typing and Call Signs

The Forest Service has adopted NWCG standards for UAS typing and call signs utilized in emergency response activities. UAS are built in a multitude of configurations, which makes classification difficult. All UAS have varying capabilities and limitations. Utilization of the appropriate make and model is essential to ensure requested product is delivered. For example: some UAS have fixed cameras and others are on a gimbal-based system with interchangeable sensors. This section is intended to provide generic operational characteristics.

UAS Call Signs

Incident Operations

Call signs will only be provided to UAS that will be utilized on incident operations. Unmanned Aircraft System Pilots (UASP) will follow established incident communications protocols by utilizing current NWCG PMS 515 policy, as instructed in S-373 or RT-373. See Table 2.

Non-Incident Operations

Call signs will be discussed and agreed to prior to conducting UAS missions and will follow local communication procedures. Current best practice is to follow the call sign and procedures outlines in PMS-515

Table 2. UAS Types and Statistics (Source: National Wildfire Coordinating Group-PMS 515)**.**

Type	Configuration	Endurance	Data collection altitude (agl-feet)	Max. range (miles)	Typical Sensors*
1	Fixed-wing Rotorcraft	6-14 hours NA	3,500-8,000 NA	50 NA	EO/Mid-wave IR High quality IR
2	Fixed-wing Rotorcraft	1-6 hours NA	3,500-6,000 NA	25 NA	EO/Long-wave IR Moderate quality IR
3	Fixed-wing Rotorcraft	20-60 minutes 20-60 minutes	2,500 and below 2,000 and below	5 5	EO/IR Video and stills Moderate quality IR
4	Fixed-wing Rotorcraft	Up to 30minutes Up to 20 minutes	1,200 and below 1,200 and below	<2 <2	EO/IR Video and stills Moderate quality IR

**Sensor payloads are variable but typically include daylight (electro-optical), infrared (IR), thermal, or mapping cameras. Type 1 and 2 UAS carry multiple camera types in a gimbaled configuration.*

Note: Certain aircraft are specialized and will not fit this classification. The table provides a genericized flight characteristic of altitude and endurance.

Operational Characteristics

Type 1 and 2

These aircraft will generally be operated by contractors and provide strategic situational awareness (SA), mapping and intelligence surveillance and reconnaissance (ISR), provide data for monitoring, measuring, assessments, and planning for natural resource management purposes.

- They typically operate above all other incident aircraft.
- Communications are maintained with the UAS crew on the assigned Victor (AM) or air-to-ground (FM) frequencies.

- All Type 1 and 2 contract aircraft will be equipped with Mode C transponders.
- Example aircraft are the Flex Rotor or FVR90.

Type 3 and 4

These aircraft are generally agency operated and perform tactical SA or mapping missions on/near the fire line or incident. For resource projects, these aircraft provide smaller scale monitoring, measuring, and aerial photography.

- Most do not carry transponders.
- Communications are maintained with the UAS crew only on assigned FM frequencies.
- None are equipped with Automated Flight Following (AFF) equipment.
- Example aircraft are the Anafi (RW), Alta X and Switchblade (RW).

Chapter 8: Aircraft

Acquisition

The National UAS Program Manager supervises the National UAS Fleet Specialist who is responsible for planning, acquisitions and managing UAS fleet availability. UAS are subject to regulations governing the procurement and management of aircraft. FSM 5703.2 assigns UAS registration responsibility to the Washington Office, and FSH 5709.16. Chapter 10 directs that all aircraft acquisition, including UAS, follow a specific planning and approval process. Requests for UAS acquisitions must be routed through the Regional UAS Specialist to the National UAS Fleet Specialist.

UAS Acquisition Procedures

UAS acquisition will follow the same policy in FSM and FSH for aircraft. UAS will be managed by the National Fleet Specialist with Regional UAS Specialists as custodians. Custodians must ensure UAS use and maintenance logs in accordance with FSH 5709.16 Chapter 40 for all assigned UAS are up to date. All acquisitions must be submitted by the Regions utilizing directions outlined on the National UAS SharePoint Site.

Note: All UAS acquisitions and contract actions must come from the National UAS Program Manager or delegated to the National UAS Fleet Specialist. NO LOCAL PURCHASES OR PROPERTY TRANSFERS ARE AUTHORIZED.

Airworthiness

The Unmanned Aircraft Systems Evaluation Committee (UASEC) will develop and oversee Forest Service UAS evaluations and approvals. Criteria will be established by the UASEC for mission requirements, airworthiness specifications, and operational compatibility. Once a UAS meets the established criteria, it can be submitted for Forest Service approval.

The American Society for Testing and Material (ASTM) UAS (Lightweight) Airworthiness Standards (F3298-19) are the benchmark for USDA Forest Service UAS for maximum gross weights of 80 pounds and below. This specification provides the core requirements for airworthiness certification of lightweight UAS (not necessarily limited to UAs under 55 pounds (GTOW). This is based on Forest Service UAS missions being public aircraft operations. Standards referenced within F3298-19 should be considered as these are best practices for the associated requirements.

Maintenance

The Branch Chief Airworthiness in coordination with the Forest Service National UAS Program Manager have the authority to review and approve all inspections, maintenance actions and Return-to-Service determinations for all Forest Service-owned and/or operated UAS aircraft. This authority may be delegated to a qualified inspector (MU1, MU2, MU3, MU4) as determined and designated by the Branch Chief Airworthiness in coordination with the Forest Service National UAS Program Manager.

All maintenance will be entered into the specific aircrafts log in AlarisPro. A thorough explanation of what was done and/or what was replaced is required.

Annual Inspection

The Branch Chief of Airworthiness and the National UAS Program will determine who will be delegated responsibility of conducting Annual Inspections (aircraft carding). This will be determined by size and complexity of the platform. These inspections will look at all components, software, firmware, payloads, and peripheral equipment. Upon successful completion of the Annual Inspection, a new Aircraft Data Card will be issued.

Repairs

Unscheduled repairs may be accomplished when authorized in the field after consulting the Regional UAS Specialist, Forest/Unit/Zone Aviation Officer, and UAS Fleet Manager. For large or complex repairs, it will be required to go out of service until approved repairs are made or a replacement aircraft is in place. Units are responsible for Return-to-Service determinations in accordance with direction of the National UAS Fleet Manager and/or National UAS Program Manager. Repairs will only be done based on authorized repairs from manufacturers Maintenance Manual, under direction of the manufacturer, and based on repair training completed during platform training.

All repairs will be entered into the specific aircraft's log in AlarisPro. A thorough explanation of the repair is required.

UAS Payloads

All UAS payload configurations must be in accordance with the approved payloads listed on the Aircraft page of the National UAS Program SharePoint. Units requiring custom payloads, or any non-approved payloads will work with the UASEC to obtain payload approval. Some payloads may require additional training, that must be coordinated prior to acquisition to obtain the necessary training requirements. For example: Drone Amplified Ignis II payload and lidar requires additional training, carding, and certification.

