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Standard Specification for Unmanned Aircraft Flight Manual (UFM) for an Unmanned Aircraft System (UAS)[1]

This standard is issued under the fixed designation F2908; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification provides the minimum requirements for an Unmanned Aircraft Flight Manual (UFM) for an unmanned aircraft system (UAS) designed, manufactured, and operated in the light UAS category as defined by a Civil Aviation Authority (CAA). Depending on the size and complexity of the UAS, an UFM may also contain the instruction for maintenance and continuing airworthiness for owner / operator authorized maintenance. This document has been purposefully designed within the broader context of the Committee F38 library. Although the original source materials for the content presented here were intended to function as standalone documents, the committee has consciously removed any redundant information in favor of adopting a referential "single-source-of-truth" approach. Consequently, when applying this standard, it is essential to consider and integrate all relevant Committee F38 standards to ensure its comprehensive and accurate implementation.

1.2 When intending to utilize the information provided in this document as a Means of Compliance for operational or design approval, or both, it is crucial to consult with the respective oversight authority (for example, CAA) regarding its acceptable use and application. To find out which oversight authorities have accepted this standard (in whole or in part) as an acceptable Means of Compliance to their regulatory requirements (hereinafter "the Rules"), please refer to the Committee F38 webpage (www.ASTM.org/COMMITTEE/F38.htm).

1.3 This specification defines the UFM information that shall be provided by the manufacturer of a UAS as part of the initial sale or transfer to an end user.

1.4 This specification applies to a UAS seeking a CAA approval, in the form of airworthiness certificates, type certificates, flight permits, or other like documentation as a UAS, in the configuration specified in the UFM delivered with the system.

1.5 Any modifications that invalidate or otherwise affect the accuracy of UFM operating instructions shall be approved by the manufacturer and communicated to the regulatory authority in the certificate / permit application.

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

F2909 Specification for Continued Airworthiness of Lightweight Unmanned Aircraft Systems

F2910 Specification for Design and Construction of a Small Unmanned Aircraft System (sUAS)

F2911 Practice for Production Acceptance of Small Unmanned Aircraft System (sUAS) (Withdrawn 2023)[3]

F3002 Specification for Design of the Command and Control System for Small Unmanned Aircraft Systems (sUAS)

F3003 Specification for Quality Assurance of a Small Unmanned Aircraft System (sUAS) (Withdrawn 2023)[3]

F3005 Specification for Batteries for Use in Small Unmanned Aircraft Systems (sUAS)

F3060 Terminology for Aircraft

F3298 Specification for Design, Construction, and Verification of Lightweight Unmanned Aircraft Systems (UAS)

F3341/F3341M Terminology for Unmanned Aircraft Systems

3. Terminology

3.1 *Unique and Common Terminology*—Terminology used in multiple standards is defined in Terminology F3341/F3341M, UAS Terminology Standard, and Terminology

[1] This specification is under the jurisdiction of ASTM Committee F38 on Unmanned Aircraft Systems and is the direct responsibility of Subcommittee F38.03 on Personnel Training, Qualification and Certification.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] The last approved version of this historical standard is referenced on www.astm.org.

F3060, Aircraft Terminology Standard. Terminology that is unique to this specification is defined in this section.

3.2 *Definitions:*

3.2.1 *applicant/proponent, n*—the person or organization responsible for seeking the approval to operate and operating a UA. The applicant/proponent may be one of the following entities: Manufacturer, operator, or original equipment manufacturer.

3.2.1.1 *manufacturer, n*—the person or organization who causes production of a product or article. A manufacturer may also be an operator.

3.2.1.2 *operator, n*—the person or organization that applies for CAA approval to operate a UAS or who seeks operational approval for types of flight operations prohibited by a CAA for that UAS.

3.2.1.3 *original equipment manufacturer, n*—the person or organization who first produced that product or article. An OEM may also be an operator.

3.2.2 *basic empty weight (BEW), n*—basic empty weight includes the standard empty weight plus optional and special equipment that has been installed in the unmanned aircraft.

