



Designation: F3623 – 23

Standard Specification for Surveillance Supplementary Data Service Providers¹

This standard is issued under the fixed designation F3623; 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 defines minimum performance requirements for Surveillance supplemental data service providers (SDSPs) and associated equipment and services. This specification also defines requirements on users of the Surveillance SDSP's services. Surveillance SDSPs may provide aircraft track information to Detect and Avoid (DAA) systems and situational awareness tools to enable beyond visual line of sight (BVLOS) UAS operations and support VLOS operations.

1.2 The expected operating environment is low- to medium-risk airspace (equivalent to Joint Authorities for Rulemaking of Unmanned Systems Specific Operations Risk Assessment (JARUS SORA) ARC-b and ARC-c airspace, respectively). It is generally intended to cover operations below 10 000 ft AGL, and specifically operations below 1200 ft AGL.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *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. Relationships Between Standards

2.1 This specification is one of several developed within ASTM International that, when taken together, endeavor to provide a robust and scalable set of DAA solutions to enable BVLOS operations for UAS. Therefore, the reader is also encouraged to consider Specification for Detect and Avoid System Performance Requirements (F3442/F3442M), Specification for Remote ID and Tracking (F3411), and Specification for UAS Traffic Management (UTM) UAS Service Supplier (USS) Interoperability (F3548). There are several ways that these standards may be used collectively.

2.2 Specification F3442/F3442M specifies high-level risk ratios that the overall system must achieve. Many components and factors go into determining and verifying a given risk ratio. These include elements such as the vehicle's speed and maneuverability; the level of human interaction required to respond to an alert; the quality, accuracy, latency and completeness of traffic surveillance information; and the performance, availability and latency of command and control (C2) links. The applicant seeking approval (which could be an operator, integrator, service provider or manufacturer) should be able to verify that the required risk ratios can be achieved. Each element to be used in an integrated DAA solution is expected to provide documentation such that risk ratios may be determined.

2.3 The latencies between the sensors and Surveillance SDSPs are important variables to be included in any risk ratio calculations.

2.4 A successfully implemented Surveillance SDSP may use this specification to define its operational requirements to verify that it is fulfilling the detect function, whether partially or fully, in a way that meets the DAA performance requirements of Specification F3442/F3442M. The Surveillance SDSP alone cannot demonstrate whether the risk ratios are achieved, since this depends on many factors controlled by each operator's integration with the SDSP, and each operator's avoidance concept.

2.4.1 The Surveillance SDSP entity writes a test plan, taking into account its system and limitations/assumptions associated with its expected users (for example, types of vehicles and on-board/ground-based DAA systems).

2.4.2 The Surveillance SDSP entity conducts a series of tests (for example, live flights, simulated encounter datasets, or a combination), documenting each test (for example, through test cards) as well as its results (for example, through collection and analysis of data).

2.4.3 The Surveillance SDSP entity uses the results of its tests as part of its documentation to users and competent authorities, demonstrating that its capabilities are as described.

2.4.4 The Surveillance SDSP entity will also conduct an interference test to determine the level at which interference adversely affects the required accuracy of the surveillance systems and set an alert level in the surveillance monitoring system to notify the pilot of degraded DAA performance.

¹ This specification is under the jurisdiction of ASTM Committee F38 on Unmanned Aircraft Systems and is the direct responsibility of Subcommittee F38.01 on Airworthiness.

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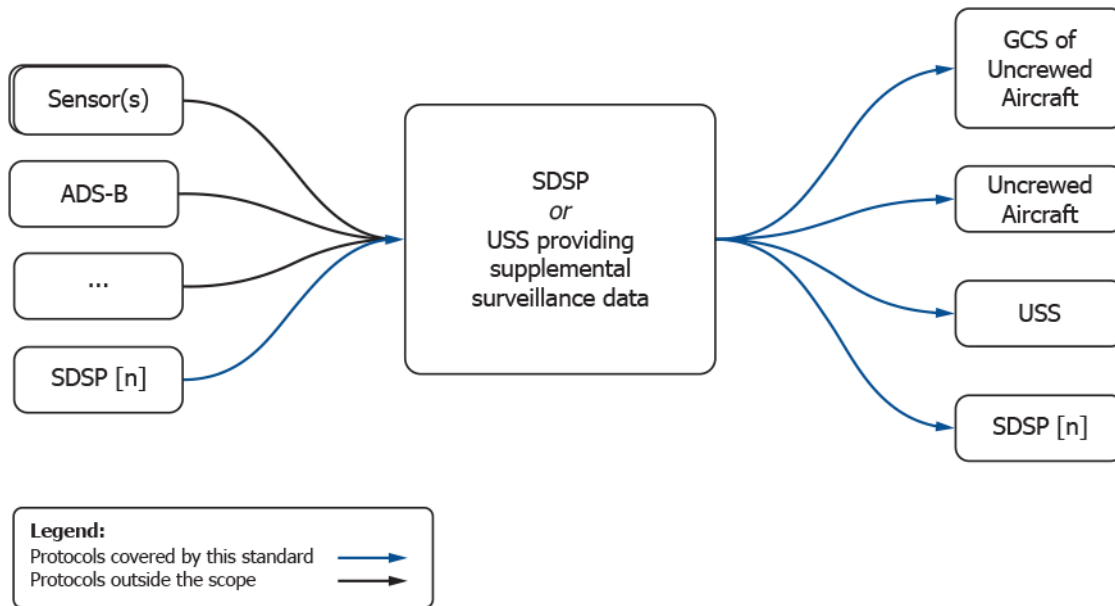