UAS Software and Applications

To utilize additional ground control station (GCS) software or applications to operate UAS, Forest Service Remote Pilots must fly with a designated agency approved pilot with experience in the specific software/application and complete the recommended training elements. A list of approved Software and Applications and their versions is maintained on the Aircraft page of the National UAS Program SharePoint. Remote Pilots requesting to utilize unapproved GCS software/applications shall direct the request to the UASEC through UAS organizational chain of command.

UAS Property Management and Security

Each UAS will have an assigned Custodian that is responsible for management and security of the system. The Custodian will work with the designated Accountable Property Officer (APO) to ensure property management policies are followed. Ensure that UAS and payloads are used and stored in accordance with FSM 6414, Property Management Controls. Follow aviation security policies and procedures as defined in FSH 5709.16, Chapter 38.

Each region/custodian must have in place the following security plan requirements:

- Sign-in, sign-out processes
- In office security
- Travel requiring overnight lodging in hotel

- Incident and fire camp storage
- Theft or vandalism

Theft or vandalism:

In the event UAS and equipment is lost, stolen, or vandalized while on home unit, the responsible party shall immediately call the regional UAS Specialist, home unit UAO/FAO and unit FS LEI Patrol Captain. If assigned to an incident notify Air Operations, Incident Security, hosting unit FS LEI Patrol Captain, home unit UAO/FAO and Regional UAS Specialists. If UAS is stolen or vandalized while in travel status, follow home unit notifications and file a police report with local law enforcement agency. Utilize the issued AD-107 with serial numbers and provide in the initial report.

Aircraft Disposal

The National UAS Fleet Manager with collaboration with the National UAS Program Manager are responsible for following Federal property policies and procedures for UAS Aircraft Disposal.

Chapter 9: Privacy, Civil Rights, and Civil Liberties Protections:

Introduction

The use of UAS significantly expands the FS ability to obtain remotely sensed and other observation data critical to fulfilling business needs. However, this use raises distinct privacy, civil rights, and civil liberties concerns that must be addressed to promote the responsible use of UAS and protections for individual privacy, civil rights, and civil liberties of FS staff and the public in accordance with the Constitution, Federal law, and applicable regulations and policies.

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

Privacy Protections

Considering the advancements in UAS technologies and diverse potential uses of UAS FS staff areas and programs, it is imperative that USDA take appropriate steps to implement UAS policies that address privacy protections, procedures, and standards to ensure compliance with the Privacy Act of 1974, USDA Privacy Act regulations, Departmental privacy policies, and other applicable laws, regulations and policies. Accordingly, FS units utilizing UAS, or UAS-collected information shall meet the following privacy requirements:

1. FS staff shall only collect information using UAS, or use UAS-collected information, to the extent that such collection or use is consistent with and relevant to an authorized purpose and FS/DOI privacy policy.

2. Information collected by or on behalf of the FS using UAS that may contain personally identifiable information (PII) shall not be retained for more than 180 days unless retention of the information is determined to be necessary to an authorized mission, is maintained in a secured system of records covered by the Privacy Act or is required to be retained for a longer period by any other applicable law or regulation.

3. The FS shall take appropriate steps to ensure that UAS-collected information that is not maintained in a system of records covered by the Privacy Act is not disseminated outside of the agency unless dissemination is required by law or fulfills an authorized purpose and complies with the agency's mission.

Civil Rights and Civil Liberties Protections

Purpose

The Departmental Regulation (DR) 3465.002 (October 7, 2019) establishes the policy for the reporting and management of Unmanned Aircraft Systems (UAS) activities and the acquisition/management of data acquired by UAS within the United States Department of Agriculture (USDA). This Departmental Regulation defines the strategic direction necessary to ensure the safeguarding of privacy, civil rights, and civil liberties of the citizens of the United States and USDA personnel when using UAS.

Scope

Departmental Regulation (3465.002) applies to all USDA Mission Areas, agencies, staff offices, programs, teams, organizations, appointees, and employees. This includes contractors and grantees operating on behalf of USDA.

To protect civil rights and civil liberties, Forest Service program managers, coordinators and pilots shall:

1. Become familiar with DR 3465.002 (Privacy, Civil Rights and Civil Liberties with Unmanned Aircraft Systems (UAS)).

2. Ensure that policies are in place to prohibit the collection, use, retention, or dissemination of data in any manner that would violate the First Amendment or in any manner that would discriminate against persons based upon their ethnicity, race, gender, national origin, religion, sexual orientation, or gender identity, in violation of law.

3. Ensure that UAS activities are performed in a manner consistent with the Constitution and applicable laws, Executive Orders, and other Presidential directives.

4. Ensure that adequate procedures are in place to receive, investigate, and address, as appropriate, privacy, civil rights, and civil liberties complaints.

Accountability

To provide for effective accountability, the FS, in conjunction with the Office of the Chief Information Officer and the Office of Civil Rights, will provide collaborative oversight of the FS UAS program within their respective areas of expertise and responsibility. FS programs employing UAS, or UAS-collected information shall comply with Departmental oversight activities and take additional appropriate steps to ensure effective oversight and accountability for their respective UAS programs.

Accordingly, bureaus and offices shall ensure:

1. Oversight procedures are implemented for UAS use, including audits or assessments, in compliance with Departmental policies and regulations.

2. FS personnel and contractors comply with UAS program training requirements, rules of behavior, and procedures for reporting suspected cases of misuse or abuse of UAS technologies.

3. Policies and procedures are implemented that provide meaningful oversight of individuals who have access to sensitive information (including any PII) collected using UAS consistent with applicable Federal laws, regulations, and policies, as well as Departmental policy guidance.

4. Any data-sharing agreements or policies, data use policies, and records management policies applicable to UAS conform to applicable laws, regulations, and policies.

5. Policies and procedures are implemented to authorize the use of UAS in response to a request for UAS assistance in support of Federal, State, local, tribal, or territorial government operations. Any

authorized use, letter of authorization, or memorandum of understanding must include the requirements of this policy and appropriate safeguards to protect privacy, civil rights, and civil liberties.

6. State, local, tribal, and territorial government recipients of Federal grant funding for the purchase or use of UAS for their own operations have in place policies and procedures to safeguard individuals' privacy, civil rights, and civil liberties prior to expending such funds.

Transparency

The FS UAS program will complete the following activities to promote transparency about UAS activities within the National Airspace System (NAS), while not revealing information that could reasonably be expected to compromise law enforcement or national security:

1. Provide notice to the public regarding where FS's UAS are authorized to operate in the NAS.

2. Keep the public informed about the FS UAS program as well as changes that would significantly affect privacy, civil rights, or civil liberties.

3. Make available to the public, on an annual basis, a general summary of FS UAS operations during the previous fiscal year.

Chapter 10: Data and Information Technology (IT) Management

Current regulatory guidance informs the 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.

Stored data should follow the USGS UAS Data Delivery Specification, which will prepare it for inclusion into a CIO provided data system. All stored data shall follow regulations regarding Privacy Protection as outlined in Chapter 9. The current Forest Service UAS data storage and governance policy can be found at the National UAS SharePoint site.

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 CIO will occur by the National UAS Program Manager and the UASC to ensure appropriate data security and data regulations are met.

