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Standard Practice for Handling of Unmanned Aircraft Systems at Divert Airfields[1]

This standard is issued under the fixed designation F2849; 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 practice identifies and describes equipage and procedures for safely handling unmanned aircraft forced to recover at alternate or diversionary airfields where personnel trained in recovering that type of aircraft may not be present. It is intended to apply to fixed-wing unmanned aircraft conducting non-visual line-of-sight operations. It is intended to establish common locations, labeling, and functions of equipment necessary to safely power down the aircraft without damaging it and common procedures for untrained personnel to follow to contact the owner of the aircraft. It addresses mission planning procedures, automated functions, and manual functions/handling procedures in the preflight, in-flight, and post-flight phases, respectively.

1.2 *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 Standard:*[2]

F2395 Terminology for Unmanned Aircraft Systems (Withdrawn 2014)[3]

2.2 *Other Standard:*[4]

ICAO Annex 1, Chapter 1

3. Significance and Use

3.1 This practice is written to preclude damage or injury to property and personnel in the event of an unplanned landing by an unmanned aircraft at an airfield not equipped or trained to handle that type of aircraft and to prevent unintentional damage to the aircraft once it lands. It is intended for use by unmanned aircraft equipment designers, procedures developers, and ground personnel.

4. Mission Planning Procedures

4.1 If mission requirements allow, alternate or divert airfields shall be planned within gliding distance of any point along the planned route of flight. This is dependent upon a number of factors including—but not limited to—geographic location of flight operations (for example, austere operating environment or maritime operations with few available airfields) and mission flight profile. If mission planning and divert airfield accommodations are in conflict, mission requirements shall take priority over divert airfield planning.

4.2 Gliding distance is defined as aircraft altitude above ground level (absolute altitude minus 1000 ft for pattern altitude) times its lift to drag ratio (L/D). Zero wind, all engines out, and 50 % fuel onboard are assumed. Aircraft configuration (for example, stores on wings) should be taken into account when determining the L/D ratio to be used for a flight segment.

4.3 Selected airfields shall be capable (for example, runway length, width, bearing strength) of accommodating recovery of the aircraft in its planned configuration.

4.4 Contact information for the alternate airfields shall be updated and made available to the pilot for use during flight.

5. Automated Functions

5.1 At a minimum, the aircraft shall be able to recognize and report the condition of not being capable of maintaining level flight at its mission altitude or at a reduced altitude (that is, sink rate at reduced or full power). This condition shall trigger the aircraft's flight control computer to enter a "divert mode" (that is, a subset of its contingency mode) of functioning. Exceptional conditions where a sink rate exists at full power under normal operating conditions, for example, when encountering mountain wave effects, should also be recognizable. There may be other contingencies such as environmental conditions, system-specific issue, or other factors which trigger the divert mode as well. This is only meant to describe a minimum level of automated functions.

[1] This practice is under the jurisdiction of ASTM Committee F38 on Unmanned Aircraft Systems and is the direct responsibility of Subcommittee F38.02 on Flight Operations.

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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.

[4] Available from International Civil Aviation Organization (ICAO), 999 Robert-Bourassa Boulevard, Montréal, Québec H3C 5H7, Canada; https://www.icao.int.