



# FAI Sporting Code

*Fédération  
Aéronautique  
Internationale*

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## Section 1 – Aerostats

Class A - Free Balloons  
Class B – Airships

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Section 1 and General Section combined make up  
the complete Sporting Code for Aerostats

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<sup>i</sup> FAI Statutes, Chapter 1, para. 1.6

<sup>ii</sup> FAI Sporting Code, General Section, Chapter 4, para 4.1.2.

<sup>iii</sup> FAI Statutes, Chapter 1, para 1.8.1

<sup>iv</sup> FAI Statutes, Chapter 2, para 2.1.1; 2.4.2; 2.5.2 and 2.7.2

<sup>v</sup> FAI Bylaws, Chapter 1, para 1.2.1

<sup>vi</sup> FAI Statutes, Chapter 2, para 2.4.2.2.5,

<sup>vii</sup> FAI Bylaws, Chapter 1, para 1.2.3

<sup>viii</sup> FAI Statutes, Chapter 5, para 5.1.1; 5.5 and 5.6

<sup>ix</sup> FAI Sporting Code, General Section, Chapter 4, para 4.1.5

<sup>x</sup> FAI Sporting Code, General Section, Chapter 1, para 1.2. and Chapter 2, para 2.2

<sup>xi</sup> FAI Statutes, Chapter 5, para 5.6.3

<sup>xii</sup> FAI Bylaws, Chapter 1, para 1.2.2

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## AMENDMENTS

### I. AUTHORITY

The Sporting Code SECTION 1 - AEROSTATS may be amended by the FAI BALLOONING COMMISSION (CIA)

### II. EFFECTIVE DATE

Amendments to the Sporting Code SECTION 1 shall come into force on January 1<sup>st</sup>, unless a different date is decided by the CIA or its Bureau.

### III. PUBLICATION

#### a. SPORTING CODE

The Sporting Code SECTION 1 - AEROSTATS shall be published by the FAI as a downloadable document on the FAI website. A printed version may also be published. The document on the FAI website is deemed to be the latest up to date version of the Sporting Code Section 1 and shall serve as a reference document in all cases.

#### b. SPORTING CODE VERSION IDENTIFICATION

- Top center of page : FAI SPORTING CODE SECTION 1 - AEROSTATS
- Bottom left corner of page : VERSION

The version shall indicate the month and year when the document becomes effective. The version shall change with any published change to the Sporting Code Section 1.

- Bottom center of page : EFFECTIVE DATE
- Bottom right corner of page : SPORTING CODE PAGE NUMBER

### IV. AMENDMENTS

Should amendments be required to the published version of the Sporting Code, a new version will be issued and published on the FAI website, as authorised by the CIA or its Bureau. Changes from the previous version are marked with a vertical line in the margin. Amendments shall be published on numbered pages and in chronological order in an "Amendments Appendix" to the Sporting Code – Section 1.

### V. SPORTING CODE DOCUMENTS UPDATING AND MAINTENANCE

NACs should advertise or distribute all documents pertaining to the Sporting Code SECTION 1 - AEROSTATS to all known holders of this Sporting Code within their responsibilities, and to their NATIONAL BALLOON FEDERATIONS and affiliated members.

VI. AMENDMENTS RECORD

**Prior to March 2008:**

VERSION NUMBER	AMENDMENT NUMBER	EFFECTIVE DATE	DATE RECEIVED	DATE AMENDED	AMENDED BY
1.93		01.01.93			
	1/03.93	01.01.94	13.12.93	13.12.93	<i>FAI Secretariat Included in Version 1.95</i>
	1/03.94	01.01.95	<i>No separate publication</i>	<i>With Version 1.95</i>	<i>FAI Secretariat Included in Version 1.95</i>
1.95		01.01.95			
1.95	1/03.95	01.01.96			
1.98	<i>Amendments not numbered</i>	01.01.98	18.12.97	18.12.97	<i>CIA Rules SC</i>
2.03	<i>Amendments not numbered</i>	01.01.03			<i>All amendments Approved since March 1998 included</i>
3.08	<i>Amendments not numbered</i>	01.01.2008			<i>All amendments Approved since March 2003 included</i>

**After March 2008:**

VERSION	AMENDMENT NUMBER	EFFECTIVE DATE	DATE PUBLISHED
<i>April 2008</i>		<i>April 1<sup>st</sup>, 2008</i>	<i>April 1<sup>st</sup>, 2008</i>
<i>January 2010</i>		<i>January 1<sup>st</sup>, 2010</i>	<i>January 1<sup>st</sup>, 2010</i>
<i>January 2011 *</i>		<i>January 1<sup>st</sup>, 2011 *</i>	<i>January 1<sup>st</sup>, 2011 *</i>
<i>May 2012</i>		<i>May 1st, 2012</i>	<i>May 1st, 2012</i>
<i>June 2013</i>		<i>June 7th, 2013</i>	<i>June 7<sup>th</sup>, 2013</i>
<i>October 2013</i>		<i>October 28, 2013</i>	<i>October 28, 2013</i>
<i>March 2014</i>		<i>March 21, 2014</i>	<i>May 26, 2014</i>
<i>May 2015</i>		<i>May 15, 2015</i>	<i>May 15, 2014</i>
<i>May 2016</i>		<i>May 1, 2016</i>	<i>May 1, 2016</i>

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**CHAPTER 1 - GENERAL**

**1.1 SCOPE**

In combination with the General Section, this Section- of the Sporting Code provides for the international encouragement and control of sporting activities involving free balloons and airships.

**1.2 LANGUAGE**

In case of dispute, the English text shall prevail.

**1.3 CHARGES**

Charges levied by NACs or delegated bodies for championship entrance, record homologation, or sporting badge issue shall be kept low where possible. Charges should in no case exceed the justifiable direct cost of the event concerned.

**1.4 BEHAVIOUR**

All participants, officials and organizers in sporting activities shall behave in a respectful, fair and sportsmanlike manner.

**END OF CHAPTER 1**

**CHAPTER 2 - CLASSIFICATION**

**2.1 CLASS A: FREE BALLOONS**

**2.1.1** Class A, - An aerostat, supported statically in the air, with no means of propulsion by any power source.

Free balloons shall be divided into five sub-classes, each containing 15 categories according to size. The sub-classes are the following:

**2.1.1.1** Sub-class AA: Free balloons, not equipped with an airborne heater, which obtain their buoyancy from a lighter-than-air gas, without pressurisation of the envelope.

**2.1.1.2** Sub-class AX: Free balloons which obtain their buoyancy solely as a result of heating air. The envelope may contain no gases other than air and the normal products of combustion.

**2.1.1.3** Sub-class AM: Free balloons which use both a lighter-than-air gas and an airborne heater, without pressurisation of any envelope.

**2.1.1.4** Sub-class AS: Free balloons which use a lighter-than-air gas and are designed to allow sufficient pressurisation of the envelope to affect performance substantially.

**2.1.1.5** Sub-class AT: Free balloons not falling into subclasses AA, AX, AM or AS. A free balloon which obtains its buoyancy as a result of heating air using solar and/or external radiation sources only may be included in this sub-class.

**2.1.2 SUB-CLASS SIZE CATEGORIES**

For each sub-class the size categories are the following:

250 m <sup>3</sup> and less	AA-1	AX-1	AM-1	AS-1	AT-1
250 m <sup>3</sup> to 400 m <sup>3</sup>	AA-2	AX-2	AM-2	AS-2	AT-2
400 m <sup>3</sup> to 600 m <sup>3</sup>	AA-3	AX-3	AM-3	AS-3	AT-3
600 m <sup>3</sup> to 900 m <sup>3</sup>	AA-4	AX-4	AM-4	AS-4	AT-4
900 m <sup>3</sup> to 1 200 m <sup>3</sup>	AA-5	AX-5	AM-5	AS-5	AT-5
1 200 m <sup>3</sup> to 1 600 m <sup>3</sup>	AA-6	AX-6	AM-6	AS-6	AT-6
1 600 m <sup>3</sup> to 2 200 m <sup>3</sup>	AA-7	AX-7	AM-7	AS-7	AT-7
2 200 m <sup>3</sup> to 3 000 m <sup>3</sup>	AA-8	AX-8	AM-8	AS-8	AT-8
3 000 m <sup>3</sup> to 4 000 m <sup>3</sup>	AA-9	AX-9	AM-9	AS-9	AT-9
4 000 m <sup>3</sup> to 6 000 m <sup>3</sup>	AA-10	AX-10	AM-10	AS-10	AT-10
6 000 m <sup>3</sup> to 9 000 m <sup>3</sup>	AA-11	AX-11	AM-11	AS-11	AT-11
9 000 m <sup>3</sup> to 12 000 m <sup>3</sup>	AA-12	AX-12	AM-12	AS-12	AT-12
12 000 m <sup>3</sup> to 16 000 m <sup>3</sup>	AA-13	AX-13	AM-13	AS-13	AT-13
16 000 m <sup>3</sup> to 22 000 m <sup>3</sup>	AA-14	AX-14	AM-14	AS-14	AT-14
Above 22 000 m <sup>3</sup>	AA-15	AX-15	AM-15	AS-15	AT-15

**2.1.3 DETERMINATION OF CUBIC CAPACITY**

The cubic capacity of a free balloon shall be calculated from the geometric form of every part of the balloon system when it has the greatest volume which it can achieve in flight without elastic extension. If the material of the balloon has sufficient elasticity that the actual volume achieved in flight would affect the size category, then that volume must be used. The volume shall be determined in figures rounded to the nearest cubic metre.

## 2.1.4 EQUIVALENCE OF GASES

In sub-class AA only, the geometric volume shall be multiplied by a factor proportional to the lift of the gas to obtain an adjusted volume before determining the category. The factors to be used are:

Hydrogen (H <sub>2</sub> ):	1.5507
Helium (He):	1.4363
Ammonia (NH <sub>3</sub> ):	0.6867

*[Historical Note: The factors result from a calculation designed to bring all sub-class AA balloons into an equivalency with balloons inflated with coal gas having a lift of 0.7 kg/m<sup>3</sup>, together with a special tolerance of up to +5% of volume. Ref. Edition of January 1998.]*

For any other gas, or any mixture of gases, the factor to be used will be

$$L / 0.735$$

where L is its lifting force in kilograms per cubic metre at 15 degrees C and 1013.25 hPa.

To determine L for mixtures of pure gases, the following theoretical lifting forces (kg/m<sup>3</sup>) shall be used:

Hydrogen (H <sub>2</sub> ):	1.13976
Helium (He):	1.05571
Ammonia (NH <sub>3</sub> ):	0.50474

## 2.2 CLASS B: AIRSHIP or DIRIGIBLE

2.2.1 Class B - An aerostat, equipped with means of propulsion and steering.

Airships shall be divided into four sub-classes each containing ten categories according to size. The sub-classes are the following:

- 2.2.1.1 Sub-class BA: Airships which obtain at least 75% of their static lift from a lighter-than-air gas.
- 2.2.1.2 Sub-class BX: Airships which obtain their static buoyancy solely as a result of heating air. The envelope may contain no gases other than air and the normal products of combustion.
- 2.2.1.3 Sub-class BM: Airships which obtain their static buoyancy both from a lighter-than-air gas and the heating of air and gas by an airborne heater.
- 2.2.1.4 Sub-class BT: All other airships, including those in which more than 25% of the lift is obtained from the thrust of the power source.