Natural Resources Operations

Data Storage

All data collected in support of Agency Natural Resources Operations shall be stored in the Imagery Data Management (IDM) system managed by the Chief Information Office (CIO). Data collected during training, proficiency or other data deemed non beneficial long term to the Agency does not need to be stored in the IDM system. Data stored outside of the IDM system shall follow the USGS UAS Data Delivery Specification, which mirrors IDM data standards and prepares it for inclusion into IDM. All stored data shall follow regulations regarding Privacy Protection as outlined in Chapter 9. The current Forest Service UAS data storage and governance policy can be found at the National UAS SharePoint site.

Pilot Responsibility

Imagery Data Management (IDM) provides the Agency with a standard and simplified system of data storage, management and governance. Additionally, IDM provides an automated data processing system that produces standard basic data products. Basic data products include orthomosaics, point clouds and digital surface models.

The baseline data responsibility for a UAS pilot is:

1. Collect raw data/video and provide appropriate quality control checks.

2. Upload raw data/video into IDM and provide complete and accurate metadata.

3. Perform quality assurance checks to the automatically generated data products.

4. Upload any applicable planning and supporting documentation.

5. Ensure the data requestor receives the processed data from IDM.

IDM allows the upload of data products that are processed outside of the IDM system. It is optional for a pilot or data specialist to process the basic data products outside of IDM; however, the raw data and base products need to be uploaded into the system before the project is closed out.

Incident Operations

Data collected in support of ongoing Wildfire and All Hazard incidents shall follow all applicable NWCG data requirements. Pilots should make a reasonable effort to provide collected data (including video) to the Documentation Unit on an Incident. Current data requirements can be found on the Interagency UAS – UASD Toolbox page.

Chapter 11: Safety and Operational Risk Management

Safety is the key consideration for all aspects of Forest Service Aviation & UAS operations. A safe UAS operation depends on the accurate risk assessment and informed decision-making. The Forest Service UAS Program adopts NWCG PMS-530. Any team member is encouraged to speak up if they believe an unsafe act is about to occur.

Personal Protective Equipment

All UAS operations will utilize the Forest Service Health and Safety Code Handbook 6709.11.

Safety Awareness

Safety awareness is a mental attitude fostered by proper management and supervisory procedures. FS management must be a partner in aviation safety to ensure that the standards and procedures established are understood and adhered to. This means that where operational decisions must be made, they are made prudently, with safety given priority over mission accomplishment. This requires individuals to know how to do a job or mission properly, applicable FS policies, approved operating procedures, and how to follow them consistently. With a good safety awareness attitude and well-trained individuals, most aviation accidents can be prevented.

Safety Policy

FSH 5709.16 Chapter 20 establishes a policy to develop a safety culture that incorporates the four pillars of SMS (Promotion, Assurance, Risk Management, and Policy) that consistently strives to prevent aviation accidents. This policy requires all employees involved in FS aviation activities to be active participants in safety management. Aviation managers are committed to supporting the Agency in developing, implementing, and continuously improving the aviation program.

The FS UAS program is committed to implementing a fully functional Aviation Safety Management System. In many ways, UAS operations share the same characteristics as manned aviation. Some aspects require special safety attention due to their differences from manned aviation.

The FS UAS program will continually review and update this safety policy. In addition, employees utilizing UAS are expected to base risk management actions off this policy, supplement and modify as appropriate, and report these changes to the FS UAS program.

Safety Planning

The FS UAS program is managed in accordance with an approved Programmatic Risk Assessment. Employees should familiarize themselves with this since it forms the foundation of all UAS operations and programmatic risks. A-450 and prerequisite Interagency Aviation Training (IAT) courses include the most current operational best practices.

FS UAS operations must be planned and conducted by employees proficient in the aspects of aviation safety that are built into the Forest Service's UAS training and qualification system. It is critical that operational planning and safety planning are performed together, with full attention to the fact that any change in one affects the other.

Prior to mission a flight risk assessment must be conducted. In practice, most pilots and managers use the General Assessment of Risk (GAR) also known as a Green, Amber, Red. Each region may have distinct GAR details. The recommended UAS Flight Risk Assessment tool template can be located on the National UAS SharePoint.

A key aspect of the Forest Service's SMS is its commitment to continuing improvement. To realize this commitment, the FS practices and promotes a just, learning, reporting culture. It is natural that even the best planning is usually met by unforeseen circumstances. The organization becomes safer and more effective when employees who encounter these unforeseen circumstances share the information. The primary method of reporting and managing safety-related occurrences for all aviation activities is the SAFECOM system (https://www.safecom.gov/). UAS are included in the Aircraft type selection options for both searching and reporting. All SAFECOM reports receive follow-up to ensure the appropriate corrective actions are documented and shared with all who can benefit from them.

Mishaps occurring during missions should also be reported immediately by FS UAS pilots to the Forest/Unit/Zone Aviation Officer and the Regional Aviation Safety Officer. FS UAS pilots shall also submit SAFECOM reports for such mishaps as well as incidents, hazards, maintenance issues, mechanical failures, etc. and the corrective actions taken by FS pilots and/or lessons learned for the benefit and education of the aviation community.

Safety Management Systems (SMS)

The commitment to safety will be reflected within aviation safety management. The adoption of SMS continues the application of Forest Service directives. SMS is not a safety program; rather it is a system which aligns, assesses, and organizes an organization's existing safety processes around the concept of system safety. SMS incorporates a proactive approach using hazard identification and risk management to achieve accident prevention.

- The Forest Service Aviation Safety Management System is available through your Regional Aviation Safety Officer

* Forest Service Aviation Safety Management Systems Webpage.

UAS Operational Risk Management

Operational Risk Management (ORM) is a continuous, systematic process of identifying and controlling hazards to increase certainty of outcomes. The goal of ORM is to improve operational effectiveness by anticipating hazards and reducing the potential for loss, thereby increasing the probability of a successful operation.
The USDA Forest Service is embracing development of an ORM process to better plan for and address the inherent risks that our employees face. The ORM Guide is a part of this effort. Adoption and implementation of ORM will allow the Forest Service to enhance employee capacity to identify, evaluate, and control risks across the full spectrum of work activities and improve the ability to accomplish objectives as safely and efficiently as possible.

1. Operational Risk Management (ORM)

2. Provide Aviation safety oversight and review through active field presence and encourage a reporting culture between management and aviation.

3. Monitor established standards and procedures and make corrections as needed.

4. Monitor accident and incident trends and implement appropriate prevention action.

5. Report accidents and incidents with potential in accordance with the local emergency response plan.

6. Conduct accident and incident investigations.

7. Provide guidance, coordination, and monitoring of safety evaluations conducted by the Regional aviation staff and Forest/Unit/Zone Aviation Officers and the National UAS Program Manager.

8. Assist in aviation activities to ensure best practices and procedures are understood.

9. Promote and provide corrective action on SAFECOM reports, develop trend analysis and communicate lessons learned.

10. Review aviation accident and incident reports and follow-up on action items.

Quality Assurance (QA) and adaptive management techniques can be used to provide a structured process for achieving objectives. Forest Service efforts to date have concentrated on the development and implementation of comprehensive policy revision, risk management processes, SMS promotion and trainingF.

