FAI Sporting Code

Section 12 – Unmanned Aerial Vehicles

UAV
Class U

2018 Edition

Effective 1st January 2018

Section 12 and General Section combined make up
the complete Sporting Code for UAV

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1 FAI Statutes, ... Chapter 1, ... para. 1.6
2 FAI Sporting Code, Gen. Section, ... Chapter 4, ... para 4.1.2
3 FAI Statutes, ... Chapter 1, ... para 1.8.1
4 FAI Statutes, ... Chapter 2, ... para 2.1.1; 2.4.2; 2.5.2 and 2.7.2
5 FAI By-Laws, ... Chapter 1, ... para 1.2.1
6 FAI Statutes, ... Chapter 2, ... para 2.4.2.2.5
7 FAI By-Laws, ... Chapter 1, ... paras 1.2.2 to 1.2.5
8 FAI Statutes, ... Chapter 5, ... paras 5.1.1, 5.2, 5.2.3 and 5..2.3.3
9 FAI Sporting Code, Gen. Section, ... Chapter 4, ... para 4.1.5
10 FAI Sporting Code, Gen. Section, ... Chapter 2, ... para 2.2.
11 FAI Statutes, ... Chapter 5, ... para 5.2.3.3.7
12 FAI Statutes, ... Chapter 6, ... para 6.1.2.1.3

THIS 2018 EDITION INCLUDES THE FOLLOWING AMENDMENTS MADE TO THE 2001 CODE

These amendments are marked by a double line in the right margin of this edition

Paragraph	Plenary meeting approving change	Brief description of change	Change incorporated by
1.1.1	2017	Clarification of UAV definition	Kevin Dodd Technical Secretary
1.1.1.1		Clarification of how a UAV is controlled by a person	
2.1.1.3.5		Add Group 4 to the propulsion classification	
4.4		Removal of a restriction on method of propulsion	
6.1.2		Deleted reference to a clause no longer contained in General Section. Renumbered subsequent sentences.	

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CHAPTER 1

DEFINITIONS

1.1	General Definition
1.1.1	Unmanned Aerial Vehicle (UAV) - an aircraft or aerostat that does not carry a human. Excluded are model aircraft according to specifications in Section 4 – Aeromodelling Records.
1.1.1.1	A UAV can be remotely controlled by a person or persons, either by direct sight or First Person View (FPV), or autonomously controlled by a hardware system and/or software system onboard the UAV, or both.

1.2	Flight Definitions
1.2.1	Flight: An event that starts at takeoff and ends with a landing of a UAV.
1.2.2	Flight Performance: The achievement attained during free flight, the evidence for which is put forward to an NAC or FAI for validation.
1.2.3	Free Flight: That part of a flight in which a UAV is not towed, carried, or assisted by another aircraft or separate external or jettisonable power source.
1.2.4	Uncompleted Flight: A flight is deemed uncompleted if any of the following occurs:
1.2.4.1	a) The UAV's Flight Termination System (FTS) is activated before the UAV reaches the finish point;
1.2.4.2	b) any part of the UAV or its equipment is shed or jettisoned after reaching the start point and before reaching the finish point;
1.2.4.3	c) an accident occurs during the flight resulting in any damage which renders the UAV incapable of subsequent flights.

1.3	Types of Flights
1.3.1	Distance - A flight performance measured for distance over a course.
1.3.2	Speed - A fight performance timed and calculated for speed over the distance of a course.
1.3.3	Goal - A flight performance over a course declared in writing before takeoff. A goal flight may also be a Distance or a Speed flight, but a Distance or a Speed flight need not necessarily be a Goal flight.
1.3.4	Duration - A flight performance timed either from a start point to a finish point, or within a control area.
1.3.5	Altitude - A flight performance for vertical distance achieved (from mean sea level).

1.4	Course Definitions
1.4.1	Course - the distance between a start point and a finish point via any turn points or control points. Distance is the shortest distance on the Earth's surface between the two points concerned, measured in accordance with General Section paragraph 7.3.1.1.
1.4.2	Closed Circuit Course - a course in which the start and finish points are at the same place.
1.4.3	Out and Return Course - A closed circuit flight performance to a single turn point.
1.4.4	Lap - A single completed flight performance around a closed circuit course.