FIG. 1 Scope of Standard and Flow of Data

3. Referenced Documents

3.1 When this specification references external standards, documents or studies, the latest revision applies unless otherwise stated herein. Standards referenced should not be considered normative unless explicitly stated.

3.2 ASTM Standards:²

F3060 Terminology for Aircraft

F3341/F3341M Terminology for Unmanned Aircraft Systems

F3411 Specification for Remote ID and Tracking

F3442/F3442M Specification for Detect and Avoid System Performance Requirements

F3548 Specification for UAS Traffic Management (UTM) UAS Service Supplier (USS) Interoperability

3.3 JARUS Documents:³

JARUS Specific Operations Risk Assessment Package, V2.0, 30 January, 2019. <http://jarus-rpas.org/content/jar-doc-06-sora-package>

3.4 EUROCAE Documents:⁴

EUROCAE Safety and Performance Requirements Standards for a Generic Surveillance System, GEN-SUR SPR (ED-261), Draft Volumes 1 and 2, 2020

3.5 EUROCONTROL Standards:⁵

EUROCONTROL Specification for ATM Surveillance System Performance (ESASSP) Edition 1.2, Volumes 1 and 2, 20 April 2021

3.6 RTCA Standards:⁶

RTCA SC-228 DO-381A Ground-based surveillance system MOPS

3.7 FAA Standards:⁷

FAA Unmanned Aircraft System (UAS) Traffic Management (UTM) Concept of Operations, Version 2.0, 2020

FAA RMA-HDBK-006C V1.1 Reliability, Maintainability, and Availability (RMA) Handbook, Version 3.1, 2015

3.8 ITU Standards:⁸

ITU-R Report M.2204 Characteristics and Spectrum Considerations for Sense and Avoid Systems use on Unmanned Aircraft Systems (UAS), November 2010

3.9 EASA Documents:⁹

Easy Access Rules for Standardised European Rules of the Air (SERA) February 2023

4. Terminology

4.1 *Use of Shall, Should, and May*—The use of shall indicates a requirement, should indicates a recommendation, and may is used to indicate that something is permitted.

4.2 *Unique and Common Terminology*—Terminology used in multiple standards is defined in F3341/F3341M, Terminology for Unmanned Aircraft Systems and F3060, Terminology for Aircraft. Terminology that is unique to this specification is defined in this section.

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 Available from Joint Authorities for Rulemaking on Unmanned Systems (JARUS), <http://jarus-rpas.org/>.

⁴ Available from EUROCAE, 9-23 rue Paul Lafargue, "Le Triangle" building, 93200 Saint-Denis, France, <https://www.eurocae.net/>.

⁵ Available from EUROCONTROL, Rue de la Fusée 96, 1130 Brussels, Belgium, <https://www.eurocontrol.int/>.

⁶ Available from Radio Technical Committee for Aeronautics (RTCA), 1150 18th NW, Suite 910, Washington, D.C., 20036, <https://www.rtca.org/>.

⁷ Available from Federal Aviation Administration (FAA), 800 Independence Ave., SW, Washington, DC 20591, <http://www.faa.gov>.

⁸ Available from the International Telecommunication Union (ITU), International Telecommunication Union, Place des Nations, 1211 Geneva 20, Switzerland, <https://www.itu.int/en/Pages/default.aspx>.

⁹ Available from European Union Aviation Safety Agency (EASA), Konrad-Adenauer-Ufer 3, D-50668 Cologne, Germany, <https://www.easa.europa.eu>.