Appendix A: Glossary and Acronyms

Refer to the follow links for definitions and acronyms.
Forest Service - Forest Service Manual 5705.1
National Wildland Fire Coordination Group - NWCG Glossary of Wildland Fire (PMS-205)
General Services Administration - 41 CFR 102-33.20 Management of Government Aircraft
Federal Aviation Administration/Department of Transportation FAA Pilot/Controller Glossary

Appendix B: Resource Management

1.0 Introduction

Unmanned aircraft systems (UAS) have the potential to augment and leverage the USDA Forest Services' capacity to gather information in support of resource management activities. Forests and grasslands across the nation are facing serious challenges. For example, but not limited to insects, disease, drought, invasive species, wildfire, and extreme weather events all threaten forest health and productivity. Millions of acres of National Forest System lands need restoration treatment to build more resilient forests and grasslands. Having sustainable, healthy, resilient forests and grasslands in the future depends on our ability to increase the efficiency of work on the ground today. Geospatial products derived from UAS collected data may be used to help the Forest Service deliver world-class science, technology, and land management practices to achieve our resource management goals.

1.1 Document Purpose

Given the breadth and diversity of the agency's mission, it is anticipated that UAS use cases for resource management will significantly grow and eventually become a predominant application area for the technology. This appendix complements guidance provided in the *Forest Service Standards for UAS Operations* to enable agency staff to successfully scope, plan and execute UAS projects to support resource management activities. This appendix is developed in coordination with multiple staff areas and provides guidance with policy references and procedural information for Forest Service, partner, and commercial uses of UAS for resource management activities on National Forest System (NFS) and other lands.

1.2 Document Scope

The scope of resource management for the purpose of this guide includes the activities of the 20+ staff areas and approximately 45 major programs that operate under the National Forest System (NFS), State, Private and Tribal Forestry (SP&TF), Research and Development (R&D) and Business Operations deputy areas and within the Office of the Chief. These staff/programs lead and coordinate the management, protection, multiple use, research and stewardship of natural and cultural resources and infrastructure on the nation's forests and grasslands. This document provides guidance for resource management UAS missions conducted under these general pathways and situations where FS operational control and non-operational control may occur. In this context, FS operational situations occur when the FS exercises authority over initiating, conducting, or terminating a flight. FS non-operational control situations occur when there are no controls, specifications, management, or requirements from the FS for conducting flight activities.

To avoid unnecessary duplication of topics, guidance and policy covered by parent documentation, an effort has been made to summarize this material, frame it in the context of resource management and provide references and links to parent documentation as appropriate.

2.0 Operational and Policy Considerations

Program Policy and Administration

Aviation operations require regulations, manuals, guides, and checklists to execute and coordinate operations in a safe and effective manner. All resource management UAS missions will adhere to applicable federal policies. To ensure adherence to the appropriate policy and regulations contact the local Forest/Unit/Zone Aviation Officer.

- The Forest Service Standards for UAS Operations and other aviation manuals, handbooks, standards, guides, and plans may be referenced at U.S. Forest Service and Interagency Aviation Publications.

3.0 Resource Management UAS Mission Types and Anticipated Uses

UAS is a rapidly evolving technology with capabilities to address numerous unmet/underserved information needs as well as support the development and implementation of innovative applications. In a recent survey of Forest Service staff, respondents identified timber/forest management, fire management, riparian/hydrological surveys, forest health surveys and forest inventory as the most frequent types of UAS missions to be conducted in the agency. A list of resource management disciplines and application areas likely to benefit from the use of UAS technologies includes:

- Abandoned Mine Land Surveys
- Air Quality Monitoring
- Archeology/Cultural Resource Surveys
- Communication Repeaters/Relays
- Field Sampling
- Forest Health Detection/Monitoring Surveys
- Fuels Treatment Monitoring
- Geological Hazard Assessments
- Hydrology/ Stream Surveys
- Infrastructure Inspection/Monitoring
- Invasive Species Detection/Monitoring Surveys
- Paleontological Surveys
- Reforestation Surveys
- Search and Rescue
- Pesticide Application/Spraying
- Post-Fire Assessments
- Rangeland Management
- Restoration Monitoring
- Soil Mapping
- Timber Planning or Management Operations
- Topographic/Boundary Surveys
- Tree Nursery Surveys
- Tree Seeding and Fertilization
- Unmanaged Recreation Assessments
- Vegetation Mapping/Assessments
- Water Sampling
- Weather Observations/Monitoring
- Wildlife Surveys/Monitoring

New mission types, payloads and non-standard operating procedures are prohibited and must be conveyed to Regional UAS Specialists who will coordinate with the National UAS Program and UASEC for approval.

4.0 Scoping and Assessing the Need for Use of UAS

As a science-based organization, the Forest Service leverages technologies that are safe, cost-effective, and correctly aligned to the given requirement. Remote sensing is an essential technology for supporting the Forest Service mission. Nearly all staff/program areas of the agency benefit from the routine availability of aerial and

satellite imagery for resource mapping and monitoring. However, agency requirements for observations and derived data products cannot be met by the spatial and temporal resolution typically provided by these sources of remote sensing data. Additional capability is needed to address existing gaps in observations and data collection.

UAS is a rapidly evolving technology and considered by some to be a "disruptive" technology. However, unlike other disruptive technologies that typically displace the use of established technologies and methods, UAS should not be viewed as a universal solution to all remote sensing needs. Information needs for projects, operational support activities, etc. should first be determined then subsequently translated into requirements and documented. These requirements should then be aligned with the safest, most technically feasible and cost-effective asset from available technologies and tools. In this context, UAS should be viewed as another tool in the remote sensing tool chest that complements, not replaces, traditional remote sensing technologies and fills requirements gaps not currently met by those technologies.

In summary, UAS remote sensing payloads collect multiple types of data for use in a wide variety of mapping, reconnaissance, inspection, sampling, and related resource management applications. However, other remote sensing platforms and sources also provide observational data at relatively high spatial and temporal resolutions and may be more efficient and cost-effective means for collecting data in particular situations. UAS may or may not be the best tool to acquire necessary data to meet your resource management project needs, or existing data that meet project requirements may already be available. Please refer to the *"What Can UAS Do for You?" Story Map* for additional guidance on:

- Alternative data sources to consider for your project, including high resolution imagery, lidar and derivative products.
- Remote sensing data that can be collected with UAS as well as geospatial data product derivatives from these acquired data.
- Technical specifications to prescribe for derivative geospatial data products which have implications on the planning and execution of source remote sensing data collection.

5.0 Considerations Prior to Initiating a UAS Project

If no current data exists or meets your project needs and UAS is determined to be the most appropriate platform and technology to capture necessary data, it is important to consider and plan each stage of the project. This ensures effective planning to develop an appropriate technical approach to address the unique situations presented by each project, an understanding the required level of effort to successfully complete the project and ensures development and delivery of geospatial data products that meet necessary technical requirements.