1.5 Start of Flight

1.5.1 Start Point - The start of the flight performance for measurement purposes. Depending on the activity and type of flight concerned, the start point may be the takeoff point, the crossing of a start line, or the point of release.

1.5.2 Start Line - A gateway of a designated width and height, the base being specified on the surface of the Earth and being approximately at right angles to the first leg of the course.

1.5.3 Takeoff Point - The precise point at which all parts of a vehicle cease to be in contact with or connected to the ground or water.

1.5.4 Point of Release - The point vertically below a vehicle when it releases from a tow or another vehicle.

1.6 Turn and Control Points and Control Area

1.6.1 Turnpoint - a clearly defined feature on the surface which is precisely specified before takeoff.

1.6.2 Rounding the Turnpoint - A turn point is rounded when the entire UAV is observed to pass outside the vertical projection of the center of the turn point feature or pylon or when the entire UAV is proved to have entered a designated sector outside the angle made by the adjacent legs of the course.

1.6.3 Control Point - a point that a UAV is required to overfly or to land at during the flight along a course.

1.6.4 Control Area - a designated area in which a UAV remains for a duration flight.

1.6.5 Designated Sequence - The order in which the turn or control points shall be flown.

1.7 Finish of a Flight

1.7.1 Finish Point - The end of a flight performance for measurement purposes. Depending on the activity and type of flight concerned, the finish point may be the landing point or the crossing of a finish line.

1.7.2 Finish Line - A gateway of a designated width and height, the base being specified on the surface of the Earth and being approximately at right angles to the last leg of the course.

1.7.3 Landing Point - The precise point at which any part of a vehicle first touches the ground or water.

1.8 Other Definitions

1.8.1 Autonomous Control - Control of a UAV's attitude, altitude, airspeed, flight path, and navigation by means of a vehicle management system. The vehicle management system may be on-board or off-board. Mission management functions may be exercised by a human being acting as mission director by means of a communications link from a remote UAV control station.

1.8.2 Flight Termination System - A controllable parachute or automatic preprogrammed course of action used to terminate the flight.

1.8.3 Operator in Command - The individual or organisation responsible for the function and safety of the UAV in flight.

1.8.4 Remote Control - Control of a UAV's attitude, altitude, airspeed, flight path, and navigation by a human being acting as pilot-in-command by means of a communications link from a remote UAV control station. This does not preclude the use of an autopilot for portions of the flight as long as the UAV control station is not left unattended.

CHAPTER 2

CLASSIFICATIONS

2.1	Class U: Unmanned Aerial Vehicle (UAV)

2.1.1 UAVs are classified according to method of control, weight, and type of propulsion as follows:

2.1.1.1 Control Classifications:

2.1.1.1.1 U-1: Remotely controlled UAV

2.1.1.1.2 U-2: Autonomously controlled UAV

2.1.1.1.3 When an Unmanned Aerial Vehicle is equipped with both methods of control, it will be classified by the control method used during the flight from the start point to the finish point. If the UAV is remotely controlled at any time from the start point to the finish point, it will be classified as a remotely controlled UAV (U-1).

2.1.1.2 Weight Classifications:

2.1.1.2.1 U-1.a and U-2.a Weight less than 5 kg

2.1.1.2.2 U-1.b and U-2.b Weight 5 kg to less than 50 kg

2.1.1.2.3 U-1.c and U-2.c Weight 50 kg to less than 500 kg

2.1.1.2.4 U-1.d and U-2.d Weight 500 kg to less than 2 500 kg

2.1.1.2.5 U-1.e and U-2.e Weight 2 500 kg to less than 5 000 kg

2.1.1.2.6 U-1.f and U-2.f Weight 5 000 kg to less than 10 000 kg

2.1.1.2.7 U-1.g and U-2.g Weight 10 000 kg to less than 20 000 kg

2.1.1.2.8 U-1.h and U-2.h Weight 20 000 kg to less than 40 000 kg

2.1.1.2.9 U-1.i and U-2.i Weight 40 000 kg or greater

2.1.1.2.10 The weight of the UAV at takeoff will be used to determine its weight classification.

2.1.1.3 Propulsion Classifications:

2.1.1.3.1 Group 1: Internal combustion and Jet

2.1.1.3.2 Group 2: Electric

2.1.1.3.3 Group 3: Rocket

2.1.1.3.4 When an Unmanned Aerial Vehicle has mixed propulsion, it will be classified in the group providing more than 50% of the propulsion (in terms of power) from the start point to the finish point.

