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Standard Guide for Training for Public Safety Remote Pilot of Unmanned Aircraft Systems (UAS) Endorsement[1]

This standard is issued under the fixed designation F3379; 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 guide covers the minimum training requirements for public safety remote pilots (PS-RPs) as it relates to their general, field, and search specific knowledge and skills.

1.2 This guide does not provide the minimum training requirements for sUAS operations in partially or fully collapsed structures, in or on water, in confined spaces, or underground (such as caves, mines, and tunnels.)

1.2.1 Basic remote piloting skills and knowledge are found in Guide F3266.

1.3 Personnel trained to this guide are not qualified to operate in leadership positions outside of UAS teams.

1.4 Further training may be required before a PS-RP can participate on a particular kind of UAS team, depending on local needs, regulations, or policies of the authority holding jurisdiction (AHJ).

1.5 This guide is created without regard to the type of unmanned aircraft system or personal protective equipment that is used by a PS-RP individual. It is expected that all UAS are compliant with Specification F3298 or Specification F2910.

1.6 The values stated in SI units are to be regarded as standard. The values given in parentheses after SI units are provided for information only and are not considered standard.

1.7 *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.*

1.8 *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]

F2908 Specification for Unmanned Aircraft Flight Manual (UFM) for an Unmanned Aircraft System (UAS)

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

F3196 Practice for Seeking Approval for Beyond Visual Line of Sight (BVLOS) Small Unmanned Aircraft System (sUAS) Operations

F3266 Guide for Training for Remote Pilot in Command of Unmanned Aircraft Systems (UAS) Endorsement

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

F3330 Specification for Training and the Development of Training Manuals for the UAS Operator

2.2 *National Wildfire Coordinating Group (NWCG) Document:*[3]

PMS 307 Work Capacity Test: Administrator's Guide

2.3 *OSHA Code of Regulations:*[4]

CFR 29 1910.120 Hazardous waste operations and emergency response

2.4 *U.S. Department of Homeland Security (DHS) Documents:*[5]

NIMS National Incident Management System

NRF National Response Framework

FEMA 501-8 NIMS Basic - The Incident Command System

2.5 *U.S. National Institute of Standards and Technology (NIST) Standards:*[6]

Standard Test Methods for Response Robots

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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] Available from https://www.nwcg.gov.

[4] Available from Occupational Safety and Health Administration (OSHA), 200 Constitution Ave., NW, Washington, DC 20210, http://www.osha.gov.

[5] Available from Federal Emergency Management Agency (FEMA), 500 C St., SW, Washington, DC 20472, http://www.fema.gov.

[6] Available from National Institute of Standards and Technology (NIST), 100 Bureau Dr., Stop 1070, Gaithersburg, MD 20899-1070, http://www.nist.gov.

3. Terminology

3.1 *Definitions:*

3.1.1 *electronic search, v*—the use of electronic systems or devices to locate a subject(s) or evidence, or both.

3.1.2 *field, n*—the location, away from the base or command post, in which a UAS team member is searching or performing other tasks.

3.1.3 *field operations, n*—searches and other tasks being performed away from the base or command post.

3.1.4 *normal area of operation, n*—(*1*) the area(s) where an AHJ performs its operations on a regular basis; (*2*) the area(s) where the AHJ is frequently called to assist with operations managed by others.

3.1.5 *personal protective equipment (PPE), n*—clothing and apparatus that reduces or limits a person's vulnerability to environmental hazards.

3.1.6 *public safety, n*—the welfare and protection of the general public.

3.1.7 *public safety organization/or individual, n*—agencies and individuals charged with the prevention and protection of the public from dangers affecting safety, such as crimes or disasters, and with aiding persons seeking emergency assistance.

3.1.8 *public safety remote pilot, n*—a trained remote pilot who operates a UAS during public safety operations; may also be referred to as a "Technical Specialist (UAS)" or "tactical flight officer."