The agency has conducted numerous resource management UAS projects in recent years under the auspices of the National UAS Program. Please refer to the *"What Can UAS Do for You?" Story Map* for guidance on project scoping considerations, including:

- Assessment of project site conditions and recommended operations based on those conditions.
- UAS platform technical capabilities and past performance project data collection metrics.
- Resources and practices to support effective data processing, management, and dissemination.
- Who will process and analyze the UAS data collected?
- How will the UAS data be utilized in resource management decisions?

6.0 Use of UAS in Special Designated Areas

UAS are considered both “motorized equipment” and “mechanical transport” and, as such, they cannot be launched from, land in, or be operated from congressionally designated wilderness areas. UAS flights over congressionally designated wilderness areas or primitive areas while operating them from outside wilderness boundaries is not clearly prohibited but is general discouraged and not recommended. Please see Chapter 5 of the Forest Service Standards for UAS Operations for additional guidance.

Regarding the above described UAS activities within certain wild and scenic river corridor boundaries, these activities may also be prohibited. Consult first with the local wilderness manager/decision maker before conducting UAS operations in any special designated area.

UAS Trip Report

A UAS trip report is an optional job aid that summarizes a UAS project’s participants, equipment, and accomplishments. The report is scalable to the requesting units needs and the project’s complexity. A UAS Trip report example can be found on the FS National UAS SharePoint Site.

New mission types, payloads and non-standard operating procedures are prohibited and must be conveyed to Regional UAS Specialists who will coordinate with the National UAS Program and UASEC for approval.

7.0 Requesting UAS

7.1 Resource Management Mission Ordering Process

Each Region has their own tool(s) and methods for receiving orders and coordinating with Remote Pilots. All roles and responsibilities need to be identified and assigned during the mission planning and ordering process. The UAS pilot typically fills the Data Collector role and may not specialize in data processing or analysis. Data requestor is expected to be responsible for data processing and analysis. The flow chart below is an example meant to help understand the normal process/workflow for ordering Resource Management missions. Orders may not go through dispatch for Resource Management missions.

Before requesting a project, ensure proper project scoping is completed.

- Estimated start and end date.
- A brief description of the project and need for imagery.
- Latitude and longitude of the center point (if possible).
- If the project is in or near a wilderness area.
- If the project is over urban or densely populated areas.
- Approximate size of the project area.
- Time of year that is best to complete the project (if applicable).
- If a current MASP is complete.
- Data products desired if known.
- Who will process and analyze the UAS data?
- How will the UAS data be used in resource management decisions?

If you have additional questions on how to order UAS for Resource Management missions, contact your Forest/Unit/Zone Aviation Officer.

Resource Management Mission Ordering Workflow is shown in Appendix C: UAS Ordering Processes.

7.2 Flight by Notification/Mission Planning worksheet

Flight by notification provides a streamlined process to conduct UAS mission through notification of pertinent information to appropriate personnel of an upcoming UAS mission. Chapter 4 of The Forest Service Standards for UAS Operations provides key elements to a Flight by Notification. These elements are similar to a mission planning worksheet and are often interchangeable. In practical terms, the flight by notification works in conjunction with a blanket MASP approval to cover the day of flight details required for properly planning a mission. In regions that implement it, it is used to reduce the number of MASP approvals required, ensure relevant project details are covered when planning a mission, and provide notification to the proper aviation staff before the project occurs. Each region may have their own unique version of a flight by notification, as long as it meets the key element requirements in the MASP. The Fight by Notification will either be managed by the regional coordinators or the forest/unit/zone aviation office. Contact the Forest/Unit/Zone Aviation Officer for questions regarding flight by notification.

The crew leader of the mission is tasked with conducting flight by notification. It is recommended that nonfiction be made a minimum of 24 hours prior to the mission.

8.0 Tools, References and Support

Several sources of tools, references, and technical support to plan and execute UAS projects are provided on the *Forest Service UAS SharePoint*. Please see the FS UAS SharePoint site for common scenario and outcome descriptions. These are intended to help staff understand different scenarios that may occur when requesting, planning, and implementing specific UAS projects.

9.0 Forest Service UAS Contacts

Overall leadership, direction, vision, and support architecture for the Forest Service UAS Program is provided by the UAS Program Manager and WO UAS staff. Regional UAS specialist/coordinator staff manage and tailor their programs to meet the needs of staff and program areas in their respective regions. Forest Service staff who intend to use UAS to support resource management applications should first contact their Forest/Unit/Zone Aviation Officer to seek support. WO staff in any deputy area, SP&TF staff and R&D staff should contact the regional UAS specialist/coordinator for the NFS region their office is located.

Please see the *Program Contacts* on the UAS SharePoint to identify regional aviation contacts and WO UAS staff.