**2.2.2 SUB-CLASS SIZE CATEGORIES**

For each sub-class the size categories are the following:

	400 m <sup>3</sup> and less	BA-1	BX-1	BM-1	BT-1
400 m <sup>3</sup>	to 900 m <sup>3</sup>	BA-2	BX-2	BM-2	BT-2
900 m <sup>3</sup>	to 1 600 m <sup>3</sup>	BA-3	BX-3	BM-3	BT-3
1 600 m <sup>3</sup>	to 3 000 m <sup>3</sup>	BA-4	BX-4	BM-4	BT-4
3 000 m <sup>3</sup>	to 6 000 m <sup>3</sup>	BA-5	BX-5	BM-5	BT-5
6 000 m <sup>3</sup>	to 12 000 m <sup>3</sup>	BA-6	BX-6	BM-6	BT-6
12 000 m <sup>3</sup>	to 25 000 m <sup>3</sup>	BA-7	BX-7	BM-7	BT-7
25 000 m <sup>3</sup>	to 50 000 m <sup>3</sup>	BA-8	BX-8	BM-8	BT-8
50 000 m <sup>3</sup>	to 100 000 m <sup>3</sup>	BA-9	BX-9	BM-9	BT-9
	Above 100 000 m <sup>3</sup>	BA-10	BX-10	BM-10	BT-10

**2.2.3 DETERMINATION OF CUBIC CAPACITY**

The cubic capacity of an airship shall be calculated from the geometric form of the lifting gas containers when they have the greatest volume which they can achieve in flight without elastic extension. If the material of the containers has sufficient elasticity that the actual volume achieved in flight would affect the size category, then that volume must be used. The volume shall be determined in figures rounded to the nearest cubic metre.

**2.2.4 EQUIVALENCE OF GASES**

No equivalence factors are used in class B.

**END OF CHAPTER 2**

**CHAPTER 3 - DEFINITIONS****3.1 FLIGHT**

An event which starts at take-off and ends with a landing of an aerostat.

**3.2 AIRBORNE**

An aerostat is airborne when its envelope, gondola, crew and all substantial parts of its equipment and payload have no contact with the ground or water surface or anything attached or resting on the ground or water. An aerostat is considered to remain airborne during momentary ground or water contact and when a trail rope is in contact with the ground or water, unless the aerostat is moored, towed, carried or assisted by outside physical help.

**3.3 TAKE-OFF**

The point in position and time at which an aerostat first becomes airborne.

**3.4 LANDING**

The point in position and time at which the aerostat first ceases to be airborne.

**3.5 POSITION CHECK POINT**

An identifiable point reached during a flight, where it can be proved the balloon passed over or through, but not necessarily declared before flight.

**3.6 UNCOMPLETED FLIGHT PERFORMANCE**

A record flight is deemed to be uncompleted if during the flight performance any of the following items occur:

- An accident occurs resulting in the death of any member of the crew within 48 hours of termination of the flight;
- the pilot in command leaves the aerostat;
- any part of the aerostat is jettisoned which results in loss of control.

**3.7 FLIGHT CREW**

Persons taking an active part in the control of an aerostat during flight.

**3.8 DISTANCE**

Unless otherwise specified, the distance between two points is the length of the shortest great circle arc joining their co-ordinates on the "FAI Sphere", a spherical surface of 6371 kilometres radius. It is thus independent of the actual shape of the earth. Methods of calculation are given in Annex 4.

**3.9 ALTITUDE**

Unless otherwise specified, altitude is the geometric height above mean sea level as defined by the national survey of the relevant country. Pressure altitudes must be adjusted for pressure at the surface and temperatures at the surface and aloft. Geopotential units of height are not used. Methods of calculation are given in Annex 2.

**END OF CHAPTER 3**

**CHAPTER 4 – WORLD RECORDS****4.1 RECORD CATEGORIES**

There shall be two categories of records in each size category:

GENERAL CATEGORY: The best performance achieved.

FEMALE CATEGORY: The best performance achieved by a woman.  
In this category all occupants must be female.

**4.2 RECORDS IN CLASS A**

Each of the size categories in the sub-classes shall be subject of the following records:

- Altitude
- Distance
- Duration
- Shortest time around the World

**4.3 RECORDS IN CLASS B**

Each of the size categories in the sub-classes shall be subject of the following records:

- Altitude
- Distance
- Duration
- Speed
- Shortest time around the World

**4.4 ABSOLUTE RECORDS**

The best records listed in 4.2 and 4.3 regardless of size and sub-class shall be considered as absolute records for classes A and B and listed separately.

**4.5 RECORDS BROKEN AS A RESULT OF PERFORMANCES IN OTHER CATEGORIES**

A record will be broken when a pilot accomplishes a better performance in an aerostat belonging to an equal or inferior size category in the same sub-class.

**4.6 DIFFERENCE BETWEEN TWO CONSECUTIVE RECORDS**

A new record must improve the preceding one by at least the following percentages:

Distance, Duration and Shortest time: 1 %

Altitude and Speed: 3 %

**4.7 GENERAL RULES**

Reference is made to General Section Chapter 7

**4.7.1 OUTSIDE HELP**

It is prohibited, after the take-off and before the landing, to take on board fuel, lifting gas, or any other physical supply provided by helpers external to the aircraft.



**4.7.2 AIR LAW AND REGULATIONS**

Violations in laws or regulations may disqualify the offender in all FAI events. A conviction for an infringement of aviation law during a record attempt will invalidate the record, if the infringement made a substantial contribution to the achievement.

**4.7.3 ACCURACY**

4.7.3.1 A performance shall, if possible, be determined with the following overall margins of error:

Altitude: +/- 1%  
Distance: +/- 1% or 500 m whichever is less  
Time: +/- 0.1%  
Speed: +/- 1%

4.7.3.2 If the overall margin of error in the determination of the performance is greater than those specified in 4.7.3.1, the value at the least advantageous limit of the actual error range shall be used.

4.7.3.3 Measurements: A performance shall not be certified with a higher precision than the technologies used to determine it.

**4.7.4 RECORD CLAIM PROCEDURE**

4.7.4.1 The CIA shall publish STANDARD RECORD CLAIM FORMS (ANNEXE 1) for records listed in paragraphs 4.2 and 4.3. Use of the standard record claim form is compulsory for every world record claim, and is strongly recommended for national record claims. Each NAC shall make the standard record claim forms available to their members.

4.7.4.2 World record claims shall be sent to FAI who will send a copy to the CIA for verification and certification. The CIA may, at its discretion, delegate to a sub-committee its authority to verify these claims for subsequent certification by the CIA or its bureau, and by the FAI Secretary General.

4.7.4.3 Except for copies of certificates and licenses, the language used in the claim dossier shall be English. Limitations in the validity of certificates and licenses shall be translated into English.

**4.8 SPECIAL RULES****4.8.1 ALTITUDE RECORDS**

4.8.1.1 The gain of height above take-off position must be at least 50% of the altitude claimed.

4.8.1.2 The flight performance shall be from take-off to landing

**4.8.2 DISTANCE RECORDS**

4.8.2.1 Normally the distance certified shall be the great circle distance between the take-off point and the landing point during a single flight, regardless of the real distance covered by the aerostat. If a pilot claims a record using multiple legs, the following rules apply:

4.8.2.1.1 - The distance certified shall be the sum of great circle distances between consecutive position check points along the flight path. The take-off and landing points are check points.

4.8.2.1.2 - The distance between any two consecutive position check points must be not less than 3185.5 km (half earth radius), and the average such distance must be not less than 6371 km (earth radius).

**4.8.3. AROUND-THE-WORLD RECORDS**

4.8.3.1 The record shall be the shortest time around the World in a single flight.

4.8.3.2 After the flight the pilot must choose:

- i) a selection of position check points which need not be the same as those which are selected to claim a distance record under 4.8.2 and need not conform to its distance limits.
- ii) Two circular caps on the surface of the earth. The radius of each cap must be 3335.85 km (30 degrees of great circle arc), and each cap must enclose one of the poles, not necessarily at its centre.
- iii) A meridian which shall be the Start and Finish Line

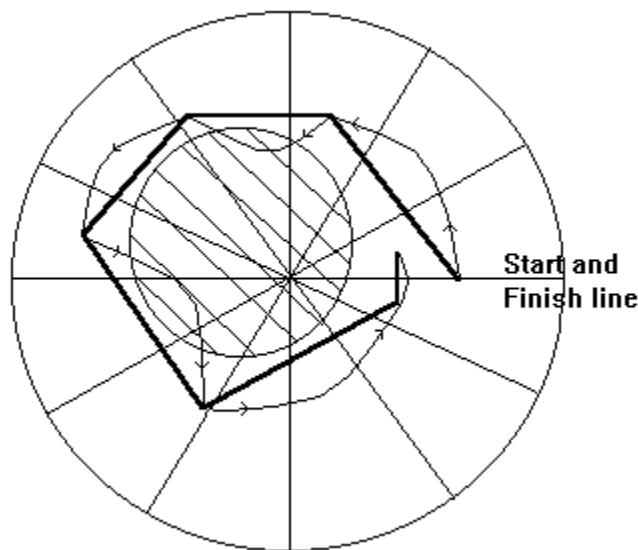
4.8.3.3 The position check points and the great circle arcs joining successive check points must lie outside both circular caps, although parts of the flight may pass inside. The track must cross all meridians after crossing the Start line and before crossing the Finish line.

4.8.3.4 The start time is the time of the last check point at or before crossing the start line, and the finish time is the time of the first check point at or after crossing the finish line.

4.8.3.5 The around-the-world record is established when the aerostat crosses the finish line.

**4.8.4 DEFINITIONS AND EXPLANATIONS**

4.8.4.1 A typical arrangement of requirements of 4.8.3 is shown in the diagram. The cap must enclose the pole and the great circle arcs joining the check points must pass outside it. The actual track of the aerostat must cut all meridians, but may pass inside the cap.



4.8.4.2 A check point is an identifiable point where it can be proved the balloon passed over or through. If many check points are available those used for calculation may be selected according to rules 4.8.2 and 4.8.3 to the applicant's best advantage.

**4.8.5 DURATION RECORDS**

The record shall be for the greatest time between take-off and landing during a single flight.

**4.8.6 SPEED RECORDS FOR AIRSHIPS**

- 4.8.6.1 The record shall be for speed over a straight 1 km course at restricted altitude.
- 4.8.6.2 The start and finish lines shall be at right angles to the course centre line, extending to a maximum of 100m on each side of it.
- 4.8.6.3 Heights shall be measured from the highest point of the starting line to the gondola. Heights and altitudes in paragraph 4.8.6 need not be corrected for temperatures according to Annex 2.
- 4.8.6.4 The airship shall fly over the course once in each direction and the speed adopted shall be the average of the two speeds rounding to the third significant digit. If more than two runs are made in the same flight, any two consecutive runs may count. not more than ten minutes may elapse between crossing the finish line and crossing the starting line in the next run.
- 4.8.6.5 The course shall have a clear approach at each end, 250m in length. Both the course and the approaches shall be clearly identified. The height over the course and approaches shall be below 500m but without ground contact. The maximum height and minimum height reached while over the course and approaches during the attempt shall not differ by more than 200m. The maximum altitude during the flight shall not exceed 900m.

