Uncrewed Aircraft Systems (UAS) Evaluation Committee

Charter

1. Background

The Director of Fire and Aviation Management has established the Uncrewed Aircraft Systems (UAS) Evaluation Committee to provide a process for evaluation of UAS and if appropriate, recommend experimental, interim, or full approval.

2. Objective

To ensure a reliable and sustainable UAS fleet and encourage technology innovation and implementation.

3. Name

The FS UAS Evaluation Committee is hereinafter referred to as the UASEC.

4. Authority

The UASEC is chartered by the FS Director of Fire and Aviation Management (FAM). The deliberations within UASEC are exempt from the Federal Advisory Committee Act under section 04 of the Unfunded Mandates Reform Act of 1995.

The UASEC reports to and receives direction from the Assistant Director Aviation and the Rotorcraft and Airworthiness Branch Chiefs. The Director of 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 UAS Airworthiness Evaluation Standards and Approval Process, or latest revision. This document is also approved by way of this charter. The UASEC may charge members or subject matter experts with tasks or create working groups and task teams as authorized by the AD Aviation.

5. Purpose

The UASEC will develop and oversee FS UAS evaluations and approvals in support of FS UAS 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.

6. Organization and Membership

The UASEC is comprised of the following primary members: National UAS Program Manager, National UAS Fleet Specialist, National Technology and Development Program lead UAS Project Engineer, designees from Airworthiness Branch, Aviation Safety Branch, Chief Information Office, and a Regional UAS Specialist. Appropriate subject matter experts may be assigned for each evaluation. The UASEC is chaired by the National UAS Program Manager. The co-chair is the Airworthiness Branch designee. Working Groups will be established as needed. The terms of tenure are indefinite for the UASEC and the subject matter experts. The Co-chair will assume duties in the absence of the Chair. Regional UAS Specialist participation will coincide with National Aviation Officer Counsel (NAOC) chair rotation.

Voting membership consists of each of the primary members. A quorum of four members or their designee must be present to be considered a voting body.

7. Cooperation and Coordination

The UASEC coordinates directly with the NAOC.

The UASEC will forward approval recommendations to the Rotorcraft Branch Chief and the Airworthiness Branch Chief. Approvals require joint concurrence of the Rotorcraft Branch Chief and the Airworthiness Branch Chief.

8. Responsibility

The UASEC has the sole responsibility of evaluating UAS proposed for the FS National UAS program.

9. Working Group Life Limit

The UASEC will be in affect from the recognized approval date, as stated below, unless re-chartered by the Director of FAM.

10. Charter Approval

This charter is effective as of the date of approval and shall remain in effect until revised or revoked.

Approved:

JEROME PEREZ Digitally signed by JEROME PEREZ
Date: 2023.07.12 08:05:25 -04'00'

Jerry Perez
Director, Fire and Aviation Management

Date:

United States Department of Agriculture

Forest Service

Forest Service Uncrewed Aircraft Systems (UAS) Airworthiness Evaluation Standards and Approval Process

Contents

1 Scope

1.1 Purpose and Applicability

This document establishes the Airworthiness standards and approval process for U.S. Department of Agriculture, Forest Service Uncrewed Aircraft Systems (UAS) with a maximum gross weight of 80 pounds and below.

1.2 Executive Summary

UAS are evaluated by the UASEC. This is a Forest Service committee under the National Aviation Program and is comprised of Forest Service Aviation and National Technology and Development Program (NTDP) subject matter experts. The Airworthiness approval is one part of the UASEC process and does not include the mission performance of the aircraft or equipment. See the UASEC Charter and Process for more details. All UAS must be approved prior to use.

Approvals require joint concurrence of the Rotorcraft Branch Chief and the Airworthiness Branch Chief. These approvals are delegated from the Director of Fire and Aviation Management to the Branch Chiefs.

Based on successful review, the committee recommends interim or full approval to the Branch Chiefs.

2 Applicable Documents

2.1 ASTM Documents

1. UAS (Lightweight) Airworthiness Standards (F3298-19)
2. Flight Manual (F2908-18)
3. Continued Airworthiness (F2909-19)

3 Experimental Approval

3.1 Purpose

Experimental operations allow the UAS Program to evaluate new UAS in controlled settings with low risk and appropriate mitigations to determine that they are capable of performing the requested missions. They must demonstrate that they are reliable, sustainable, field maintainable and the UAS has manufacturer support for technical issues identified during experimental testing. These may be approved with limited or preliminary airworthiness documentation. Approval requires joint concurrence of the Rotorcraft Branch Chief and the Airworthiness Branch Chief after review of an abbreviated data package.