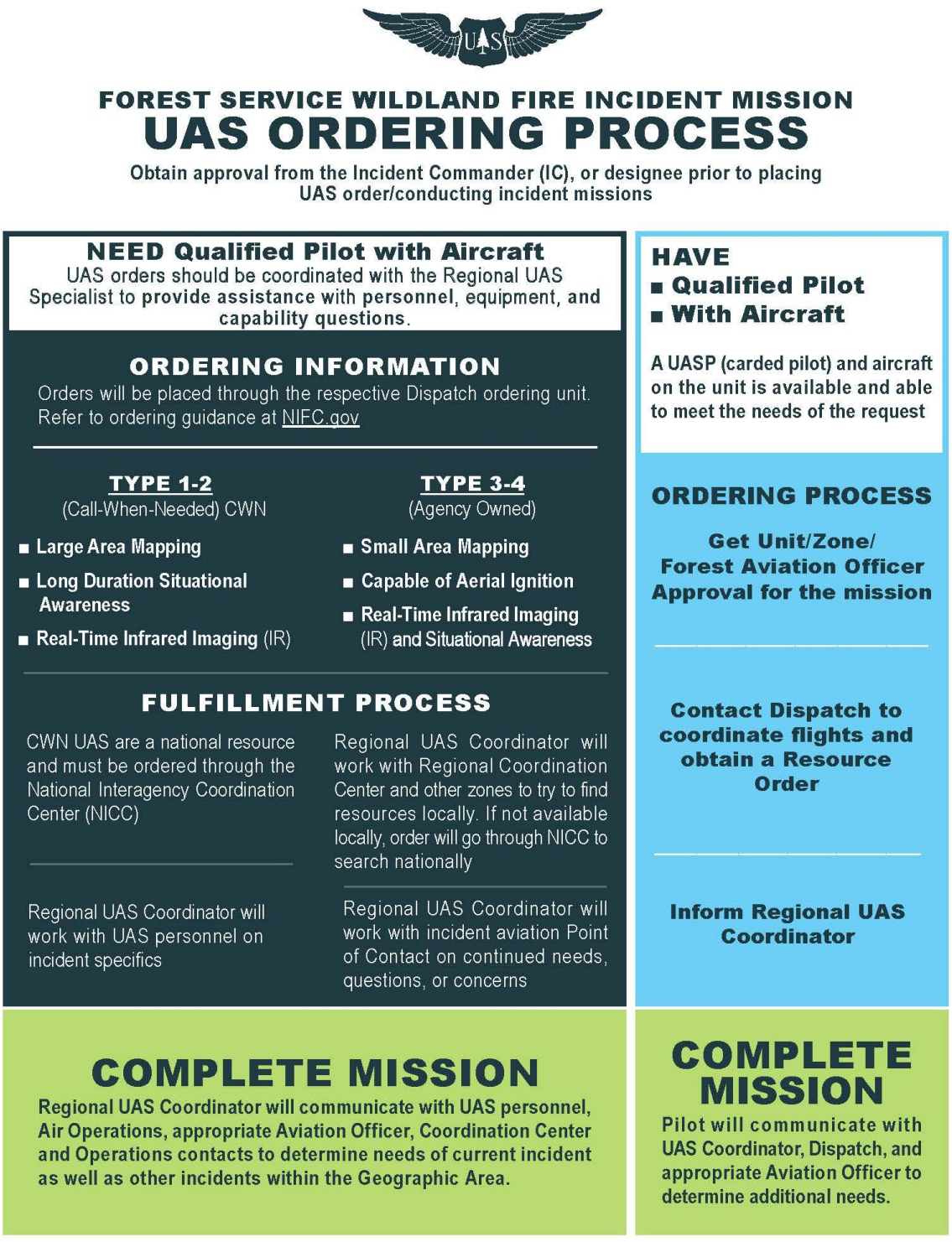
10.0 UAS Agreement Language

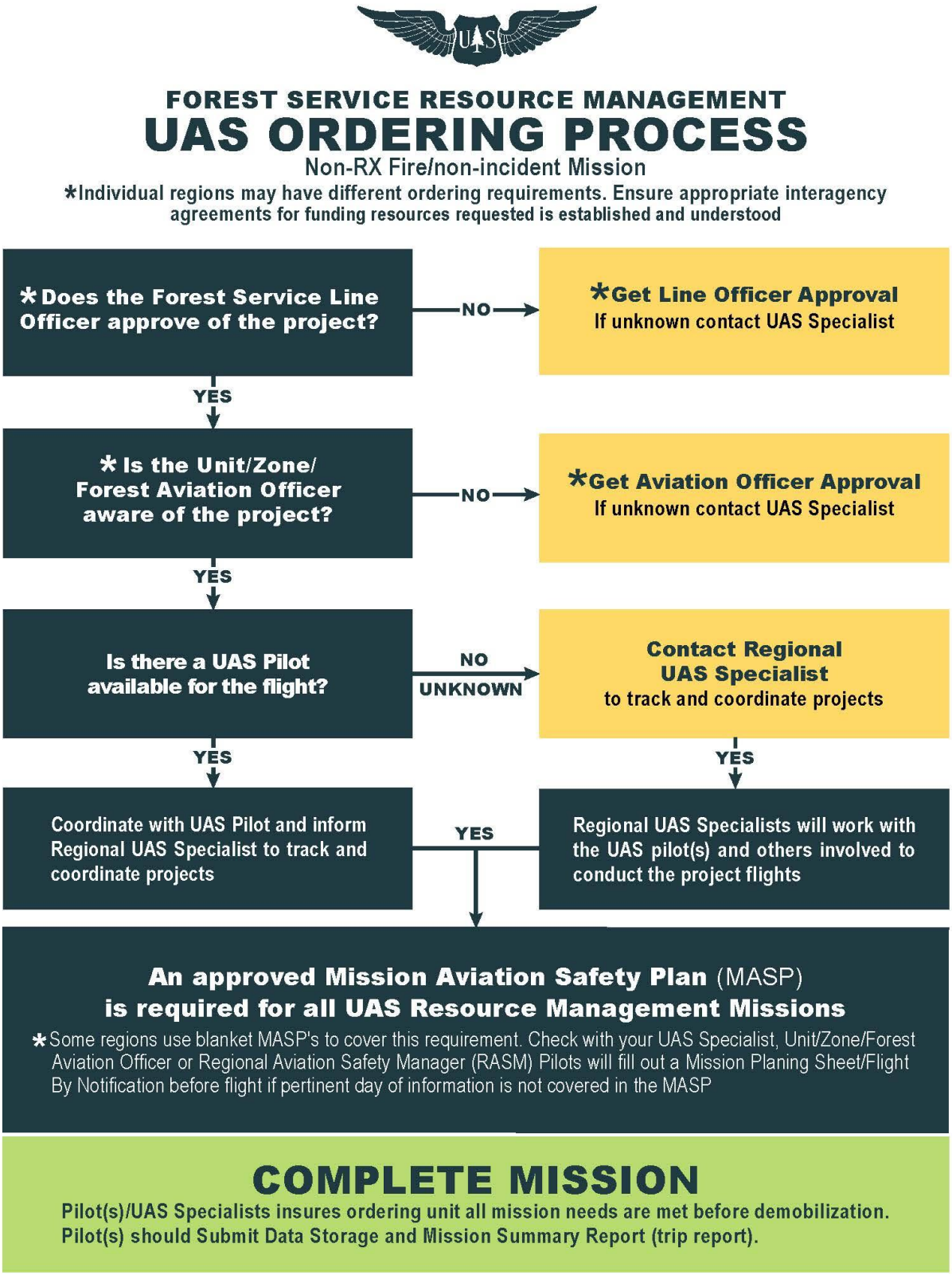
The formalized documentation (e.g., Grant, Agreement, SUP or Contract) between the external entity and the Forest Service where the Forest Service is not in operational control should include the below verbiage:

- UAS operations will be overseen, operated, and under full operational control of (*insert name of External entity here*).
    - Per the FS 5700 Zero Code, Aviation Operational Control is defined as “Concerning flight, the exercise of authority over initiating, conducting, or terminating a flight.” The qualified UAS operator will assume all aviation operational control as defined in the FS 5700 Zero Code.
- In case of an accident or incident involving UAS, the party with operational control (*insert name of External entity here*) will be responsible for:

    - Notification of the accident and or incident to the National Transportation Safety Board (NTSB) and the Federal Aviation Administration (FAA).
    - Coordination with the respective Dispatch Center.
- (*Insert name of External entity here*) will provide the name of the pilot, pilot's Part 107 license number and expiration date, and FAA registration numbers of UAS being used for the missions.
    - If operating under a Certificate of Authorization (COA), (*insert name of External entity here*) will provide a copy of COA to the respective Forest Service Regional UAS specialists.
- (*Insert name of External entity here*) UAS Operator is asked to post a NOTAM.
- UAS Flights will not be carried out if there are contracted or agency-owned manned aircraft operating in proposed flight area.
- (*Insert name of External entity here*) pilot will notify the appropriate dispatch (e.g., forest or coordination center) of UAS mission prior to flights.
    - (*Insert name of External entity here*) will notify the appropriate dispatch of UAS flight start and end times.
- Mission Aviation Safety Plan (MASP) is not required as the Forest Service is not in operational control.
- Forest Service requests that (*insert name of External entity here*) provide a brief writeup after the conclusion of the mission that highlights processes that need improving and processes that made the mission successful. We ask that the writeup be shared with both the National, Forest and Regional UAS specialists.