3.1.9 *response organization, n*—a group, be it governmental or nongovernmental, of which the PS-RP is a member and under whose auspices the PS-RP operates in the field.

3.2 *Abbreviations and Acronyms:*

3.2.1 *AHJ*—authority holding jurisdiction

3.2.2 *FEMA*—Federal Emergency Management Agency

3.2.3 *PS-RP*—public safety remote pilot

3.2.4 *PS-RPIC*—public safety remote pilot in command

3.2.5 *RPIC*—remote pilot in command

3.3 See Table 1 for task and knowledge definitions relating to the education requirements for PS-RP.

3.3.1 *Explanations for Task Knowledge and Subject Knowledge Levels:*

3.3.1.1 A task knowledge scale value may be used alone or with a task performance scale value to define a level of knowledge for a specific task.

3.3.1.2 A subject knowledge scale value is used alone to define a level of knowledge for a subject not directly related to any specific task, or for a subject common to several tasks.

3.3.2 *Examples:*

3.3.2.1 *Task Knowledge Example*—Emergency procedures; (see Table 1, Level b: knows procedures). PS-RP is expected to be able to recite step-by-step procedures for emergency procedures for the UAS.

3.3.2.2 *Task Knowledge and Performance Example*—Emergency procedures; (see Table 1, Level 3b: competent performance, knows procedures). PS-RP is expected to be able to perform the step-by-step procedures for emergency procedures for the UAS.

3.3.2.3 *Subject Knowledge Example*—The anatomy of the eye; (see Table 1, Level A: knows facts). PS-RP is expected to be able to identify basic facts about the eye and identify part of the eye in a drawing or diagram.

4. Significance and Use

4.1 Every person who is identified as a PS-RP shall have met the requirements of this guide.

4.2 This guide is to be used by individuals and agencies having jurisdiction who wish to identify the minimum training standards for PS-RP.

4.3 This guide is only the first level of training for PS-RP personnel, and as such, only establishes the minimum knowledge, skills, and abilities required for a person to perform as a PS-RP.

4.4 Nothing in this guide precludes a user of this guide from adding additional requirements for its own members. The US-specific examples are intended to establish a common frame of reference.

4.5 This guide by itself is not a training document. It is only an outline of the topics required for training or evaluating a PS-RP, but it can be used to develop a training document or program.

TABLE 1 Task and Knowledge Levels

Scale Value		Definition: The Individual
Task Performance Levels	1	IS LIMITED (Can do simple parts of the task. Needs to be told or shown how to do most of the task.)
	2	IS PARTIALLY PROFICIENT (Can do most parts of the task. Needs only help on hardest parts.)
	3	IS COMPETENT (Can do all parts of the task. Needs only a spot check of completed work.)
	4	IS PROFICIENT (Can do the complete task quickly and accurately. Can tell or show others how to do the task.)
Task Knowledge Levels	a	KNOWS NOMENCLATURE (Can name parts, tools, and simple facts about the task.)
	b	KNOWS PROCEDURES (Can determine step-by-step procedures for doing the task.)
	c	KNOWS OPERATING PRINCIPLES (Can identify why and when the task must be done and why each step is needed.)
	d	KNOWS ADVANCED THEORY (Can predict, isolate, and resolve problems about the task.)
Subject Knowledge Levels	A	KNOWS FACTS (Can identify basic facts and terms about the subject.)
	B	KNOWS PRINCIPLE (Can identify relationship of basic facts and state general principles about the subject.)
	C	KNOWS ANALYSIS (Can analyze facts and principles and draw conclusions about the subject.)
	D	KNOWS EVALUATION (Can evaluate conditions and make proper decisions about the subject.)

4.6 It is up to the training authority to determine the depth or detail of training to meet its needs. Terminologies and requirements for secondary or associated training should be task/specialization-specific—not all operators require all types and levels of training. This guide supports alternatives and subsets of knowledge requirements appropriate to the type of operation, when part of a documented training program according to Specification F3330.