2.1.1.3.5 Group 4: Unpropelled

CHAPTER 3

RECORDS IN CLASS U

3.1	Available Records
3.1.1	Records are available in Class U for distance, speed, duration, and altitude as follows:
3.1.1.1	Distance Records:
3.1.1.1.1	Distance in a Straight Line
3.1.1.1.2	Distance Over an Out and Return Course
3.1.1.2	Speed Records:
3.1.1.2.1	Speed Over a Straight Course of 15 to 25 Kilometers
3.1.1.2.2	Speed Over an Out and Return Course of 100 Kilometers
3.1.1.2.3	Speed Over an Out and Return Course of 200 Kilometers
3.1.1.2.4	Speed Over an Out and Return Course of 500 Kilometers
3.1.1.2.5	Speed Over an Out and Return Course of 1 000 Kilometers
3.1.1.2.6	Speed Over an Out and Return Course of 2 000 Kilometers
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3.1.1.2.8	Speed Over an Out and Return Course of 10 000 Kilometers
3.1.1.3	Duration Records:
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3.1.1.3.2	Duration Beyond a Distance of 50 Kilometers
3.1.1.3.3	Duration Beyond a Distance of 100 Kilometers
3.1.1.3.4	Duration Beyond a Distance of 200 Kilometers
3.1.1.3.5	Duration Beyond a Distance of 500 Kilometers
3.1.1.3.6	Duration Beyond a Distance of 1 000 Kilometers
3.1.1.3.7	Duration Beyond a Distance of 2 000 Kilometers
3.1.1.3.8	Duration Beyond a Distance of 5 000 Kilometers
3.1.1.4	Altitude Record:
3.1.1.4.1	True Altitude

3.2	Absolute Records
3.2.1	The best records listed in 3.1.1.1, 3.1.1.2, 3.1.1.3, and 3.1.1.4 shall be considered as absolute records, regardless of control, weight, and propulsion classifications.

3.3	Holder of Records
3.3.1	The record will be held by the Operator in Command of the UAV.

CHAPTER 4

RULES FOR WORLD RECORDS

4.1 Improvement in Consecutive Records

4.1.1 A new record must constitute an improvement over the preceding record of at least:

- 1% in distance records
- 1% in speed records
- 1% in duration records
- 3% in altitude records

4.2 Accuracy of Measurement

4.2.1 Measurements involved in a record claim shall be the subject of a detailed report on their accuracy certified by a qualified person or body approved by the NAC concerned.

4.2.2 Distance records (3.1.1): in the measurement of the record distance the error must not exceed 0.02%.

4.2.3 Speed records (3.1.2): in the measurement of the record speed the error must not exceed 0.25%.

4.2.4 Duration records (3.1.3): in the measurement of the record duration the error must not exceed 0.1%.

4.2.5 Altitude records (3.1.4): in the measurement of the record altitude the error must not exceed 1%.

4.3 Measuring Equipment

4.3.1 Unless FAI's CASI has determined otherwise, any measuring device previously used in any other FAI Air Sport or record may be used in support of record attempts under Class U.

4.4 Other Rules

4.4.1 All records in Class U shall be made without refueling in flight. Evidence must be provided that refueling did not occur at any time during the flight. Solar panels that are used to recharge batteries or provide power to electric engines shall not be considered as refueling for these purposes.

4.4.2 Start and finish points must be pre-declared in writing for all record attempts.

4.4.3 The UAV shall be weighed in its takeoff configuration prior to the record attempt.

4.4.4 Intermediate landings shall not be permitted during the record attempt.

4.4.5 A flight performance may not include more than one lap of a course.

4.4.6 The use of auxiliary propulsion specifically for the record attempt is prohibited.

CHAPTER 5

SPECIAL RULES FOR WORLD RECORDS

5.1	Distance Records
5.1.1	Distance in a Straight Line
5.1.1.1	The course shall be declared in writing before takeoff.
5.1.1.2	Turn points are not allowed.
5.1.1.3	The flight performance will be the great circle distance between the start point and finish point.
5.1.2	Distance Over an Out and Return Course
5.1.2.1	The course shall be declared in writing before takeoff.