3.2 Required Documentation

Prior to approval, the applicant must provide the following documentation to the Branch Chiefs for review:

1) Manufacturer Technical Package
    a) Flight Manual (*items may be included in the Flight Manual)
    b) Maintenance Manual*
    c) Inspection Program*
    d) Illustrated Parts Breakdown*
    e) Aircraft Maintenance Tracking Spreadsheet
    f) Logbooks
    g) Manufacturer's Technical Issues/Technical Directive Process (how issues are identified and Service Bulletins are distributed)
    h) Total Accumulated Flight Time During Manufacturer Testing
    i) Highest Flight Time Accumulated on One Airframe by Manufacturer
2) ASTM 3298-19 Compliance Matrix
3) Test Plan from the UAS Program including:
    a) Mission Evaluation Plan
    b) Estimated flight time for each mission
    c) Schedule of planned operations for the evaluation period
    d) Personnel assigned (pilot/program/airworthiness POC's)
    e) Draft Test & Evaluation MASP
    f) Mechanical/system failure notification and return to service process
    g) Emergency Response Plan

3.3 Operational Environment

These are intended to be low risk operations with approval from the Regional Aviation Officer. Flight with other aircraft and flight over people shall not be approved. Other expanded operations, as defined in ASTM F3298-19, are not permitted unless mitigated in the Regionally approved Mission Aviation Safety Plan (MASP). Simulated and tethered flight may be used to demonstrate compliance.

3.4 Limitations

Experimental operations are limited to no longer than one year for the model approved. No more than fifteen aircraft may be operated, and none may exceed 100 flight hours. The aircraft must be in the configuration desired for further approval. Operations shall not include flight with other aircraft as identified in ASTM F3298-19 A1.6 or flight over people as identified in ASTM F3298-19 A1.8.

3.5 Airworthiness Audits

Airworthiness audits will be conducted throughout the operational period. Audits will be coordinated between Operations, Airworthiness, and conducted to minimize impact. They will be conducted by an approved UAS inspector with a rating of MU1 or MU2.

3.6 Deliverables

A final report must be provided to the Branch Chiefs that consolidates the results of the test. This shall include:

1) Pre evaluation aircraft inspection reports
2) Accumulated Flight Time
3) Accumulated Down Time for unscheduled maintenance
4) Mechanical deficiencies causing aircraft unavailability
5) Electronic and software deficiencies causing aircraft unavailability
6) Manufacturer’s response and corrections for system deficiencies
7) Accident/Incident reports
8) Aircraft logbooks for the evaluation period
9) Post evaluation aircraft inspection reports