Appendix C: UAS Ordering Processes




FOREST SERVICE RESOURCE MANAGEMENT
UAS ORDERING PROCESS
Non-RX Fire/non-incident Mission
*Individual regions may have different ordering requirements. Ensure appropriate interagency agreements for funding resources requested is established and understood
*Does the Forest Service Line Officer approve of the project?
NO
*Get Line Officer Approval
If unknown contact UAS Specialist
YES
* Is the Unit/Zone/ Forest Aviation Officer aware of the project?
NO
*Get Aviation Officer Approval
If unknown contact UAS Specialist
YES
Is there a UAS Pilot available for the flight?
NO
UNKNOWN
Contact Regional UAS Specialist
to track and coordinate projects
YES
YES
Coordinate with UAS Pilot and inform Regional UAS Specialist to track and coordinate projects
YES
Regional UAS Specialists will work with the UAS pilot(s) and others involved to conduct the project flights
An approved Mission Aviation Safety Plan (MASP)
is required for all UAS Resource Management Missions
*Some regions use blanket MASP's to cover this requirement. Check with your UAS Specialist, Unit/Zone/Forest Aviation Officer or Regional Aviation Safety Manager (RASM) Pilots will fill out a Mission Planing Sheet/Flight By Notification before flight if pertinent day of information is not covered in the MASP
COMPLETE MISSION
Pilot(s)/UAS Specialists insures ordering unit all mission needs are met before demobilization.
Pilot(s) should Submit Data Storage and Mission Summary Report (trip report).

Appendix D: UAS Aviation Mishap Response
UAS FLYAWAY

A loss of link is the loss of command-and-control between the UAS and the ground control station (GCS), resulting in the UAS automatically returning to the home location via GPS assistance. In the event of a **FLYAWAY**, the UAS should descend at a predetermined speed and drift with the wind, potentially causing unintended flight outside of the established operational boundaries. In a flyaway scenario, the Pilot in Command (PIC) does not have control of the UAS, creating an emergency situation.

*** Notifications can be delegated as needed. The local Forest Aviation Officer (FAO)/Unit Aviation Officer (UAO) should be one of the first notifications made.**

Time	Action	Contact and Phone	Time Log
Immediately	• (PIC) or designee will clear the affected airspace and suspend air operations in the area. Notify and relay pertinent information (Altitude, direction, battery life) to Aerial Supervision, aircraft in the area, and ground personnel if applicable. • If UAS will enter controlled airspace, (PIC) or designee will notify the controlling agency. • (PIC) or designee will notify flight following contact, AOBD, IC, and/or dispatch as required.		
After fuel and battery load has passed	• Resume air operations. • Search for the missing UAS. • Follow established mishap reporting procedures based on damage and/or injury (See notifications below)		
Notifications	<u>Minimal damage to UAS and/or payload</u> (Field Repairable/In the Manual) • (PIC) will notify AOBD/IC, dispatch and the FAO/UAO. * • FAO/UAO will notify RASO, and regional UAS Point-of-Contact as required. • If applicable, (PIC) will file a SAFECOM after all other notifications have been made. <u>Total system loss/extensive damage of UAS and/or payloads</u> • (PIC) will notify AOBD/IC, dispatch and the FAO/UAO. * • FAO/UAO will notify RASO, and regional UAS Point-of-Contact as required. • Regional UAS Point-of-Contact will notify the National UAS Coordinator. • PIC will file a SAFECOM after all other notifications have been made. <u>Damage to personnel or property in addition to the UAS and payload (*FAA reportable*)</u> • (PIC) will notify AOBD/IC, dispatch and the FAO/UAO. * • FAO/UAO will notify RASO, and regional UAS Point-of-Contact as required. • Regional UAS Point-of-Contact will notify the National UAS Coordinator. • PIC will file a SAFECOM after all other notifications have been made.		

UAS MISHAP/ACCIDENT

FAA and NTSB reporting criteria for UAS differ from piloted aircraft. The Aircraft Accident Checklist located in the NWCG Aviation Mishap Response Guide (PMS-503) will be completed by the PIC for any mishap/accident that requires repairs that are not contained in the aircrafts operating manual or been deemed field repairable.

*** Notifications can be delegated as needed. The local Forest Aviation Officer (FAO)/Unit Aviation Officer (UAO) should be one of the first notifications made.**

Time	Action	Contact and Phone	Time Log

Immediately at time of UAS mishap	• The PIC will follow the NWCG Aviation Mishap Response Guide and Checklist Priority of Actions (PMS-503)
	  ○ Protect people.
	  ○ Protect property.
	  ○ Preserve evidence.
	  ○ Notify and investigate.
	  ○ Recovery operations.
	• If applicable, (PIC) or designee, will notify Aerial Supervision, aircraft in the area, and ground personnel.
	• If applicable, (PIC) will notify flight following contact, AOBD, and/or dispatch as required.		

30 minutes	• Follow established mishap reporting procedures based on damage and/or injury (See notifications below) • Search and recover missing UAS. • (PIC) or designee, will complete Aircraft Accident Checklist.		
Notifications	Minimal damage to UAS and/or payload (Field Repairable/In the Manual) • (PIC) will notify AOBD/IC, dispatch and the FAO/UAO. * • FAO/UAO will notify RASO, and regional UAS Point-of-Contact as required. • If applicable, (PIC) will file a SAFECOM after all other notifications have been made. Total system loss/extensive damage of UAS and/or payloads • (PIC) will notify AOBD/IC, dispatch and the FAO/UAO. * • FAO/UAO will notify RASO, and regional UAS Point-of-Contact as required. • Regional UAS Point-of-Contact will notify the National UAS Coordinator. • PIC will file a SAFECOM after all other notifications have been made. Damage to personnel or property in addition to the UAS and payload (*FAA reportable*) • (PIC) will notify AOBD/IC, dispatch and the FAO/UAO. * • FAO/UAO will notify RASO, and regional UAS Point-of-Contact as required. • Regional UAS Point-of-Contact will notify the National UAS Coordinator. • PIC will file a SAFECOM after all other notifications have been made.		

Appendix E: UAS Aerial Ignitions

Purpose

The purpose of the UAS Aerial Ignition (Ai) Appendix is to serve as a resource for understanding the history, intent, capability, operations, and approach to the UAS Aerial Ignition Program.

Mission

The UAS Program understands the importance of leveraging technologies as a tool to protect public lands from the devastating effects of wildfires, protect watersheds, old growth timber, wildlife and other natural resources that exist in the agency mission statement. UAS Ai can play a critical role in wildland fire management and ecological restoration efforts. UAS Ai operations may occur on both planned and unplanned wildfires in remote or inaccessible areas with enhanced precision and safety. UAS Ai can reduce the risk and exposure to agency personnel and increase safety to both ground and air resources. The UAS Ai Program will continue to aid in the reduction of helicopter aerial ignition operations.

The National UAS Program and the National Interagency Prescribed Fire Training Center (NIPFTC) have partnered to deliver a realistic and standardized training environment. Ensuring that our natural resources are protected while proactively managing the risk of wildfire. It is critical that prescribed fires and UAS missions are adequately planned and executed by personnel with the appropriate training and certification, as improperly executed missions can result in serious safety and legal consequences.