**END OF CHAPTER 4**

**CHAPTER 5 - FIRST CATEGORY SPORTING EVENTS****5.1 INTRODUCTION**

This chapter sets out the framework for:

WORLD CHAMPIONSHIPS (GS 4.1.4)  
CONTINENTAL REGIONAL CHAMPIONSHIPS (GS 4.1.3.1 & 4.1.3.2)  
INTERNATIONAL SPORTING EVENTS (GS 4.1.2)

- 5.1.1 Sporting Events in class A and class B may belong to either of the following categories of Sporting Events:
- General, with no gender or age limitation;
  - Female, where all persons on board of the aerostat, except for competition officials, must be female,
  - Junior, where all persons on board of the aerostat, except for competition officials, must be aged less than 27 years the year of the event
- 5.1.2 Unless an article refers specifically to an age or gender category, or either World, Continental Regional or Special International Sporting Event, it applies to all.

**5.2 OBJECTIVES**

The objectives of a First Category Sporting Event are to:

- Determine the Champion Pilot, or two Champion Pilots in the case of a World Gas Balloon Championship;
- to stimulate the development of aerostation by an international comparison of performance of pilots and aerostats;
- to reinforce friendship amongst aeronauts of all nations.

**5.3 AUTHORITY**

- 5.3.1 A First Category Sporting Event shall be organised in accordance with this Section and the General Section of the Sporting Code of the FAI by, or on behalf of, a NAC affiliated to the FAI.
- 5.3.2 World Championships in the same sub-class, age or gender category shall not be held closer to each other than approximately two years.
- 5.3.3 Continental Regional Championships in the same sub-class, age or gender category shall not be held more than once a year on the same continent.
- 5.3.4 Intentions to bid and bids from an NAC to organise a First Category Sporting Event must be presented in the standardised CIA format published in the CIA Bidding Check-list and timetable, and shall be subject to the following bidding process:
- 5.3.4.1 World - or Continental Regional Championship:

Intentions to bid must be received by the CIA at least 60 days before the date fixed for the CIA meeting three calendar years before the year scheduled for the Event. They shall be included in the Agenda of that meeting. Exceptionally, and only if the CIA has received less than 2 intentions to bid in accordance with the three year deadline, the CIA may accept intentions to bid up to 60 days before the date fixed for the CIA meeting two calendar years before the year scheduled for the event. Intentions to bid shall not be accepted more than six years before the year of the event. The letters of intent, supported by a letter of recommendation from the bidders' NAC, shall be presented to the CIA meeting by the bidding NACs' respective CIA delegates and be recorded in the meeting minutes. The letters of intent

must contain the following information:

- The title, dates and place of the event,
- the organiser's name, coordinates and qualifications,
- the maximum total number of competitors the organiser is prepared to accommodate,
- the equal number of competitors to be invited from each eligible NAC,
- the organiser's policy on entry-fees,

5.3.4.2 Test Events shall be compulsory for World and Continental Championships unless the Organizer has recent and equivalent CAT1 experience.

- Test Event information must be available on the Sanction Application for it to be accepted
- If no test-event is planned, justification for not holding the test-event must be clearly explained on the Sanction Application
- No Sanction Fee will be required for the organizing of a Test Event for Worlds and Continental Championships and must be run at a minimum per the requirements of a CIA Sporting Event
- At minimum the Jury President must be nominated by CIA and all reports from the event must be sent to CIA

5.3.4.3. Ensuing bids, supported by the complete bid files and the FAI/CIA Organiser Agreement signed by the organizing NAC and the Organiser, must be presented to the CIA Plenary meeting two calendar years before the year scheduled for the Event, unless these time limits are changed by the CIA under special circumstances Bid presentations shall be included in the Agenda of that meeting, and the bidding NACs' respective CIA delegates shall present the bids to the CIA meeting. Bids shall be considered by this meeting and the CIA is empowered to accept or reject such bids.

Voting by the Plenary to award the organisation of World- or Continental Championships shall be by secret ballot and simple majority.

5.3.4.4 Other First Category Sporting Events:

Bids must be received by the CIA at least 60 days before the date fixed for the CIA meeting the year scheduled for the Event, unless these time limits are changed by the CIA under special circumstances They shall be included in the Agenda of that meeting. The bidding NACs' respective CIA delegates shall present the bids to the CIA meeting, supported by the complete bid files and the FAI/CIA Organiser Agreement signed by the organising NAC and the Organiser. Bids shall be considered by this meeting and the CIA is empowered to accept or reject such bids.

## 5.4 CHANGES TO APPROVED EVENT PARTICULARS

The organiser may not change or otherwise modify any of the event particulars approved and sanctioned by the CIA except by CIA authorization.

## 5.5. ELIGIBILITY

5.5.1 A First Category Sporting Event is open to all NACs which have met their obligations to the FAI. In the case of a Continental Regional Championship (CRC) it is open to all these NACs in that region, but the organising NAC may issue invitations to compete to other NACs, but not for the title of Continental Regional Champion.

5.5.2 Organisers may invite on a personal basis, in accordance with the Sporting Code General Section Chapter4, a limited number of individuals who do not otherwise have an opportunity to participate.

5.5.3 Aerostats flown in a First Category Sporting Event must have current certificates of registration and airworthiness, or in place of the latter, an equivalent document from the recognised authority of the country concerned. The organisers are empowered to reject any aerostat which in their opinion is not of a reasonable standard of airworthiness.

5.5.4 Aerostats carrying advertising shall in all respects be treated equally with other balloons.

However, the organisers may in the entry conditions reserve the right to advertising on the basket only.

5.5.5 After the beginning of the GENERAL BRIEFING of a First Category Sporting Event, no change of competitor or entrant is permitted.

5.5.6 RETURN OF ENTRY FEES

5.5.6.1 If the contest does not take place, is cancelled or stopped except for reasons of force majeure, entry fees shall be returned in full by the organizing NAC.

5.5.6.2 A competitor who or a team which withdraws from an event after having had their entry accepted may be entitled to a full or partial refund of the entry fees paid, in accordance with criteria established by the CIA.

**5.6 INVITATION AND ENTRY PROCEDURES FOR WORLD- AND CONTINENTAL REGIONAL CHAMPIONSHIPS**

5.6.1 INITIAL INVITATION TO NAC

5.6.1.1 The organising NAC must issue initial invitations to participate to all eligible NACs. Copies of all invitations must be sent to the respective National Balloon Federations and CIA delegates, where these exist, for information.

5.6.1.2 The organising NAC shall issue an invitation for an equal number of at least two competitors to each eligible NAC.

5.6.1.3 Only the initial invitation must be sent by the organising NAC to eligible NACs, all further documents pertaining to the initial invitation may be addressed directly by the organisers to the nominated participants.

5.6.1.4 **Nomination of Entrants**  
Each NAC wishing to enter a World or Continental Regional Championship shall nominate its own entrants by the time limit for entry published in the invitation.

- 5.6.1.5 **Invitation of current Medal Holders**
- The World Championship Gold, Silver and Bronze medal holders shall be directly invited by the organisers of the next World Championship.
  - The Continental Championship Gold, Silver and Bronze medal holders shall be directly invited by the organisers of the next Continental Championship.
  - The Junior World Championship Gold medal holder shall be directly invited by the organisers of the next Junior World Championship and by the organisers of the next World Championship in the following year
  - The Junior Continental Championship Gold medal holder shall be directly invited by the organisers of the next Junior Continental Championship and by the organisers of the next Continental Championship In the following year.
  - The Women World Championship Gold medal holder shall be directly invited by the organisers of the next Women World Championship and by the organisers of the next World Championship in the following year.
  - The Women Continental Championship Gold medal holder shall be directly invited by the organisers of the next Women Continental Championship and by the organisers of the next Continental Championship in the following year.

5.6.2 EVENT INFORMATION

The following information must be given to all eligible NACs with the initial invitation:

**Competitor numbers:**

- Number of eligible NACs invited,
- Number of pilots invited per NAC,
- Number of medal holders invited,
- Maximum total number of competitors,

**Entry-fee:**

- amount,
- what is included
- currency,
- refund policy

**Deadlines:**

- NACs acceptance,
- First round of invitations,
- Second round of invitations
- 60 / 45 day limit (World Championships / Continental Championships)

5.6.3 COMPETITOR INVITATION PROCEDURE

5.6.3.1 **Round 1**

After the deadline for NACs to accept their invitation to compete, invitations shall be sent out to nominated pilots up to the maximum number per eligible NAC as given in the Event Information.

5.6.3.2. **Round 2**

After the closing date for Round 1 additional invitations will be sent out. A pilot may only qualify for the second round of invitations provided their NAC has responded within the time limits and have taken up all their initial invitations. Invitations for Round 2 shall be in accordance with the Ranking Method and up to the maximum allowed for the event.

5.6.3.3 **Round 3**

Following a request by the organiser to the CIA, a further round of invitations may be sent out as in Round 2.

Invitations will follow on from where Round 2 ended.

Invitations will only be sent out up to the maximum total number of competitors the organiser is prepared to accommodate.

Invitations will not be accepted later than 60 days for World Championships and 45 days for Continental Championships before the start of the event.

5.6.4 ENTRY CONDITIONS

5.6.4.1 Pilots-in-Command

Pilots-in-command shall have been authorized to act as pilot-in-command of the sub-class of aerostat for which the first category event is held. At least twelve months prior to the start of the event. Each pilot-in-command shall have accumulated at least 50 hours as pilot-in-command of aerostats of the sub-class by the closing entry date, except for the junior events where it shall be at the start of the general briefing.

These experience criteria may only be modified by the CIA for a specific subclass of aerostat, under special circumstances claimed by the organising NAC.

5.6.4.2 Ranking Method

The number of additional invitations to each eligible NAC shall be determined by the results of the previous similar event. Additional places will be allocated according to each NAC's ranking positions and in the same order as in the final results of this event.

5.6.4.3 Limitation

No NAC shall have more competitors than 10% of the total number of competitors the organiser is prepared to accommodate. The current medal holders, invited under rule 5.6.1.5 are not included in this limit.

5.6.5 DEADLINES

5.6.5.1 Closing Dates

The invitation of pilots for all rounds shall have their own closing dates for return of entry forms and payment of entry fee.

Organisers, NACs and entrants must adhere to published closing dates for entry.

5.6.5.2 Standby List

If an NAC fails to respond by the proper deadline or if an entrant fails to fulfil his obligations, the NAC or the entrant in question may lose their respective right to enter, but may be kept on a standby list should vacancies appear.

Competitors on the standby list will be offered places should they become available after Rounds 1 & 2.

Closing dates for entries for pilots on the Standby list will be absolutely no later than the 60 / 45 day limit before the event.

5.6.6 PROCEDURES FOR CHAMPIONSHIP ENTRANTS WHO FAIL TO APPEAR

5.6.6.1 An entrant who fails to appear at an FAI World Air Games, World or Continental Regional Championship events is defined as an entrant who is absent at the time of the roll call of the General Briefing of the event, without giving valid reason of force majeure (see note) after the time limits stated in 5.6.2, and has not been replaced by another competitor from the same NAC. An absent entrant shall be qualified "No-Show" only by decision of the International Jury.