4 Airworthiness Process

4.1 Overview

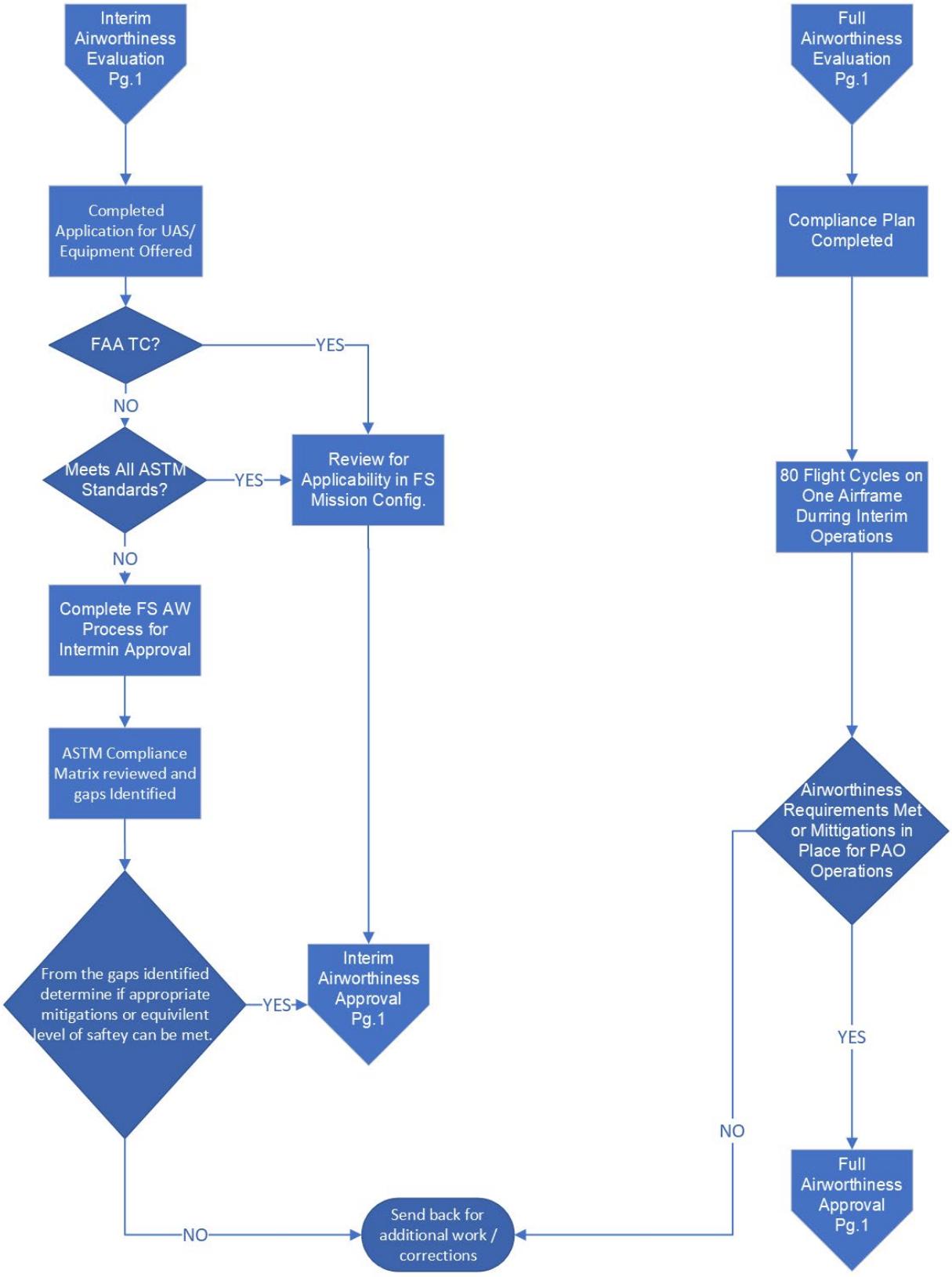
The ASTM UAS (Lightweight) Airworthiness Standards (F3298-19) are the benchmark for USDA Forest Service UAS for maximum gross weights of 80 pounds and below. This specification provides the core requirements for airworthiness certification of lightweight UAS (not necessarily limited to UAs under 55 lb 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. These include, but are not limited to, Flight Manual (F2908-18) and Continued Airworthiness (F2909-19).

Each aircraft while in the Forest Service mission configuration will show how it complies, does not comply, alternately complies or compliance is unknown. Evidence to support how the aircraft complies with the standard will be provided for each requirement met.

Once the manufacturer/integrator/applicant has completed the ASTM UAS (Lightweight) Airworthiness Standards (F3298-19) compliance matrix, the Uncrewed Aircraft Screening and Evaluation Committee (UASEC) will use that data along with the other documents in the application to evaluate the aircraft.

The UASEC Process Flow Chart gives the general sequence of actions to move through the process. Due to the Public Aircraft Operations nature of the missions that UAS will perform for the Forest Service there may be risk mitigations accepted rather than specific compliance when deemed appropriate using a risk evaluation. A formal mitigation must be in place to address all mandatory requirements (shall/must/may not) that the UAS has not met. Items marked should are optional but recommended. If applicable to specific missions or approvals, documentation is required to substantiate conformance or mitigation.

4.1 Airworthiness Flow Chart



4.2 Application Package

The following documents must be submitted to the UASEC for evaluation.

1) FAA Type Certificate Data Sheet (if issued)
2) Other Airworthiness Approvals
    a) NASA
    b) DOD
    c) Etc.
3) ATSM F3298-19 Compliance Matrix
4) Manufacturer Technical Package
    a) Engineering and Design Data
    b) Flight Manual (*items may be included in the Flight Manual)
    c) Maintenance Manual*
    d) Inspection Program*
    e) Illustrated Parts Breakdown*
    f) Aircraft Maintenance Tracking Spreadsheet
    g) Logbooks
    h) Manufacturer's Technical Issues/Technical Directive Process (how issues are identified and Service Bulletins are distributed)
    i) Manufacturer's Production Acceptance Program
    j) Manufacturer's Quality Assurance Program
    k) Total Accumulated Flight Time During Manufacturer Testing
    l) Highest Flight Time Accumulated on One Airframe by Manufacturer

4.3 Airworthiness Review Procedures

A complete application package must be submitted prior to the UASEC starting the review. UAS that have been issued an FAA Type Certificate for the configuration submitted will receive an expedited review to verify the approval matches the Forest Service mission requirements. UAS that meet all ASTM requirements will receive an expedited review to validate the documentation and configuration.