UAS Aerial Ignitions Supporting Documents:

1. Reducing Employees Exposure to Aerial Prescribe Fire Operations

2. Sam Houston Helicopter Accident - Facilitated Learning Analysis

3. National Interagency Prescribed Fire Training Center Strategic Plan 2023-2028

Strategy

Interagency Fire Unmanned Aircraft Systems Subcommittee (IFUASS) and the UAS Qualifications and Curriculum Board anchors the Ai academy to the interagency wildland fire mission. All Aerial Ignition training must be approved by IFUASS (PMS-515 Ch 8) and is the only approved training curriculum recognized by the FS. This training will allow the FS UAS Program to continue to build UAS Ai capabilities while aiding in the reduction of helicopter aerial ignition operations.

3 Year Plan

Formalize training and increase capacity of UAS Ai.

- Develop and implement a UAS Aerial Ignition Academy schedule to better serve all regions.
    - Fall version outside of southeast peak prescribe fire season.
    - Design a hybrid UAS Ai Workshop that incorporates classroom and field training (Ai Hybrid Academy).
- Formalized aerial ignition payload maintenance training.
- Design and implement annual UAS Ai refresher training.

5 Year Plan

- Ensure UAS Ai operations meet regional objectives while supporting the national demand.
- Conduct training according to regional UAS Ai needs assessments.
- Support the goals and objectives outlined in the Support Mission Strategy for UAS by establishing an appropriate number of highly skilled agency UAS Ai instructors and evaluators.
- Continue to evaluate emerging UAS Ai platforms and payloads.

UAS Aerial Ignition Operations

Aerial Ignitions operations is the most complex mission profile our agency pilot's conduct. Training and certification for UAS Ai requires significant a financial investment and time commitment. Pilots must meet standards identified in the NWCG Standards for Wildland Fire Position Qualifications (PMS 310-1). All agency UAS Ai missions will adhere to, NWCG Standards for Fire Unmanned Aircraft Systems Operations (PMS 515). In addition to NWCG Standards for Fire Unmanned Aircraft Systems Operations (PMS-515), the Forest Service has identified additional requirements to attend the Aerial Ignition Academy and receive Ai carding. See "Student Prerequisite Requirements" below for additional requirements.

UAS Aerial Ignition Academy

The UAS Aerial Ignition Academy is designed to give students the foundation for qualification as an Ai remote pilot. The student will gain knowledge of proper ignition techniques, airspace coordination, airspace deconfliction, mission planning, Ai aircraft/payload maintenance, and current UAS policy. Over the course of the three-week academy students will gain the confidence to conduct aerial ignition missions and become subject matter experts within UAS Ai. Students will experience multiple days of hands-on UAS Ai burning in the wildland-urban-interface (WUI), a variety of diverse fuels, while supporting different agencies and unique management objectives.

Core Curriculum Topics:

- Aircraft orientation and maintenance
- Payload orientation and maintenance
- Ignition patterns and techniques
- Monitoring and evaluation of fire effects
- Current UAS policy
- Airspace review

Supplementary Topics:
Supplementary topics augment the core curriculum, enhancing students' expertise and versatility in aerial ignition operations. These topics may include:

- Data Management: Efficient data recording and management for comprehensive analysis and reporting.
- Aerial Imagery Techniques: Utilizing aerial imagery to enhance situational awareness and decision-making during operations.
- Case Studies: Learning from real-world case studies, identifying best practices, and applying lessons learned to improve performance.

Cost

There is no tuition associated with the UAS Ai Academy. Students and home units will follow current budget policy for base 8 salary, per diem, lodging, as well as overtime incurred during Academy attendance.

Ai Evaluations

Students will operate under the direct guidance, coaching and mentorship from agency approved UAS Ai evaluators. Student progress will be documented using the aerial ignition mission evaluation form. Evaluators/Final evaluators will complete a Mission Evaluation Form after every mission.

- The current Mission Evaluation form can be found at uas.nifc.gov/aerial-ignition

Instructor Requirements

Instructors for the UAS Aerial Ignition Academy must meet specific prerequisites to ensure their competence and ability to deliver effective training:

- Lead Instructor
    - Unit Instructor at a previous Ai Academy
    - Must be designated as a UAS Aerial Ignition Final Evaluator
    - Approved by the UAS Aerial Ignition Steering Committee
    - Has acted as an Evaluator at a previous Ai Academy
- Unit Instructor
    - Carded UAS Ai Remote Pilot
    - Completed M-410 or A-220

Student Prerequisite Requirements

Students attending the UAS Aerial Ignition Academy must meet specific qualifications to ensure competency in the knowledge and skills needed for UAS Ai operations. Students must meet the following prior to attendance and maintain throughout the academy:

- Current Incident Qualification Card (Red Card) for the duration of the Ai academy.
- Carded and current on the aircraft for which the payload will be attached.
- Qualified Unmanned Aircraft Systems Pilot (UASP)
    - Or 5 hours of wildland fire operational flights if still in trainee status.
- Qualified as any NWCG single resource position taskbook or less than current (Held this position previously but has lost currency).
    - Or Trainee of any NWCG single resource qualification
- Completed A-456 (Classroom portion)- Extended Line of Sight (ELOS) & Beyond Visual Line of Sight (BVLOS)

Other Training Which Supports Development of Knowledge and Skills

- Completion of NWCG S-219 Firing Operations course

Final Carding Requirements:

- Refer to PMS-515 Chapter 8 (NWCG PMS-515 UAS Aerial Ignition)
    - UAS Aerial Ignition Training and Qualification

Selections for Ai Academy

Student nominations will be entered into an Interagency Ai Nomination Priority List populated by the Regional UAS Specialists or designee. Final student selections will be coordinated with Regional UAS specialists, Interagency partners, and WO UAS staff.

Nomination selection timeline:

- Nominations are due 120 days before the first day of course.

- Selections Completed 90 days before the first day of course.
- Course Coordinator will notify the selected students.

UAS Ai Academy Operating Plan:

An Interagency UAS Ai Academy Operating Plan has been created by the UAS Ai Steering Committee to outline policy and procedures of attendance. The UAS Ai Academy consists of Interagency personnel to assist with coordinating prescribed fire operations following the workshop portion of the academy.

Additional information contained within the UAS Ai Academy Operating Plan:

- UAS aircraft and support equipment
- Roles and responsibilities of academy cadre
- Roles and responsibilities of academy students
- Organizational structure
- Procedures for hosting unit
- Evaluation processes and requirements

Appendix F: Revisions and Amendments

Users are encouraged to recommend changes to the Forest Service Standards for UAS Operations guide annually through their Regional UAS Specialist or Regional Aviation Officer. Recommended changes will be reviewed annually by the FS National UAS Program Manager.

The following chart may be used to track suggested and approved document revisions and amendments. For each revision or amendment, please enter the following information:

1. Tracking number.

2. Chapter and Section where the revision or amendment was made.

3. Brief description of the revision or amendment.

4. Date approved or denied by appropriate official.

Tracking Number Month/Year/Number	**Chapter/Section**	**Brief Description**	**Person Submitting**	**Date approved or denied**
EXAMPLE: 12-2019-01	2/Insp Pilot	Additional Final Evaluator Pilot responsibility.	Chet Mariana	02-2019 (denied)