*Note: The event proposed as force majeure must pass three tests:*

1. *Externality: The entrant must have nothing to do with the event's happening*
2. *Unpredictability: If the event could have been foreseen, the entrant is obligated to have prepared for it. Being unprepared for a predictable event leaves the entrant responsible. Lack of resources (equipment, finances, crew, and time) is a typical example of things that can be prepared against, and cannot therefore constitute a valid reason.*
3. *Unpreventable: The consequences of the event must have been unpreventable (illness is only acceptable if the entrant can prove that his physical condition would have prevented him to exercise his pilot licence privileges during the event).*

5.6.6.2. After the roll-call of the General Briefing and before publication of the official final entry list, the event director shall inform the Jury President of any entrant absent at the time of the roll call of the General Briefing of the event. The Jury must consider all available case-relevant information before qualifying an entrant as a "No-Show". The Jury's decision must be recorded in a written declaration to be published on the official notice board. A "No-Show" decision must be forwarded by the event director to the NAC concerned without delay.

5.6.6.3 A no-show entrant shall be prominently mentioned as such on the official entry list published after the General Briefing, or in case of a declared "No-Show", after the Jury's decision. He shall not be qualified as a competitor and shall not be considered in the ranking calculations.

5.6.6.4 A no-show entrant shall be disqualified from participating in any FAI Category 1 event for the rest of that year and an additional period of two calendar years. For the next event of the same type, a no-show's NAC will have its entitlement to entries reduced by the number of its no-shows in the previous event.



## **5.7 REGULATIONS FOR FIRST CATEGORY SPORTING EVENTS**

- 5.7.1 With reference to the Sporting Code - General Section 4.9.1, regulations governing First Category Events in classes A and B shall be published by the CIA and must be used for the control of all such events.
- 5.7.1.1 The GENERAL RULES common to all sub-classes A and B, and to all types of events, shall be published by the CIA in ANNEX 3 to the Section One of the Sporting Code. They shall be reprinted in the MODEL EVENT RULES published by the CIA and in the EVENT RULES for the respective events. They must not be modified.
- 5.7.1.2 The COMPETITION RULES for any sub-class in classes A and B, and for any type of event, shall be published by the CIA in the MODEL EVENT RULES. They shall not conflict with the rules in the Sporting Code, shall be reprinted in the EVENT RULES for the respective events and must not be modified, except where variations, proposed options or local particulars are specifically allowed in the MODEL EVENT RULES.
- 5.7.2 The MODEL EVENT RULES must be used by the organisers of Category One Sporting Events to write the respective EVENT RULES. Proposed EVENT RULES, together with the final information on the organisational structure and entry fee must be received by the CIA at least 60 days before the date fixed for the last CIA meeting before the event, unless this time limit is waived by the CIA or its Bureau under special circumstances.
- 5.7.3 The Event Rules must be approved by the CIA. The CIA may at its discretion delegate to a subcommittee its authority to consider these rules for subsequent approval by the CIA or its Bureau. In this case organisers must circulate copies of proposed rules to the members of the subcommittee.
- 5.7.4 Event Rules that are approved must be distributed by the organiser to each entrant and official not later than three months before the start of the event.

## **5.8 DEFINITION OF CHAMPION**

- 5.8.1 The winning competitor(s) shall be the competitor(s) with the highest aggregate score at the end of the Event.
- 5.8.2 Team competition may be allowed upon decision by the CIA for each event.
- 5.8.3 To be recognised as a First Category Sporting Event and for a Champion to be declared, at least three tasks must have been completed on not less than two separate flights, unless the CIA has decided otherwise for a specific event.

## **5.9 OPERATIONAL REGULATIONS**

- 5.9.1 A valid task is one in which all entered competitors were given a fair opportunity to make a valid take-off, unless they had withdrawn or had been disqualified.
- 5.9.2 For First Category Sporting Events in class A, any device designed to act as an automatic flight control is prohibited, regardless of the specific nature of the device.
- 5.9.3 The scoring system shall not deliberately weigh the scores of one Championship task over another, and should tend to produce a similar points-spread in each task. Tasks shall, as far as possible, be designed not to favour any specific size category of aerostat.
- 5.9.4 The results of each task shall be published with the minimum of delay at a place to be notified to the competitors at the briefing on the opening day of the Event.
- 5.9.4.1 All result sheets shall be marked with at least the following information:  
Event name, task date, task sequence number, task name and rules and official publication time.

5.9.4.2 If more than one result sheet version is published for a particular task, the changes from the previous issue shall be marked and the different versions shall be numbered in sequence.

5.9.4.3 The fixed data used in the scoring formulas, for a given task, e.g. P, M, RM, W and SM, shall be printed and penalties given should be followed by a rule reference and a brief description.

## **5.10 INTERNATIONAL JURY**

5.10.1 The International Jury is nominated. The President of the Jury is appointed by the CIA and may not be of the same nationality as the organising NAC.

5.10.2 The Jury members may consist of two or four members based upon the request of the organising NAC. All Jury members are appointed by the CIA.

5.10.3 Qualifications and operational procedures for jury members are contained in a handbook approved by the CIA. The requirements of this handbook are compulsory at all First Category Events.

## **5.11 OPERATIONAL OFFICIALS**

Event Director, Deputy Event Director, Safety Officer and Stewards shall be appointed by the organisers and approved by the CIA

### **5.11.1 SAFETY OFFICER**

The Safety Officer shall give advice to the Event Director on any matters regarding safety. Operational procedures for the Safety Officer are contained in the "**Safety Officer Handbook**" approved by the CIA

## **5.12 COMPETITION OBSERVERS**

Requirements concerning observer qualifications, observing procedures and the selection process may be published by the CIA.

**END OF CHAPTER 5**

**CHAPTER 6 - THE COUPE AERONAUTIQUE GORDON BENNETT**

- 6.1 The FAI controls competition for this trophy. It is a First Category International Competition for distance in gas balloons.
- 6.2 Regulations and detailed model rules are maintained by the CIA.

**END OF CHAPTER 6**

**CHAPTER 7 - OTHER FAI AIR SPORT ACTIVITIES****7.1. CIA SPORTING EVENT****7.1.1 DEFINITIONS**

In accordance with the Sporting Code General Section, a CIA Sporting Event is defined as an International Sporting Event in aerostation,

- organised by or on behalf of an NAC or the CIA in compliance with the Sporting Code and the rules and regulations published by the CIA for this type of event,
- approved and sanctioned by the FAI Ballooning Commission in accordance with the rules and regulations published by the CIA,
- classified as an FAI Category II event,
- and in which pilots of all abilities may take part using simplified organisational structures and basic CIA competition rules to compete in a safe and fair way.

**7.1.2 OBJECTIVES**

The objectives of a CIA Sporting Event are to promote the aims and objectives of FAI by particularly:

- encouraging participation in international events in which pilots of all abilities can take part,
- facilitating fair "entry level" competition using simplified rules that apply equally to all CIA Sporting Events and participants, and that are based, as far as appropriate, on those for FAI Category I Events and must not conflict with them in principle,
- promoting physical and moral qualities, technical knowledge and skill as basic to aeronautical activities and air sports,
- reinforcing friendship amongst aeronauts of all nations.

**7.1.3 AUTHORITY**

The rules, regulations, programmes and all other official documents shall carry the statement of FAI and CIA authority, and display the CIA logo. During the Sanction Application process official documents may carry the statement "CIA sanction pending".

**7.1.4 SANCTION APPLICATIONS**

7.1.4.1 Sanction Applications from a NAC for a CIA SPORTING EVENT, along with proof of payment of the sanction fee, must be received by the CIA at minimum of 90 days before the starting date of the event. Sanction Applications shall not be accepted more than one year before the year of the event.

7.1.4.2 Sanction Applications shall be reviewed by the CIA's Event Development Service (EDS) and forwarded with an acceptance/rejection recommendation to the CIA President within 30 days. The CIA Bureau is empowered to accept or reject the Sanction Application. In case of acceptance, a CIA SPORTING EVENT Sanction Certificate will be delivered to the organisers by the CIA Secretary.

7.1.4.3 Sanctioned CIA SPORTING EVENTS shall be registered in the FAI Sporting Calendar by the CIA.

7.1.4.4 The CIA shall publish a guide on sanction applications and event organisation for CIA SPORTING EVENTS.

**7.1.5 QUALIFICATION**

7.1.5.1 In order to qualify as a CIA SPORTING EVENT, a minimum of 2 NACs and, for sub-class AX, at least 15 competitors shall have entered the event. The minimum number of tasks and flights to be completed for a winner to be declared shall be stated in the event rules.

7.1.6 CHANGES TO APPROVED EVENT PARTICULARS

The organiser may not change or otherwise modify any of the event particulars approved and sanctioned by the CIA except by CIA authorization.

7.1.7 ELIGIBILITY

7.1.7.1 A CIA SPORTING EVENT is open to participants from any NAC which has met its obligations to the FAI.

7.1.7.2 Official entry forms to a CIA SPORTING EVENT shall be obtained on request by the participant from the organiser.

7.1.7.3 Entry applications shall be accepted only if made on an official entry form accompanied, if appropriate, by the entry fee in full and received by the specified closing date.

7.1.8 RESPONSIBILITY OF THE ENTRANT

7.1.8.1 A competitor entering a CIA SPORTING EVENT must hold a valid FAI Sporting Licence. He represents the FAI Member that issued his FAI Sporting Licence.

7.1.8.2 Pilots-in-command shall have been authorised to act as pilot-in-command of that subclass of aerostat for which the CIA SPORTING EVENT is held, at least six months prior to the start of the event, Each pilot-in-command shall have accumulated at least 25 hours as pilot-in-command of aerostats in that subclass by the closing entry date.

7.1.8.3 Aerostats flown in a CIA SPORTING EVENT must have current certificates of registration and airworthiness, or in place of the latter, an equivalent document from the recognised authority of the nation concerned. The organisers are empowered to reject any aerostat which in their opinion is not of a reasonable standard of airworthiness.

7.1.8.4 After the beginning of the GENERAL BRIEFING of a CIA SPORTING EVENT, no change of competitor or entrant is permitted.

7.1.8.5 The entrants and competitors are required to know, understand, accept and abide by the Sporting Code and the rules and regulations for the contest, and by entering are deemed to accept them without reservation.

7.1.9 INVITATIONAL DEADLINES

The entry and selection procedures and the time limit for entry shall be published in the invitation and/or the official entry form.

Organisers must adhere to the published deadlines for entry.

7.1.10 RETURN OF ENTRY FEES

If the contest does not take place, is cancelled or stopped except for reasons of force majeure, entry fees shall be returned in full by the organising NAC. A competitor or team who withdraws shall have no right to the return of any fees.

7.1.11 RESULTS AND PRIZE GIVING

7.1.11.1 The results of a CIA SPORTING EVENT shall be final only after all protests have been dealt with by the Jury and the Jury has ceased its functions.

The final results shall be given in writing to the organising NAC and to all competitors.

7.1.11.2 All prizes, whether trophies or money, which are referred to in the initial application, rules or regulations of a contest, must be presented at the conclusion of the contest. The organising NAC shall be accountable for all prizes.

7.1.12 RULES FOR CIA SPORTING EVENTS

The rules shall be distributed by the organisers to all entrants as far in advance of the event as possible, but not later than 30 days before the starting date of the event.

7.1.13 DEFINITION OF WINNER

The winning competitor(s) shall be the competitor(s) with the highest aggregate score at the end of the competition. The title of the winner shall not be "World", "Regional", "Continental" or "National" Champion.