Aircraft that partially meet the ASTM requirements will receive a detailed review of the provided documentation. The UASEC will identify additional data required from the applicant and any questions. Following receipt of the additional data, the UASEC will identify gaps between the UAS and the ASTM requirements and any available mitigations. A risk analysis will be performed to determine if the requested missions can be safely performed with the existing deficiencies and proposed mitigations.

Prior to interim approval the applicant must provide documentation of at least 50 hours of flight time on a single aircraft in the requested configuration. This may be accomplished via tethered or training flights.

After review, the UASEC may recommend an interim approval. This will include the necessary steps the applicant must complete prior to a full approval based on the review of the submitted UAS.

The UASEC may recommend a full approval after the interim approval conditions have been complied with. Any modifications to the aircraft configuration will require further review and approval by the UASEC. All approvals will be issued with joint concurrence of the Rotorcraft and Airworthiness Branch Chiefs.

4.4 Limitations

ASTM F3298-19, A1.6 defines Used Near Manned Aircraft as *"operation of an unmanned aircraft in an area of non-segregated airspace that requires integration into manned traffic, and when the UAS routinely yields right of way to manned aircraft. This includes ground operations on airports that support manned and unmanned aircraft. UAS intended to be used near manned aircraft should be compatible with the existing rules and regulations applicable to other aircraft in the same class of airspace."*

The Forest Service clarifies this definition to include vertical stacking of aircraft. Aircraft segregated horizontally or temporally are not included.

ASTM F3298, A1.8 defines Flown Over People as *"operation of an unmanned aircraft over a human being that are not directly participating in the operation of the small unmanned aircraft; or not located under a covered structure or inside a stationary vehicle that can provide reasonable protection from a falling unmanned aircraft."*

The Forest Service clarifies this definition to include sustained flight over people not involved in the operation.

The Forest Service will not approve aircraft for operations near manned aircraft or flown over people. Reliability has not been proven to warrant accepting the risk.

5 Interim Approval

5.1 Purpose

Operations under interim approval allow the UAS Program to evaluate the UAS in the mission environment. The aircraft must demonstrate that they are reliable, sustainable, field maintainable and the UAS has manufacturer support for technical issues identified during testing. This provides the opportunity for the manufacturer/integrator and the UAS Program to address gaps and mitigations identified during the airworthiness evaluation. Additionally, this allows the UAS to build representative flight time showing it can be reliably operated to perform the requested missions.

5.2 Operational Environment

These are intended to be low risk operations with approval from the Regional Aviation Officer. Flight with other aircraft and flight over people shall not be approved. Other expanded operations, as defined in ASTM F3298-19, are not permitted unless mitigated in the Regionally approved Mission Aviation Safety Plan (MASP). Incident/RX operations must comply with NWCG PMS-515.

5.3 Limitations

Interim operations are limited to no longer than two years for the model approved. No more than 15 aircraft may be operated, and none may exceed 200 flight hours. The aircraft must be in the configuration desired for further approval. At least 80 flight cycles must be accumulated on a single aircraft prior to request for full approval. This must be actual mission, training, or WO benchmark flights and my not be tethered.

5.4 Airworthiness Audits

Airworthiness audits will be conducted throughout the operational period. Audits will be coordinated between Operations, Airworthiness, and conducted to minimize impact. They will be conducted by an approved UAS inspector with a rating of MU1 or MU2.

6 Full Approval

6.1 Purpose

UAS with full approval may operate within the scope of the approval conditions without further limitations provided the aircraft configuration is unchanged. Aircraft that have completed 80 flight cycles during interim operations may be recommended for full approval.

6.2 Operational Environment

Within regulations, agency policy and the scope of the approval

6.3 Limitations

The aircraft may not be modified outside of the approved configuration. The Forest Service will not approve aircraft for operations near manned aircraft or flown over people as outlined in 4.4.

6.4 Airworthiness Audits

Audits performed after full approval will follow standard procedures used with other aircraft.

Appendix 1 ASTM Compliance Matrix

See current electronic version

Appendix 2 Airworthiness Risk Assessment and Mitigations

See current electronic version