4.7 This guide does not stand alone and must be used with the referenced documents to provide the specific information needed by the user.

4.8 This guide can be used to evaluate a book or other document to determine if its content meets the necessary topics for training a PS-RP. Likewise, the guide can be used to evaluate an existing training program to see if it meets the requirements of this guide.

4.9 The knowledge, skill, and ability requirements presented in the following sections are not presented in any particular order and do not represent a training sequence.

5. Program Management

5.1 A PS-RP training program shall be developed as described by Specification F3330.

5.2 Except where a physical skill needs to be shown, it is up to the instructor, evaluator, or tester to determine the best way to evaluate a person's knowledge. This may be by written exam, oral exam, demonstration, or by some combination of the three.

5.3 A PS-RP training program shall use Table 1 when establishing requirements.

6. General Knowledge

6.1 The following subject, performance, and task knowledge areas shall be assessed by levels (see Table 1) of competency in the exam items:

6.2 A PS-RP shall meet the general knowledge requirements of Guide F3266 for endorsement as a RPIC.

6.3 A PS-RP shall complete the following FEMA and National Incident Management System (NIMS) training, or equivalent:

6.3.1 IS-100: Introduction to the Incident Command System, ICS-100.

6.3.2 IS-200: Incident Command System for Single Resource and Initial Action Incidents.

6.3.3 IS-700: National Incident Management System, An Introduction.

6.3.4 IS-800: National Response Framework, An Introduction.

6.4 Hazardous materials awareness training, such as:

6.4.1 Training in accordance with the Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations (CFR) Part 1910.120: Hazardous Materials Awareness, or

6.4.2 IS-5.A: An Introduction to Hazardous Materials, and IS-3: Radiological Emergency Management.

6.5 A PS-RP should complete the Department of Interior, Office of Aviation Management (DOI OAM), Course A-100 Basic Aviation Safety, or equivalent training.

7. Public Safety Remote Pilot Skills

7.1 A PS-RP should meet the skills requirements of Guide F3266 for endorsement as a RPIC.

7.2 A PS-RP shall demonstrate the ability to complete the public safety remote pilot competency lane described in Annex A1.

7.3 A PS-RP should demonstrate the ability to perform flight tasks in a variety of personal protective equipment, as determined by the organization.

7.4 A PS-RP shall demonstrate the ability to perform, to the trainer's satisfaction, a sufficient number and variety of actual or mock UAS incidents that are likely to occur in their normal area of operations, including the selection and dispatch of appropriate resources, conduct of the flight operations, and follow-up reports.

8. Public Safety Remote Pilot in Command Skills

8.1 A PS-RPIC shall meet the skills requirements of Guide F3266 for endorsement as a RPIC.

8.2 A PS-RPIC shall demonstrate the ability to complete the public safety remote pilot competency lane described in Annex A1, indoors and outdoors, and in day and night conditions.

8.3 A PS-RPIC shall know the six phases of UAS operations:

8.3.1 Preplanning,
8.3.2 Notification,
8.3.3 Planning and Strategy,
8.3.4 Tactics and Techniques,
8.3.5 Suspension, and
8.3.6 After action review or critique.

8.4 To the extent determined by the AHJ, PS-RPIC shall know the roles of other agencies or organizations, at the following levels, that coordinate, provide resources, provide services, or perform other functions in search and rescue for the AHJ:

8.4.1 National,
8.4.2 State or Provincial,
8.4.3 Tribal, and
8.4.4 Local.

9. Public Safety Remote Pilot Instructor Skills

9.1 PS-RP instructor shall meet the skills requirements of Section 8 and Section 9 for endorsement as a PS-RPIC.

9.2 All instructors shall be thoroughly knowledgeable about the unmanned aircraft environment and with the working environment of public safety.

10. Incident-Specific Knowledge and Skills

10.1 Personnel shall be trained to recognize visible and potential hazards or environments associated with a UAS