7.1.14 OPERATIONAL REGULATIONS

7.1.14.1 A valid task is defined as one in which all entered competitors were given a fair opportunity to make a proper start, unless they had withdrawn or had been disqualified.

7.1.14.2 The scoring system shall not deliberately weigh the scores of one competition task over another, and should tend to produce a similar points spread in each task. Tasks shall be designed not to favour any specific size category of aerostat.

7.1.14.3 The results of each task shall be published with the minimum of delay at a place to be notified to the competitors at the briefing on the opening day of the event.

7.1.15 OFFICIALS IN CIA SPORTING EVENTS

7.1.15.1 THE JURY

7.1.15.1.1 A CIA Sporting Event shall have a Jury to deal with protests and monitor the conduct of the event. The composition of the Jury may be either representative or nominated. The President and the members of the Jury shall be approved by the organising NAC before the start of the first competition task.

7.1.15.1.2 The Jury President should represent a different NAC than the organising NAC. Operational procedures for all Jury members, meetings and proceedings are contained in the CIA JURY HANDBOOK approved and published by the CIA. The use of this handbook is compulsory at all CIA SPORTING EVENTS.

7.1.15.1.3 In addition to being the Chairman at Jury meetings, the President has the right to require the organisers to abide by the FAI Sporting Code and the published rules and regulations for the event. If the organisers fail to do so, the president has the power to stop the event until a Jury meeting has considered the situation.

7.1.15.1.4 The Jury has the right to terminate the contest if the organisers fail to abide by the Sporting Code and published regulations.

7.1.15.1.5 Complaints, Penalties, Disqualifications, Protests are handled as set forth in the Sporting Code General Section, Section One, Jury Handbook and Competition Rules.

7.1.15.2 OPERATIONAL OFFICIALS

7.1.15.2.1 The organising NAC shall approve officials charged with the operational management. These officials include the Event Director and may include other functionaries as required.

7.1.15.2.2 The Event Director shall be in overall operational charge of the event. He is responsible for good management and the smooth and safe running of the event. He shall make operational decisions in accordance with the rules of the Sporting Code and competition rules. He can penalise or disqualify a competitor for misconduct or infringement of the rules. He shall attend meetings of the Jury and give evidence if requested.

He shall publish the officially accepted entry list prior to the start of the contest, issue daily results and report the full results and details of protests to his NAC and to the CIA within the specified time limits.

7.1.16 THE SAFETY OFFICER

7.1.16.1 The Safety Officer shall be approved by the organising NAC.

7.1.16.2 The Safety Officer shall give advice to the Event Director on any matters regarding safety. Operational procedures for the Safety Officer are contained in the “**Safety Officer Handbook**” approved by the CIA.

**END OF CHAPTER 7**

<b>CHAPTER 8 - CIA PROFICIENCY CERTIFICATES AND SPORTING BADGES</b>
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**8.1 CERTIFICATES OF PROFICIENCY (GS 2.6).**

Certificates of proficiency are documents recognising the level of performance or qualifications of an individual. They may be issued in any of the FAI Sports. The requirements and rights accorded to the holders of proficiency certificates are determined by the CIA.

**8.2 CIA SPORTING BADGES**

CIA SPORTING BADGES shall be awarded by the CIA to pilots for achievements, which do not require to be renewed, in FREE BALLOONS (FAI Class A) or AIRSHIPS (FAI Class B). For goal flights only free balloons may be used.

**8.2.1 QUALIFICATIONS AND REQUIREMENTS**

*Note The performance limitations listed below are included in the requirements.*

*Thus "At least 100 km means "100 km or more". "Within 1 metre" means "1 metre or less".*

**8.2.1.1 Silver Badge**

The following tasks shall have been achieved in one or more flights:

- Distance : A distance of at least 100 km
- Duration : A duration of at least 3 hours
- Altitude : An altitude of at least 3000 metres
- Goal : A prior declared goal-flight of at least 3 km with a marker drop or landing within 10 metres of the goal

Three gold performances will qualify for a silver badge

**8.2.1.2 Gold Badge**

The following tasks shall have been achieved in one or more flights:

- Distance : A distance of at least 300 km
- Duration : A duration of at least 6 hours
- Altitude : An altitude of at least 6000 metres
- Goal : A prior declared goal-flight of at least 3 km with a marker drop or landing within 1 metre of the goal

Three diamond performances will qualify for a gold badge.

**8.2.1.3 Diamonds**

There are four diamonds, which may only be added to a Gold Badge.

- Distance Diamond : A flight of at least 500 km
- Duration Diamond : Sub-class AX and BX: A flight of at least 12 hours.  
All other: A flight of at least 24 hours.
- Altitude Diamond : A flight to an altitude of at least 9000 metres
- Goal Diamond : A prior declared goal-flight of at least 3 km with a marker drop within 10 cm of the goal.

*Note: The Gold Badge with 3 Diamonds shall be the highest achievable badge value. No Gold Badge with 4 Diamonds shall be issued.*

**8.2.2 GENERAL CONDITIONS**

The candidate must be the pilot-in-command on each flight executed towards any Badge or Diamond, and he may not be accompanied by any other licensed aerostat pilot on flights for a Silver Badge performance.



On flights for a Gold performance, or a Diamond performance, any accompanying licensed aerostat pilot may not hold whichever badge that the candidate will be claiming. This restriction does not apply to competition observers acting under the control of an Event Director during national or International Championships.  
Any flight may count towards any Badge or Diamond for which it fulfils the conditions.

### 8.2.3 SPECIAL CONDITIONS

#### 8.2.3.1 Marker

The marker used in any goal-task must be a streamer made from coated nylon of less than 100 grams/m<sup>2</sup>.

It must be 170 cm long, 10 cm wide, and weighted with a maximum of 70 grams of ballast.

It must be signed by the Officials Observer and visible to him at take-off.

Any marker supplied by the organisers of an FAI or National Balloon Federation approved event may be used for badge tasks being attempted during the flight.

#### 8.2.3.2 Goal

A goal declared in any goal-task must be declared in writing to the Official Observer before the flight. The goal must be any precisely identifiable point from which measurements may be made. If possible, the Official observer should set out a target visible from the air and measure from the target.

If no target has been used, and an ambiguity regarding goals is such that reasonable positions for the goal exist beyond the required distance from the marker, the task shall be invalid.

A single goal must be declared on any one flight. During competition tasks to multiple goals in National and International Championships, a candidate may declare one of them to the Official Observer for Badge purposes.

During competition a goal in a Fly-On task may be declared in writing on the marker in a previous task.

#### 8.2.3.3 Altitude

For badge flights the rules in Section 1, 4.8.1 apply

#### 8.2.3.4 Distance

For badge flights the rules in Section 1, 4.8.2 apply

### 8.2.4 DEFINITIONS AND CONTROL

Flights qualifying for Badges or Diamonds shall be controlled in accordance with the requirements of the Sporting Code, General Section Chapters 2, 5 and 8, and Section One.

### 8.2.5 CLAIM PROCEDURES

#### 8.2.5.1 Register of Badges

An NAC or delegated Ballooning Authority shall keep a register of badge flights which it has validated, and shall report to the FAI information on awards earned as follows:

- The NAC or delegated Ballooning Authority reporting,
- name of pilot,
- class and Sub-class of aerostat used,
- type of badge or diamond awarded,
- tasks flown, with dates and performance achieved.

#### 8.2.5.2 Awarding Badges

The reporting NAC or delegated Ballooning Authority shall remit to the FAI monetary

instrument covering the cost of the badges.

The Records Review Subcommittee of the CIA shall monitor the operation of the badge system, and maintain a register of all badges awarded.

The PR and Development Subcommittee of the CIA shall make arrangements for design, procurement and delivery of awards to the NAC or delegated Ballooning Authority concerned.

8.2.5.3 The CIA Records Review Subcommittee may appoint observers and act as co-ordinator where National Balloon Federation arrangements have not been made.

8.2.5.4 Inexpensive badges will be available from the CIA for purchase by NAC/National Balloon Federation. Precious metal badges may be commissioned by winners at their own expense if they wish.

**END OF CHAPTER 8**

**ANNEX 1 - BALLOON AND AIRSHIP RECORD CLAIMS****CONTROLLING OFFICIAL OBSERVER'S CHECKLIST FOR RECORD FLIGHTS****A. BEFORE THE ATTEMPT:**

1. Study the FAI Sporting Code, General Section and Section 1 Aerostats, and the current list of World Records (Class A or B) obtainable from FAI.  
  
Study the record claim forms.
2. Inform the organising NAC and confirm appointment as official observer (GS 5.2.1)
3. Organising NAC must inform other NACs over whose territory the flight is likely to pass (GS 7.4.3). When a record attempt originates and terminates in another country, the NAC of that country is the controlling NAC. (GS 7.4.2)
4. Time recording equipment, except GPS, should be checked with accurate time over 3 hours.
5. Check barographs and other recording equipment. Check sealing materials.
6. Inspect FAI Sporting Licence and passport of each crew person.
7. If the organising NAC restricts record attempts to permit holders, inspect the permit.
8. The volume of the aerostat may be determined by making measurements and appropriate geometric calculations, or, the volume certified by the manufacturer for that specific aerostat may be accepted.  
  
However, measurements such as gore length and circumference should be made by the observer and compared to the manufacturers design measurements to confirm that no modifications to the volume have been made since manufacture.
9. Please ensure that your NAC has authorised you to submit the preliminary claim described in C.7 below.

**B. ON THE DAY:****TAKE-OFF**

1. Record precise details of take-off location (Form 3).
2. Recheck timepiece. Obtain temperature and barometric pressure (QNH or altimeter setting). If altimeter is used for verification of an altitude record attempt, check to be set to 1013.25 hPa (29.92 inches Hg).
3. Check barograph, scribe baseline (note time), seal instrument, seal to aerostat and **START IT!**
4. Inspect and prepare any other recording equipment.
5. Record time and description of take-off.

**FLIGHT**

6. If possible observe in flight. Record periodic observations of time, position and apparent height. Make frequent observations if landing is imminent, in case landing is not observed.

**LANDING**

7. Observe landing and record precise details of time and place.
8. Interview witnesses if necessary.
9. Remove barograph if used, stop mechanism, and keep with instrument seal unbroken for evaluator.
10. For altitude records verified by barograph, obtain temperature and barometric pressure for the landing location and the temperature distribution in the atmosphere from the surface up to the peak altitude.

**C. AFTER THE EVENT:**

1. Write the report of the Controlling Official Observer describing the main narrative of the flight, and the basis on which he/she is satisfied that the claims are proven to be true. (But not unnecessarily repeating information on forms.)
2. Complete forms and supplementary reports as applicable.
3. Supply a map or plan showing flight track.
4. Recheck time recording equipment over 3 hours GPS excepted.
5. Arrange for analysis of barograph or other recording equipment.
6. Check finished file for completeness and against the Sporting Code.
7. ALL DATA THAT ARE IMPORTANT TO PROVING THE RECORD MUST BE AUTHENTICATED BY THE OBSERVER AND BY A TECHNICAL EXPERT WHERE APPROPRIATE.
8. If a World Record is possible, file a preliminary claim with FAI within 7 days (GS 7.8.3) and ensure certification by the NAC as a National Record. The full record claim file (GS 7.8.1-2) must be sent within 120 days of the attempt by the NAC to:

The Secretary General  
Fédération Aéronautique Internationale  
Maison du Sport International  
Av. de Rhodanie 54  
CH - 1007 Lausanne  
Switzerland.