3.2.3 *field maintenance, n*—inspections and repairs made by owners/operators at a remote operating location away from their normal maintenance facility/provider.

3.2.4 *flight training supplement (FTS), n*—additional information provided by the UAS manufacturer to provide instruction in the proper operation of the system.

3.2.5 *landing area, n*—the total area defined by the manufacturer needed to recover and bring the UAS to a complete stop from a height of 50 feet above the surface.

3.2.6 *light unmanned aircraft systems, n*—unmanned aircraft that are approved for operation under the authority of a CAA (for example, UAS approved to operate by the Federal Aviation Administration (FAA) under 14 CFR Part 107, UAS approved to operate by European Aviation Safety Agency (EASA) as Open and Specific Category UA, and UAS approved to operate by CASA as Small, Medium, or Large RPA, or combinations thereof).

3.2.7 *manufacturer, n*—entity responsible for assembly and integration of components and subsystems to create a safe operating UAS.

3.2.8 *maximum takeoff weight, n*—the maximum allowable weight for takeoff (including payload).

3.2.9 *minimum operating crew (MOC), n*—the minimum operating crew includes the pilot in command, a visual observer (if one is required) and any other required crew member in order to safely operate a specific UAS which includes the make, model, and control station specific to that unmanned aircraft.

3.2.10 *model number, n*—a manufacturer-issued unique identifying number or code assigned to each manufactured type of aircraft having the same structural design, components, and standard configuration.

3.2.11 *pre-flight planning, n*—an activity conducted by the pilot and his/her flight crew prior to takeoff to ensure that the flight will be conducted safely and in accordance with all applicable standards and regulations. The activity includes, but is not limited to, such things as checking weather, route of flight, airspace, equipment configuration, support personnel, terrain, and communications requirements.

3.2.12 *shall vs. should vs. may, v*—use of the word "shall" implies that a procedure or statement is mandatory and must be followed to comply with this standard, "should" implies recommended, and "may" implies optional at the discretion of the supplier, manufacturer, or operator. Since "shall" statements are requirements, they include sufficient detail needed to define compliance (for example, threshold values, test methods, oversight, reference to other standards). "Should" statements are provided as guidance towards the overall goal of improving safety, and could include only subjective statements. "Should" statements also represent parameters that could be used in safety evaluations, and could lead to development of future requirements. "May" statements are provided to clarify acceptability of a specific item or practice, and offer options for satisfying requirements.

3.2.13 *small unmanned aircraft system (sUAS), n*—composed of the small unmanned aircraft (sUA) and all required on-board subsystems, payload, control station, other required off-board subsystems, any required launch and recovery equipment, and command and control (C2) links between the sUA and the control station.

3.2.13.1 *Discussion*—For purposes of this standard sUAS is synonymous with the term small Remotely Piloted Aircraft System (sRPAS) and sUA is synonymous with the term small Remotely Piloted Aircraft (sRPA).

3.2.13.2 *Discussion*—Unless otherwise specified by a CAA, the term "sUAS" applies only to UA that have a maximum take off gross weight of 55 lb/25 kg or less.

3.2.14 *takeoff area, n*—the total area defined by the manufacturer needed to launch the UAS to a point where the aircraft is 35 feet above the takeoff surface.

3.3 *Acronyms:*

3.3.1 *AGL*—above ground level

3.3.2 *BEW*—basic empty weight

3.3.3 *EASA*—European Aviation Safety Agency

3.3.4 *FAA*—Federal Aviation Administration

3.3.5 *IAS*—indicated airspeed

3.3.6 *MOC*—minimum operating crew

3.3.7 *MSL*—mean sea level

3.3.8 *UFM*—unmanned aircraft flight manual

4. Applicability

4.1 The purpose of the UFM is to provide guidance to owners, operators, mechanics, pilots, crew members, airports, regulatory officials, and aircraft and component manufacturers containing normal, abnormal, and emergency procedures, checklists, limitations, performance information, details of the aircraft systems and other material relevant to the operation of the aircraft.