5.2	Speed Records
5.2.1	Speed Over a Straight Course of 15 to 25 Kilometers
5.2.1.1	The course shall be declared in writing before takeoff, and must be a minimum of 15 kilometers in length and a maximum of 25 kilometers in length. The controlling NAC must certify the length of the course prior to the record attempt.
5.2.1.3	The course shall have clear approaches at each end of at least 5 kilometers. The course and its approaches shall be clearly marked. The UAV must maintain level flight while over the course and its approaches, with a tolerance of 100 meters. The maximum altitude of the UAV at any time during the flight shall not exceed 2 000 meters above the altitude over which the course and its approaches is flown.
5.2.1.4	The UAV shall fly over the course at least once in each direction. The speed adopted shall be the average of the two speeds calculated to the nearest 1/100th of a kilometer per hour. If more than two runs are made during the same flight, any two consecutive runs may be selected to count with the condition that they have been accomplished in opposite directions. The two runs selected must have been achieved within a maximum elapsed time of 45 minutes.
5.2.2	Speed Over an Out and Return Course (course lengths of 100, 200, 500, 1 000, 2 000, 5 000 and 10 000 Kilometers)
5.2.2.1	The course shall be declared in writing before takeoff.
5.2.2.2	The UAV shall fly level (with a tolerance of 100 meters) for a distance of 1 kilometer immediately preceding the crossing of the start line.
5.2.2.3	The altitude of the UAV at the finish line shall not be less than its altitude at the start line.

5.3	Duration Records
5.3.1	Duration
5.3.2	Duration Beyond a Distance (of 50, 100, 200, 500, 1 000, 2 000, and 5 000 Kilometers)
5.3.2.1	The course and control area shall be declared in writing before takeoff.
5.3.2.2	The control area shall be a circular area with the following maximum radius:
5.3.2.2.1	Duration Beyond a Distance of 50 Km: 5 Km radius

5.3.2.2.2	Duration Beyond a Distance of 100 Km:	10 Km	radius
5.3.2.2.3	Duration Beyond a Distance of 200 Km:	20 Km	radius
5.3.2.2.4	Duration Beyond a Distance of 500 Km:	50 Km	radius
5.3.2.2.5	Duration Beyond a Distance of 1 000 Km:	100 Km	radius
5.3.2.2.6	Duration Beyond a Distance of 2 000 Km:	125 Km	radius
5.3.2.2.7	Duration Beyond a Distance of 5 000 Km:	125 Km	radius

5.3.2.3 The entire control area shall be located beyond the specified distance.

5.3.2.4 The flight performance shall be the total time spent completely within the control area. Timing commences when the UAV enters the control area and ceases any time it leaves the control area. The UAV may leave the control area for collision avoidance or weather avoidance purposes.

5.3.2.5 The UAV must return to the takeoff point after completing the flight performance.

5.4 Altitude Records

5.4.1 True Altitude

5.4.2 The altitude achieved shall be the true altitude measured from sea level as defined in the relevant country by the national survey.

5.4.3 The start point must be at an altitude of less than 500 meters above ground level.

CHAPTER 6

RECORD FILE

6.1	Claims

6.1.1 Notice of a preliminary claim for a record must be received by FAI within 7 days of its completion as an attempt (General Section 7.8.3).

6.1.2 The file containing all the information and certification necessary to prove that the conditions have been met in support of the record claim must be received by FAI within 120 days of the attempt (General Section 7.8.1).

6.1.3 FAI can request additional evidence or clarification in support of a record claim.

6.2	Certification

6.2.1 Each record file shall contain all flight certificates necessary to establish full details of the record. The certificates found in Annex 3 of the Sporting Code, Section 2, shall be used.

6.2.2 All certificates must be signed or countersigned by the official(s) controlling the record attempt and must be accompanied by the necessary evidence (when appropriate).