Telephone: +41-21-3451070  
Fax: +41-21-3451077  
Email: record@fai.org

**D. THE RECORDS HOMOLOGATION FILE (GS 7.8.1 & 7.8.2)**

The aim of the FAI in relation to records is to ensure that no false record claim is taken into the record book, while doing everything possible to ensure that every true and adequately proven record is recognised.

The record homologation file is not a bureaucratic ritual. Controlling Observers must remember that the object is to communicate to the scrutineers the quality of the proof that the claim is true, and this means that the observer's narrative is the core of the document. In particular, it is important to describe the areas in which the information is imperfect (these exist in all record flights) so that a fair judgement can be made.

The forms are supplied as a guide, but will not be appropriate for all cases. They must be modified or substituted when they are not correct and it is absolutely essential that any inappropriate statements are struck out before signing.

Except for copies of certificates and licenses, the language used in the dossier shall be English. Limitations in the validity of certificates and licenses shall be translated to English.

The following is a guide to the contents of the homologation file:

- CONTENTS PAGE
- FORMS 1 to 6 as appropriate
- CONTROLLING OFFICIAL OBSERVER'S NARRATIVE
- PILOT(S) INFORMATION (FAI Sporting Licence, pilot licence, passport or residence evidence, photo.)
- AEROSTAT INFORMATION (Volume calculation, drawing or illustration, technical description, certificates of registration and airworthiness if applicable.)
- FLIGHT (Maps of flight and take-off and landing positions sufficiently accurate to show good latitude and longitude figures, and to show scales, layout of speed course.)
- CALIBRATIONS, REPORTS etc. (Barograph calibration, barogram report with barogram, timing report, calculation of results and accuracies, other calibrations, photographic evidence, for altitude records also verification of the temperature in the atmosphere, etc.)
- ASSISTANT OBSERVER AND WITNESS REPORTS
- NARRATIVE BY PILOT (Optional, for interest only. Information supplied by the pilot has very little status as evidence.)

## BALLOON AND AIRSHIP RECORD CLAIM FORMS

**FORM 1  
RECORD CLAIM FORM**

SUB-CLASS AND CATEGORY OF PERFORMANCE	
DATE OF PERFORMANCE	

<b>PILOT IN CHARGE</b>	Gender : M/F
FAI LICENCE NUMBER & EXPIRY DATE	
NATIONALITY & PASSPORT NUMBER	

<b>CO-PILOT(S)</b>	Gender : M/F
FAI LICENCE NUMBER & EXPIRY DATE	
NATIONALITY & PASSPORT NUMBER	

AIRCRAFT TYPE & REGISTRATION MARKS	
------------------------------------	--

CONTROLLING NAC	
-----------------	--

<b>CONTROLLING OFFICIAL OBSERVER</b>	
NAME:	
ADDRESS:	
EMAIL ADDRESS	
APPOINTING NAC	

RECORD	SUB-CLASS AND CATEGORIES CLAIMED
ALTITUDE :	
DISTANCE :	
DURATION :	
SPEED (CLASS B ONLY) :	
SHORTEST TIME AROUND THE WORLD :	

I certify that the record claims above are, in my opinion, satisfactorily proven, and that the performance was made in accordance with the regulations of the Sporting Code.

CONTROLLING OFFICIAL OBSERVER:

PLACE AND DATE OF SIGNATURE:

**FORM 2**

**CERTIFICATE OF BALLOON OR AIRSHIP PARTICULARS**

MANUFACTURER	
MODEL DESIGNATION	
REGISTRATION MARKS	
MANUFACTURER'S SERIAL NUMBER	

DECLARATION OF VOLUME (SPORTING CODE SECTION 1, 2.1.3 & 2.2.3) :	
I certify that the total volume of the aerostat is	
	<input style="width: 100%;" type="text"/>
calculated by means of	_____
The lifting gas is	<input style="width: 100%;" type="text"/>
Volume verification is enclosed as attachment	_____
SIGNATURE TO DECLARATION OF VOLUME :	_____
QUALIFICATION OF SIGNATORY :	_____
PLACE AND DATE OF SIGNING :	_____

EQUIVALENCE CALCULATION (SUB-CLASS AA ONLY)
SUB-CLASS AND CATEGORY OF AEROSTAT :

CONTROLLING OFFICIAL OBSERVER

PLACE AND DATE OF SIGNATURE

**FORM 3**

**DEPARTURE CERTIFICATE**

AEROSTAT MAKE AND MODEL	
REGISTRATION MARKS	
OTHER DESCRIPTIVE DETAILS	
PILOT IN COMMAND	
OTHER CREW ON BOARD	

I certify that a take-off was accomplished as follows:

PLACE	
MAP REFERENCE	
LATITUDE / LONGITUDE	
ELEVATION (AMSL)	
DATE	
TIME OF LAST CONTACT WITH THE GROUND	
OFFICIAL TIME SOURCE USED	

CONTROLLING OFFICIAL OBSERVER

PLACE AND DATE OF SIGNATURE

Additional description of take-off place: Sketch plan, distances and bearings to identifiable landmarks etc.



**FORM 4**

**INSTALLATION OF BAROGRAPH**

I certify that the barograph was sealed, sealed to the aerostat, and started as follows:

BAROGRAPH MANUFACTURER		
BAROGRAPH SERIAL NUMBER		
METHOD OF SEALING INSTRUMENT		
METHOD OF SEALING TO AEROSTAT		
ALTITUDE OF BASELINE		
TIME OF BASELINE :		
TEMPERATURE		AT TIME :
BAROMETRIC PRESSURE		AT TIME :
SOURCE OF METEOROLOGICAL DATA		
TIME OF STARTING BAROGRAPH		

CONTROLLING OFFICIAL OBSERVER

PLACE AND DATE OF SIGNATURE

**FORM 5  
LANDING CERTIFICATE**

AEROSTAT MAKE AND MODEL	
REGISTRATION MARKS	
OTHER DESCRIPTIVE DETAILS	
PILOT IN COMMAND	
OTHER CREW ON BOARD	

I certify that a landing took place as follows

DATE	
PLACE	
MAP REFERENCE	
LATITUDE / LONGITUDE	
ELEVATION	
TIME OF LAST VISUAL CONTACT WITH AEROSTAT IN FLIGHT	
TIME OF LANDING CLAIMED BY CREW	
EARLIEST TIME ESTABLISHED BY WITNESS AFTER LANDING	
OFFICIAL TIME SOURCE USED	

WITNESS	
ADDRESS	
TELEPHONE	

WITNESS	
ADDRESS	
TELEPHONE	

CONTROLLING OFFICIAL OBSERVER:

PLACE AND DATE OF SIGNATURE:

Additional description of landing place : Sketch plan, distances and bearings to identifiable landmarks etc.

**FORM 6**

**REMOVAL OF BAROGRAPH**

I certify that I found the seals unbroken before I removed the barograph from the aerostat and stopped its mechanism. I have maintained it in my possession with the instrument seal unbroken, until it was passed to the appropriate person for evaluation and calibration.

BAROGRAPH MANUFACTURER		
BAROGRAPH SERIAL NUMBER		
METHOD OF SEALING INSTRUMENT		
METHOD OF SEALING TO AEROSTAT		
DATE AND TIME OF STOPPING		
TEMPERATURE		AT TIME :
BAROMETRIC PRESSURE		AT TIME :
SOURCE OF METEOROLOGICAL DATA		
DELIVERED TO (DATE)		

Note: The observer may decide to extract the barogram, evaluate it and perform the calibration, or to use expert help to do all or part of this, at his/her discretion.

CONTROLLING OFFICIAL OBSERVER

PLACE AND DATE OF SIGNATURE

**ANNEX 2 – CALCULATION OF GEOMETRIC ALTITUDE FROM BAROMETRIC ALTITUDE**

1. Metric units (SI) are used for calculations (GS 8.1.1 - FAI UNITS OF MEASUREMENT). If other units are used, the following conversion factors should be applied:
  - Feet to metres: multiply by 0.3048
  - Inches mercury to hecto Pascal (hPa): multiply by 33.8639
  - Fahrenheit to Celsius: reduce by 32, multiply by 5/9
  - Celsius to Kelvin: add 273.15
2. The instrument (barograph or altimeter) used must be designed for the altitude achieved. It must be calibrated for instrument error and the necessary correction applied to the result. Compensation must also be applied for instrument temperature if the instrument has been used outside the manufacturer's operating limits.
3. Meteorological information must be obtained for a position and time as close as possible to that of the flight. The surface pressure should be obtained together with temperature and (optionally) humidity for a range of heights up to the height being measured. If meteorological information is not available the air must be assumed dry, the temperature the coldest possible at each height for that location and season, and the surface pressure the lowest that could have been possible.
4. The claimed altitude must be adjusted for the effect of the atmospheric data by a method which can be shown to be correct. Calculations have been accepted using the following methods:
  - 1) CALCULATION OF CORRECTED ABSOLUTE ALTITUDE by Hans Akerstedt (Version 2/95 June 1995 effective date) - a method of manual calculation.
  - 2) CAMERON BALLOONS PROGRAM FOR FAI RECORDS (CBFAI version 97.3 and later). This is a program which gives a result which is as precise as the data used, calculating the atmosphere layer by layer.
  - 3) Direct interpolation is possible using certain types of meteorological data. The result must usually be converted from geopotential to geometric metres.

Altitude calculations are very complex and procedures can differ for different types of instrument and available meteorological data. It is recommended that specialist help be obtained.
5. The CIA Secretary can advise how to obtain the correction methods in paragraph 3 above.

**ANNEX 3 – GENERAL REGULATIONS FOR FIRST CATEGORY SPORTING EVENTS**

With reference to the Sporting Code

- General Section, para. 4.9 - GENERAL REGULATIONS FOR FAI SPORTING EVENTS, and
- Section 1, Chapter 5 - RULES FOR FIRST CATEGORY SPORTING EVENTS, para. 5.7.1.1,

the General Regulations below, common to all sub-classes in classes A and B and to all types of events, are published by the CIA in this Annex to the Sporting Code Section 1.

They shall be reprinted in the MODEL EVENT RULES for the respective events and they must not be modified.

**GENERAL REGULATIONS FOR FIRST CATEGORY SPORTING EVENTS****1. SCOPE**

In combination with the Sporting Code GENERAL SECTION and SECTION ONE, this document contains the rules and regulations that apply to this event.

**2. SANCTION**

The event is an approved FAI First Category Sporting Event sanctioned by the FAI Ballooning Commission (CIA).

**3. RESPONSIBILITY**

Entrants and competitors remain completely responsible for the safe operation of their aerostats at all stages of inflation, launch, flight and landing. They must ensure that their equipment, their crew and their own level of skill and experience are suitable for the conditions in their own judgement. A competitor is responsible for all the actions of his crew during the event.

**4. CONDUCT**

Entrants and Competitors and their crews are required to behave in a sportsmanlike manner, and to comply with the directions of the Event officials. In considerate behaviour or airspace violations shall be penalised by the Event Director.

**5. DISHONESTY**

An entrant or competitor who deliberately attempts to deceive or mislead the observers, officials or stewards or who interferes with another entrant or competitor or his property, shall be disqualified from the Event.

