



FAI Sporting Code

*Fédération
Aéronautique
Internationale*

Section 12 – Unmanned Aerial Vehicles

UAV Class U

2019 Edition

Effective 1st January 2019

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 2019 EDITION INCLUDES THE FOLLOWING AMENDMENTS MADE TO THE 2018 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
		Early implementation – effective 1st June 2018	
1.1.1	2018	Amended definition to comply with par 2.1.3 of GS	Kevin Dodd Technical Secretary
1.3.6		Added and defined 'Payload' records	
2.1.1		Amended 'Type' to separate fixed wing, rotary wing and aerostat and further define rotary wing	
2.1.1		Addition of 'light classes'; reduction in heavier classes	
3.1.1.2		Course lengths added for small UAVs	
3.1.1.3		Clearer distinction between duration (only time) and duration (distance) records; reduction in duration (distance) records	
3.1.1.5, 3.2.1		Specification of different payload records	
4.4.6		Paragraph deleted; no restriction on propulsion systems	
5.2.1, 5.2.2		Specification of speed records; amended to accommodate lighter classes	
5.3.1, 5.3.2		Specification of duration records; clarified and amended to accommodate lighter classes	
5.5		Specification of payload records	

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		Added 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 that does not carry a human and is controlled primarily by means of an onboard flight system.
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. Note: In Section 4, Aeromodelling Records are defined. Differences between Aeromodelling and UAV records: <ul style="list-style-type: none">• Records for model aircraft are always in Visual Line Of Sight (VLOS) of the pilot.• For Aeromodelling records, onboard flight systems that control position and attitude of the model aircraft are not permitted, except auxiliary stabilising devices for helicopters.
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 flight 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).
1.3.6	Payload - A flight performance, measured and calculated for payload times distance over a course, payload times speed over a course, payload times duration of a flight, and payload times altitude above mean sea level.
1.3.6.1	Payload is the weight difference of the UAV with and without the payload. Payload is defined as added mass that can be easily installed and removed without affecting the normal operation of the aircraft.

1.4	Course Definitions
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- 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
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- 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
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- 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
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- 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
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- 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 type, weight, and type of propulsion as follows:
2.1.1.1	Type Classifications:
2.1.1.1.1	Type 1 Fixed wing aerodyne
2.1.1.1.2	Type 2 Rotary wing aerodyne
2.1.1.1.2.1	Variable pitch (helicopter)
2.1.1.1.2.2	Fixed pitch (multirotor ≥ 3 rotors)
2.1.1.1.3	Aerostat
2.1.1.2	Weight Classifications: The weight of the UAV at takeoff will be used to determine its weight classification.
2.1.1.2.1	less than 50 g
2.1.1.2.2	50 g – less than 250 g
2.1.1.2.3	250 g – less than 1 kg
2.1.1.2.4	1 kg – less than 2.5 kg
2.1.1.2.5	2.5 kg – less than 5 kg
2.1.1.2.6	5 kg – less than 25 kg
2.1.1.2.7	25 kg – less than 100 kg
2.1.1.2.8	100 kg – less than 500 kg
2.1.1.2.9	500 kg – less than 2 500 kg
2.1.1.2.10	2 500 kg – less than 10 000 kg
2.1.1.2.11	10 000 kg – less than 50 000 kg
2.1.1.2.12	Weight 50 000 kg or greater
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
2.1.2	A table of classifications for UAV records is provided on the following page:

Subclass	Category-Weight	Group-Propulsion	Types of records
U-Absolute	1: less than 50 g	1-Internal combustion and jet	Distance in a straight line
U-1-Fixed wing	2: 50 g to less than 250 g	2-Electric	Distance over an out and return course
U-2-Helicopter	3: 250 g to less than 1kg	3-Rocket	Speed over a straight course between 50 m and 15 km
U-3-Multirotor	4: 1kg to less than 2.5 kg	4-Unpropelled	Speed over a straight course between 15 km and 25 km
U-4-Aerostat	5: 2.5 kg to less than 5 kg		Speed over an out and return course: 50 m
	6: 5 kg to less than 25 kg		Speed over an out and return course: 100 m
	7: 25 kg to less than 100 kg		Speed over an out and return course: 200 m
	8: 100 kg to less than 500 kg		Speed over an out and return course: 500 m
	9: 500 kg to less than 2,500 kg		Speed over an out and return course: 1 km
	10: 2,500 kg to less than 10,000 kg		Speed over an out and return course: 5 km
	11: 10,000 kg to less than 50,000 kg		Speed over an out and return course: 10 km
	12: 50,000 kg or greater		Speed over an out and return course: 100 km
			Speed over an out and return course: 1000 km
			Speed over an out and return course: 5 000 km
			Speed over an out and return course: 10 000 km
			Duration
			Duration beyond a distance of 10 km
			Duration beyond a distance of 50 km
			Duration beyond a distance of 500 km
			Duration beyond a distance of 2 500 km
			Duration beyond a distance of 5 000 km
			True Altitude
			Payload times distance over a course
			Payload times speed over a course
			Payload times duration of a flight
			Payload times altitude above mean sea level
			Absolute – Distance
			Absolute – Speed
			Absolute – Duration
			Absolute – Altitude
			Absolute – Payload

CHAPTER 3

RECORDS IN CLASS U

3.1	Available Records
3.1.1	Records are available in Class U for distance, speed, duration, altitude and payload 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 50 Metres to 25 Kilometres
3.1.1.2.2	Speed Over an Out and Return Course of 50 Metres to 10 000 Kilometres
3.1.1.3	Duration Records:
3.1.1.3.1	Duration – Time
3.1.1.3.2	Duration - Distance
3.1.1.3.2.1	Duration Beyond a Distance of 10 Kilometres (only for UAV weight classes < 5 kg)
3.1.1.3.2.2	Duration Beyond a Distance of 50 Kilometres
3.1.1.3.2.3	Duration Beyond a Distance of 500 Kilometres
3.1.1.3.2.4	Duration Beyond a Distance of 2 500 Kilometres
3.1.1.3.2.5	Duration Beyond a Distance of 5 000 Kilometres
3.1.1.4	Altitude Record:
3.1.1.4.1	True Altitude
3.1.1.5	Payload
3.1.1.5.1	Payload times distance over a course, (unit kgm)
3.1.1.5.2	Payload times speed over a course, (unit kgm/s)
3.1.1.5.3	Payload times duration of a flight, (unit kgs)
3.1.1.5.4	Payload times altitude above mean sea level. (unit kgm)
3.2	Absolute Records
3.2.1	The best records listed in 3.1.1.1, 3.1.1.2, 3.1.1.3, 3.1.1.4 and 3.1.1.5 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.

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 50 Metres to 25 Kilometres.
5.2.1.1	The course shall be declared in writing before takeoff, and must be a minimum of 50 metres in length for UAVs ≤ 5 kg and between 15 kilometres and 25 kilometres in length for UAVs > 5 kg. The controlling NAC must certify the length of the course prior to the record attempt.
5.2.1.2	The course shall have clear approaches at each end of at least 30% of the course length with a minimum of 25 metres and a maximum of 5 kilometres. 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 10 metres for classes ≤ 5 kg and 100 metres for classes > 5 kg. The maximum altitude of the UAV at any time during the flight shall not exceed 200 metres for classes ≤ 5 kg and 2 000 metres for classes > 5 kg above the altitude over which the course and its approaches is flown.
5.2.1.3	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 50 metres, 100 metres, 200 metres, 500 metres, 1 and 5 kilometres for classes ≤ 5 kg and 10, 100, 1 000, 5 000 and 10 000 kilometres for classes > 5 kg.
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 10 metres for classes ≤ 5 kg and 100 metres for classes > 5 kg, for a distance of 1 kilometre for classes > 5 kg 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
5.3.1.1	True time without refilling of fuel or recharging of batteries.
5.3.1.2	The time achieved shall be true time measured by data logging.

- 5.3.2 Duration Beyond a Distance of (10, 50, 100, 200, 500, 1 000, 2 000, and 5 000 Kilometres)
- 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 10 km: 1 km radius
- 5.3.2.2.2 Duration Beyond a Distance of 50 km: 5 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
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- 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.

5.5	Payload Records
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- 5.5 Payload records
- 5.5.1 Distance, speed, duration and altitude as per paragraphs 5.1 – 5.4.
- 5.5.2 Weight class is determined without payload.

CHAPTER 6

RECORD FILE

6.1	Claims
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|-------|---|
| 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
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|-------|---|
| 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). |