**6. GENERAL BRIEFING**

A General Briefing on the rules, regulations and major aspects of the Event shall be held before the start of the Event. Attendance at the General Briefing is compulsory for all entrants, observers and other officials. The official competitors list, compiled from the roll call of the entrants taken at the General Briefing, shall be published as soon as practicable after the General Briefing but before the first Task Briefing. Where a justifiable reason exists, a late entry may be accepted by the director in consultation with the Jury, but not after publication of the first scores.

**7. COMPLAINTS**

- 7.1 **Assistance:** A competitor who is dissatisfied on any matter should first ask the appropriate official to assist him. He may ask for his result or points score to be checked, or the calculation to be explained.

- 7.2 **Complaint:** A complaint is a request by a competitor to the Director to investigate any matter in which the competitor is dissatisfied.
- 7.3 **Complaint Form:** A formal complaint must be submitted in English and in writing and will receive a written reply.
- 7.4 **Complaint Procedure:** Complaints shall be handed or transmitted by the competitor to the Event Director or his designated official, who will acknowledge receipt and record the time of receipt.
- 7.5 **Time Limits:** Complaints must be submitted as soon as possible after the event giving rise to the complaint and must be dealt with expeditiously.
- 7.6 **Shortened Time Limits:** Complaints made on or after the last day of the Event, must be submitted within set time limits announced at and published after the General Briefing.
- 7.7 **Communication and Publication:** Replies to Complaints shall be posted on the Official Notice Board at fixed times, announced in advance by the Director. The Director may at his discretion publish the text of any formal complaint together with his reply. If requested by the competitor, he must do this.

## 8. PROTESTS

- 8.1 **Protest:** If dissatisfied with the decision on a complaint made during the event, a competitor has the right of protest.

### 8.2 Protest Form:

1. Within a set time limit of the reply to his complaint, the competitor shall declare his intention to protest to the Event Director.
2. Within a set time limit of the reply to his complaint, the competitor shall submit his protest in English and in writing accompanied by the protest fee.

- 8.3 **Deposit Fee:** The amount of the deposit fee to accompany a protest shall be EUR 100 or its equivalent in any locally rated currency.

- 8.4 **Protest Procedure:** Declarations of intention to protest, and protests with deposits, shall be handed or transmitted by the competitor to the Event Director, who will acknowledge receipt and record the time of receipt.

The Event Director must present any protest to the Jury President without delay.

The President shall schedule a meeting of the International Jury within 24 hours of receiving a protest.

- 8.5 **Time Limits:** Declarations of intention to protest and protests must be submitted within set time limits announced at and published after the General Briefing.

- 8.6 **Shortened Time Limits:** Protests made on or after the last day of the Event, must be submitted within set time limits announced at and published after the General Briefing.

- 8.7 **Publication:** The text of all protests and the decisions of the Jury shall be posted on the Official Notice Board.

- 8.8 **Right of Hearing:** A competitor who has made a protest has the right to make a verbal presentation of his case to the Jury. He may be assisted by an interpreter or advisor of his choice during this meeting.

- 8.9 **Proof of Rules Violation:** The production and demonstration of evidence for any alleged infringement by a competitor always rests entirely with the event officials. Rules shall not be written in order to oblige the competitor to prove his compliance with the rules or his innocence in case of alleged infringement.

**9 RESULTS**

The results of the event shall be final only after all Protests have been dealt with by the Jury, and the Jury has ceased its functions. The final results must be made public before the prizegiving is held

**ANNEX 4 – DISTANCE CALCULATIONS**

1. Chapter 3, para 3.8 gives the definition of distance for FAI purposes, for aerostats, and this annex gives the method and formulas to be used in distance calculations.

2. **Method:** Each degree of angle at the earth's centre, extended upwards to the surface of the Earth, is equivalent to a distance of 1/360<sup>th</sup> of the circumference based on local earth radius. Taking  $\pi$  as 3.141 592 654 and R as 6371 km, each degree is equivalent to the following distance in kilometres:

$$\frac{2\pi R}{360} = \frac{2 \times 3.141592654 \times R}{360} = \frac{6371}{57.29577951} \text{ km per degree}$$

= 111.194 926 645 km per degree subtended at the earth's centre to the surface of the sphere.

For an angle  $a$  subtended at the Earth's centre between two positions A and B on the Earth's surface which are defined in degrees (and decimal degrees) of Latitude and Longitude, the formula (assuming a constant radius) is:

$$\text{Cos } a = (\text{Cos Lat A} \times \text{Cos Lat B} \times \text{Cos (Long A - Long B)}) + (\text{Sin Lat A} \times \text{Sin Lat B})$$

A computer, spreadsheet programme, or other calculating device should be used which is capable of working to at least 10 significant figures before distances based on the above formula will be considered. Hand-calculators vary but PC spreadsheet programmes generally work to about 15 figures. The above formula uses cosines of very small angles (figures close to 1); it may be converted to the one that follows which uses Sines (figures close to zero) which will generally produce a more accurate result when a calculator is used which has a floating point system :

$$\text{Sin } \frac{\alpha}{2} = \sqrt{\text{Cos LatA} \times \text{Cos LatB} \times \text{Sin}^2\left(\frac{\text{LongA} - \text{LongB}}{2}\right) + \text{Sin}^2\left(\frac{\text{LatA} - \text{LatB}}{2}\right)}$$

A computer, spreadsheet programme, or other calculating device should be used which is capable of working to at least 7 significant figures before distances based on the above formula will be considered. Hand calculators vary but PC spreadsheet programmes generally work to about 15 figures.

3. **PC-based Programmes.** PC-based programmes which use the above formulas are available both commercially and through a number of NACs. Spreadsheet programmes can also be used with one of the above formulas.

A Great Circle calculator is available on Internet:

<http://www.fai.org/how-to-set-a-record/world-distance-calculator>

Set units to kilometres and set earth model to FAI Sphere

Lat/Long input format can be degrees and decimals or degrees-minutes-seconds

4. **Geodetic Datums Used for Lat and Long Figures.** To be accurate, the lat and long figures used in the any distance calculation must be derived from the same geodetic datum (GD). For small distances where the maps used in reading the lat and longs of the points to be measured use the same GD, distance calculations using map-derived lat and longs will be accurate for the world model used (for FAI, a sphere of radius 6371 km), but for longer distances where points are on different types of maps, the maps will frequently use different GDs. In this case the lats and longs must be transformed to lats and longs with respect to a common GD before the calculations are performed; the World Geodetic System 1984 (WGS 84) Geodetic Datum shall be used. Transformation programmes between co-ordinates for some 200 local-area GDs and WGS 84 are available on the commercial market and may be used for this purpose. It is emphasised that WGS 84 is only used for the production of accurate lats and longs where this is needed due to differences in maps.



4.1 **Submission to FAI.** Figures submitted to the FAI must include the original lats and longs before any transformation to WGS 84 lats and longs, together with the Title of the map edition and the Title of the Geodetic Datum appropriate to the map from which the original lats and longs were taken. FAI reserves the right to check all calculations including GD transformations if required.

5. **When Exact Calculation of FAI Distance is not Critical.** When calculation of the exact distance by the FAI method is not critical, Air Sport Commissions and NACs may specify how distance calculations may be made. These circumstances include where a distance required for a certificate or badge has been exceeded by an indisputable margin, or in competitions where comparison of distances using the same calculation method is the prime requirement.

These methods may include direct measurements from maps, and the use of Pythagoras' theorem with grid or lat and long co-ordinates.

For areas of the world which have maps with kilometre grids, grid references and Pythagoras produce results in kilometres directly.

For maps with lat & long co-ordinates, Pythagoras may be used on Northings/Southings of Latitude Difference in degrees and decimal degrees, and Eastings/Westings of Longitude Difference in degrees and decimal degrees multiplied by the Cosine of the mean latitude of the leg concerned; this gives a result in degrees subtended at the Earth's centre ( $1^\circ = 60$  Nautical Miles) which can then be converted to Kilometres by multiplying by the conversion factor 111.194 926 645, derived as shown in para 2. This conversion factor gives kilometres per degree of latitude directly, but for longitude, the longitude difference between two points has to be reduced by multiplying by the Cosine of the mean Latitude of the leg in order to allow for the shortening of the distance between degrees of longitude on the Earth's surface between the equator and the poles, for instance at  $60^\circ$  N or S, the longitude difference would be halved ( $\text{Cos } 60^\circ = 1/2$ ) in order to obtain true degrees of Eastings/Westings subtended at the Earth's centre.

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**ANNEX 5 - PENALTIES AND DISQUALIFICATIONS**

The Director of a Sporting Event may penalise a competitor as described in the rules for the event. These penalties may be in the form of an operational disadvantage, deduction of points, alteration of placing order, disqualification, or any other penalty designated by the Air Sport Commission concerned.

The severity of the penalties which may be imposed may range from a minimum loss of points to disqualification indicated below, as appropriate to the offence..

**1 Technical Infringements**

Technical infringements of rules or failure to comply with requirements caused by mistake or inadvertence where no advantage has accrued or could have accrued to the competitor concerned should, as a guide, carry penalties leading to a reduction of not less than 2% of the best score or maximum available score for the task.

**2 Serious Infringements**

Serious infringements, including dangerous or hazardous behaviour or actions, repetitions of lesser infringements and violations of airspace, should, as a guide, carry minimum penalties leading to a reduction of not less than 5% of the best score or maximum score for the task.

**3 Unsporting Behaviour**

Cheating or unsporting behaviour, including deliberate attempts to deceive or mislead officials, bringing FAI into disrepute, wilful interference with other competitors, falsification of documents, use of forbidden equipment or prohibited drugs, or repeated serious infringements should, as a guide result in disqualification from the Sporting Event.

**4 Publication.**

Penalties shall be listed on the score sheet of the day on which the penalty was given.

**5 SURRENDER OF SPORTING LICENCE**

A competitor who has been disqualified shall surrender his Sporting Licence to the Event Director.

He shall have no right to claim back any part of his entry fee and will not be eligible for any prizes awarded during the event. Any delay in the surrender of the Sporting Licence shall be added to the period of surrender.

During the period of surrender of the Licence, participation in any FAI sporting activity, including attempts on records, is prohibited.

Disqualification will be grounds for disciplinary action by the NAC concerned, and the Event Director shall send the surrendered licence to the disqualified competitor's NAC at the end of the event, with the details of the case.

## **ANNEX 6 - BALLOON AND AIRSHIP RECORD VERIFICATION**

### **INSTRUMENTS AND PROCEDURES FOR AEROSTAT RECORDS**

#### **1. General**

Unlike many other FAI Airsport Commissions, the CIA does not approve specified instruments and does not keep a list of recommended instruments. The reason is that the CIA does not have the capacity to approve a specific instrument and does not want to limit the use of new technology. The CIA approves the documentation rather than the instrument used.

An instrument approved by FAI or by another FAI Air Sport Commission is not automatically accepted for aerostat records.

For aerostat records, the claim file shall be sent by an NAC to FAI. The file shall contain all documents in original.

The CIA Records Subcommittee will appoint a reviewer of a nationality different from the record claimant. FAI will send copies of the record claim file to the reviewer, who will decide if any further documentation is needed. The reviewer will then make a recommendation to FAI who will accept the claim based on the reviewer recommendation.

The reviewer may adjust the claimed record performances if necessary.

#### **1.1 Official Observers**

The requirements for official observers (OO) are found in Sporting Code, General Section, chapter 5.2.

Air Traffic Control officials and competition officials may serve as temporary official observers. See GS 5.2.4.

GS 5.2.4.2 gives the procedure to follow in case the OO is not present, for instance at a landing. In such a case the OO may appoint an assistant observer to witness and record the landing time and position.

In any case, the recordings of a temporary or assistant observer or external witnesses must be verified and signed by the Official Observer.

The Official Observer should keep a log of events during a record attempt with times and positions as applicable. The times used in the log may be local times but when transferred to the claim forms, UTC should be used.

##### **1.1.1.Organising NAC. GS 7.4.1**

The NAC which issues the FAI Sporting License of any person attempting an International record or, (the Organising NAC) is responsible for certifying the International Record claim dossier prior to submission to FAI, regardless of where the record attempt took place.

##### **1.1.2.Record attempts in countries other than that of the organising NAC**

In this case General Section rules 7.4.2. and 7.4.3 apply.

#### **1.2 Accuracy and margins of error**

The required accuracy limits are found in SC 1, 4.7.3.

The margins by which new records must improve an existing record are listed in SC 1, 4.6.

The accuracy limits and improve margins are established to ensure that a new record really is an improvement. If the acceptable accuracy margins are  $\pm 1\%$  and the improvement margin is  $\pm 3\%$  we can be sure that a new record is at least 1 % better than the existing record.

If a record flight is recorded by more than one instrument, the result will be the average of all acceptable results.

#### **1.3 GPS**

All measuring devices have a margin of error. Normally, all performances claimed are based on positions, altitudes and times measured and recorded by separate GPS systems. A GPS has a typical

margin of error of  $\pm 15$  metres horizontally and about  $\pm 2$ -3 times that amount vertically. The difference is, among other factors, that the GPS satellites are more suitably positioned for horizontal position measurements.

### **1.3.1 CEP**

GPS manufacturers usually use the expression CEP. The accuracy shown on the instrument display is usually also the CEP horizontal accuracy. This looks like the accuracy is very good, but what does it mean?

CEP means Circular Error Probable, or Circle of Equal Probability, and is an expression used in artillery. It means that 50% of artillery shells will hit within a circle of the given radius. It also means that 50% of the shells will fall outside this circle. A few shells will fall far outside the circle and very few will score a direct hit.

For a GPS, the CEP figure gives an illusion of good precision. For Air Sport records, a 50% margin of error is not good enough. We want a 95% probability for our record figures to be reliable. To achieve that, we have to multiply the CEP figure by 2.4. ( $2.4 \times \text{CEP } 5 \text{ m} = 12 \text{ m}$ ) (Ref: Normal distribution equation).

### **1.3.2 SBAS augmentation**

A GPS instrument can be set to receive correction signals from a small number of satellites over some parts of the World. The global system is called SBAS, (Satellite Based Augmentation System) and is sending correction signals for a variety of error sources, enabling a far better accuracy than basic GPS operation. When those signals are received, it is indicated on the GPS display with a d (dGPS).

The system used in the USA is called WAAS (Wide Area Augmentation System). Similar systems are operational in Europe, EGNOS, Japan and eastern Asia, MSAS, and soon also in southern Asia. They are all compatible and parts of the global SBAS system. The system makes corrections for satellite geometry, timing inaccuracies and a number of atmospheric conditions.

The SBAS specification is: Better than  $\pm 25$  ft (7.6 m) accuracy both horizontally and vertically.

Unless clearly stated in the record file, it will be assumed that the GPS was not set to receive correction signals (WAAS/SBAS) and the uncorrected accuracy will apply.

## **1.4 Ballast**

The use and release of ballast is governed by rules established by the local authorities. In some countries, it may be possible to get permission to release ballast under special conditions. It is the responsibility of the pilot to obtain permission.

## **2.1 Take off**

Sporting Code, Section 1, para 3.3 gives the definition: **The point in position and time at which an aerostat first becomes airborne.**

A GPS time is considered to be accurate. If any other timing device is used, it must be checked against another accurate timing device.

The take-off can also be verified by a GPS recording. The time and position is in this case when the recording first shows that the aerostat is airborne (an altitude above the initial altitude) and moving with a significant speed.

## **2.2 Landing**

Sporting Code, Section 1, para 3.4 gives the definition: **The point in position and time at which the aerostat first ceases to be airborne.**

The landing can be established by the Official Observer, by a temporary observer, by external witnesses or by an assistant observer. A GPS time is considered to be accurate. If any other timing device is used, it must be checked against another accurate timing device.

The landing can also be verified by a GPS recording. The time and position is in this case when the recording first shows that the altitude is constant is (an altitude below the flight altitude) and moving with a speed close to zero.

### **2.3 Airborne, Ground contact. SC1, 3.2**

Momentary ground contact is allowed. Mooring the aerostat during a record attempt is not permitted..

### **2.4. Recording of flight**

Some GPS instruments will automatically assume take off and landing times and positions. Those have been found to be unreliable. Times and positions shall be recorded by the Official Observer or be calculated from the numerical GPS log. See under 2.1 and 2.2 above.

A diagram produced by a GPS is normally not usable for determining times and positions as such diagrams have insufficient resolution. A diagram can be used to verify that the flight has not been interrupted except momentarily.

The GPS shall be set to record at suitable intervals depending on the intended duration of the flight but should normally not be more than 60 seconds, except for very long distance flights.

### **3. Duration flights**

When the times of take off and landing are both established by the Official Observer or by temporary or assistant observers, the duration will be the time between those events. The duration established by GPS recording will only be used as a further verification. Timings by witnesses are considered to be more accurate.

In case any or both of the events has not been witnessed, the duration will be taken from the GPS recordings. If more than one recording is available, the result will be the average of available recordings.

### **4. Distance flights**

When a distance flight is recorded by GPS, ensure that the instrument settings are the same during the whole flight. The map datum shall be WGS84. The accuracy requirement is the same as that used in the pre-GPS era. Therefore it is usually not difficult to obtain the required accuracy. See Annex 4..

The procedures will be the same as for duration flights.

The record file should contain a large scale map covering the whole flight and more detailed maps for the take off and landing areas.

The distance shall be the Great Circle distance between take off and landing positions, calculated on the FAI sphere (a sphere with a radius of 6 731 km.). For very long distances, special rules apply. See SC1, 4.8.2 and Annex 4..

### **5. Altitude flights**

In the old days, mechanical barographs were used. Now more modern electronic instruments are used. The results from both must be corrected for temperature distribution in the atmosphere up to peak altitude. The result from the instrument must be supported by a barogram or, for electronic instruments, by a printout. A diagram is normally not sufficient for exact evaluation.

The barometric altitude can then be corrected to geometric altitude with a computer program, or with the method described in Annex 2 in this Sporting Code.

A GPS can also be used for altitude verification. Note that commercially available GPS has an altitude limit that may be below the intended record altitude. In such a case, a professional GPS with a higher altitude range must be used. Make sure to note if the GPS is set to enable WAAS/SBAS correction signals or not.

A GPS does not measure the height over the sea level but rather the height over the WGS84 ellipsoid surface. The GPS reading must therefore be corrected. This can be done on Internet at:

<http://sps.unavco.org/geoid/>

The correction varies between about +50 to -50 metres depending on the position on the earth for the peak altitude.

**6. Speed flights**

Both the course and the time over the course must be accurately measured. The total accuracy of the speed depends on the accuracy of both.

If the length is measured by GPS set to WAAS, the accuracy of start and end of the course is  $\pm 5$  m. The distance of the course will then have an accuracy of  $\pm 7$  m or 0,7 % of the 1000 m course.

The measured speed is calculated from the time over the course. There is a timing error at both ends of the course and the timing accuracy adds up like the square root of the sum of both errors squared.

If the accuracy of the measurement of the course length and the airship speed is 60 km/h the timing accuracy must be better than  $\pm 0.12$  sec. At 30 km/h the timing accuracy must be better than  $\pm 0.25$  sec.

If the length of the course can be determined with better accuracy, for instance by a professional surveyor then there will be more margins available for the timing.

Example: If the course is measured with an accuracy of  $\pm 1$  m and the airship speed is 60 km/h, the timing accuracy must be better than  $\pm 0.36$  sec.

The timing at both ends can be made in several ways but the timing devices must be synchronised or be made by the same instrument.

Further calculations of speed accuracy is available from the CIA Records Subcommittee.

**7. Round the World and very long distances and duration**

Very long flights is usually recorded by on board GPS, transmitting position reports by satellite link to a flight control centre. The transmissions should be automatic at regular intervals, but reports on request from flight control centre are also useful.

**7.1 Duration**

The take off should be precisely recorded by the Official Observer. For very long duration flights it may be impractical to use short recording intervals on the GPS recorders. Measuring the landing time with sufficient accuracy ( $\pm 1$  minute) may not be possible, using the GPS recordings. Instead an external witness can be used. See GS 5.2 and this Annex, 1.1.

**7.2. Distance**

Until about 1980, the distance flown was measured from start to landing and it was not possible to split the distance into multiple legs. Thus, a very long distance flight would become shorter as the flight passed half the distance around the world. A perfect round the world flight with a landing at the take off point would be calculated as 0 km. As several teams were planning very long flights, the current rules were developed.

To ensure that a new record really was better than an existing record, certain limitations had to be included. The limitations are that each leg must be at least  $\frac{1}{2}$  Earth radius, 3185.5 km. The average length of all legs must be at least 1 Earth radius, 6371 km. It is not possible to state that a flight over X km may be split into two legs. It has to be calculated with a computer program. See SC1, 4.8.2.

Until recently, the program CBFAL has been used. This is however not compatible with current operative systems. Furthermore the CBFAL can only find the optimum solution for up to 3 legs. A round the world flight can probably be split into 5 or more legs. The CBFAL program was developed around 1992. At that time personal computers did not have the capacity to handle the amount of calculations needed in a reasonable time. Work is in progress to update the program. Until then, own programs may be developed. If in doubt, ask the CIA Records subcommittee for assistance.

**7.3. Around-the-world record**

This record is for the shortest time around the world in a single flight. For rules and definitions, see SC1, 4.8.3 and 4.8.4.

The time is between a point at or before a starting line, chosen by the pilot after the flight, until the flight passes this line again after having crossed all meridians. The shortest such time may not be from the meridian of the take off, but can be at any point along the flight path, as long as all meridians have been crossed and all criteria in 4.8.3 have been met.

## **8. Units and measurements**

### **Units:**

See **GS 8.1.1**. The system of units to be used by FAI shall be the metric system (SI units), with the exception of angular units.

### **Margins and precision**

**General Section 8.3.2** Each Air Sport Commission shall determine the precision with which a performance will be recorded. A performance must not be certified with a higher precision than the technologies used to determine it.

This means that the record result will depend on the accuracy of the instruments and procedures used.

If timing is calculated from GPS recordings at 10 sec. Intervals, the duration shall be given in hours, minutes and tens of seconds. If the recordings are at 1 minute intervals, the duration shall be given in hours and full minutes only.

A distance measured by GPS is accurate to  $\pm 10$  m if the GPS is receiving WAAS/SBAS corrections. If not, the accuracy is  $\pm 25$  m.

An altitude measured by GPS is accurate to  $\pm 10$  m if the GPS is receiving WAAS/SBAS corrections. If not, the accuracy is not better than  $\pm 50$  m. This may still be better than if measured by a barograph.