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Section 4 – Aeromodelling

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F7A - HOT AIR BALLOONS

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1 FAI Statutes, Chapter 1, para. 1.6

2 FAI Sporting Code, General Section, Chapter 3, para 3.1.3.

3 FAI Statutes, Chapter 1, para 1.8.1

4 FAI Statutes, Chapter 5, para 5.1.1.2; 5.5; 5.6 and 5.6.1.6

5 FAI Bylaws, Chapter 1, para 1.2.1

6 FAI Statutes, Chapter 2, para 2.3.2.2.5,

7 FAI Bylaws, Chapter 1, para 1.2.3

8 FAI Statutes, Chapter 5, para 5.1.1.2; 5.5; 5.6, 5.6.1.6

9 FAI Sporting Code, General Section, Chapter 3, para 3.1.7

10 FAI Sporting Code, General Section, Chapter 1, paras 1.2. and 1.4

11 FAI Statutes, Chapter 5, para 5.6.3

12 FAI Bylaws, Chapter 1, para 1.2.2

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VOLUME F7

SECTION 4C – MODEL AIRCRAFT – F7 – LIGHTER-THAN-AIR MODELS

7.1 Class F7A - Hot Air Balloons

THIS 2008 EDITION INCLUDES THE FOLLOWING AMENDMENTS MADE TO THE 2007 CODE

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

Paragraph	Plenary meeting approving change	Brief description of change	Change incorporated by
7.1.3.2	Rationalisation of terms throughout	Change "can" to "may"	Jo Halman Technical Secretary
7.1.10, 7.1.10.1, 7.1.10.2, 7.1.11.1, 7.1.11.2, 7.1.12.1		Change "pilot" to "competitor"	
7.1.11.1		Change "organising committee" into "Organisers"	
	No rule changes since the 2007 edition.		

Four-Year Rolling Amendments for Reference			
Paragraph	Plenary meeting approving change	Brief description of change	Change incorporated by
Rule Freeze	2006	Rule freeze reduced to two years & provisional classes not included in the rule freeze	Jo Halman Technical Secretary
7.1.1 & 7.1.2		Text split into two paragraphs and all subsequent paragraphs re-numbered appropriately	
7.1.3		Paragraph title changed and text split into three paragraphs	
7.1.3.3		Two new sentences regarding target responsibility and early advice	
7.1.5		Add the requirement for an anemometer	
7.1.6		Move the text relating to safety to 7.1.10	
7.1.7		Addition of judges and assistants	
7.1.8		Additional text regarding judges	
7.1.9		Add "and Helpers" to the paragraph title & define number of balloons and helpers' duties	
7.1.10		Amend the text regarding safety & disqualification	
7.1.10.1		Change text to "common electric mass"	
7.1.10.2		Additional rules regarding re-fuelling	
7.1.10.3		Define when flights are allowed and the maximum wind before flights are forbidden	
7.1.11.1 & 11.2		Organisers' responsibilities moved from 7.1.11.2	
7.1.12		Add "During Tasks" to the paragraph title & add "free flight" at end of paragraph	
7.1.12.2		Re-structure the whole paragraph with some additional text and some deletions	
7.1.12.3		Define Flight Director's duties regarding flights	
7.1.13		Extend the time period to two weeks for a protest regarding results	
7.1.14		Change the paragraph title to "Results"	
7.1.14.1		Change the paragraph title to "Basic Score" and define the scoring system including a table	
7.1.14.2	Change the paragraph title to "Calculated Score"		
7.1.15.1-7.1.15.5 & 7.1.15.7 & 7.1.15.8	Delete unnecessary text regarding scoring with some additional text in places.		

RULE FREEZE FOR THIS VOLUME

With reference to paragraph A.12 of Volume ABR:

In all classes, the two-year rule for no changes to model aircraft/space model specifications, manoeuvre schedules and competition rules will be strictly enforced, but in step with the World Championship cycle of each category.

Volume F7 contains only provisional classes and is not, therefore, subject to this restriction.

The only exceptions allowed to the two-year rule freeze are genuine and urgent safety matters, indispensable rule clarifications and noise rulings.

VOLUME F7
TECHNICAL REGULATIONS FOR
RADIO CONTROL LIGHTER-THAN-AIR MODELS

7.1 CLASS F7A - HOT AIR BALLOONS

7.1.1. Definition

A hot air balloon is a lighter-than-air model airship, supported statically in the air, with no means of propulsion by any power source, which obtains its lift only as a result of heated air. The envelope may contain no gas other than air and the normal products of combustion.

The hot air is produced by one or several radio-controlled burners using gas provided by onboard cylinders. The cylinders and the radio equipment are most often in a basket (not mandatory).

7.1.2 Characteristics

The hot air balloons must fit the national regulations for model aircraft (size, weight etc).

Hot air balloons above 150 kg are not model airships. The weight of gas is limited to 2 kg for balloons under 12 kg (full fuel included) and to 5 kg for balloons equal or above 12 kg (full fuel included).

7.1.3 Marker, Identification and Target

7.1.3.1 Marker

A marker is provided for each competitor by the organisers. . The markers must be of similar size and weight. The markers must be identified. Personal markers are not allowed. The competitor is allowed to make minor changes to adapt the marker to the dropping unit. The drop of the marker is radio controlled.

7.1.3.2 Identification

The organisers may implement additional identification items for the competitor, his assistant(s) and his balloon(s).

7.1.3.3 Target

The Flight Director is responsible for the target management.

The target should be advised early enough to allow the competitors to adapt their flight.

The target must be physical and clearly visible by the competitors.

7.1.4 Refuelling Area

The place for refuelling the cylinders of the balloon from master cylinders or tanks must be defined and secured by the organisers.

7.1.5 Inflating and Take-off Area

These areas must be away from the refuelling area. They must be defined by the Flight Director. It is necessary to have specific equipment (such as helium balloons, wind vane etc) to verify the wind conditions. An anemometer must be provided by the Organisers to measure the speed of the wind (see paragraph 7.1.10.3).

7.1.6 Flying Site

The flights are most often outdoor flights (airport, aeromodelling site, open land etc) but indoor flights may be utilised in the case of adverse weather conditions. The flying site must fit the safety rules, be in accordance with the general rules for aerial circulation, have the necessary agreements from the appropriate authorities or owners and must allow normal flight of the balloons.

7.1.7 Competition and Tasks

A competition is made up of several tasks.

A competition is valid if a minimum of three tasks (of which two are different) are validated. There is no upper limit of the number of tasks.

Several examples of tasks are provided in paragraph 7.1.15 but any task can be created provided it is fully explained to the competitors, the judges and the assistants.

7.1.8 Panel of Judges

The Panel of Judges must have a Chairman, a Flight Director and one or more Judges. The Panel of Judges is defined prior to the start of the competition.

Usually the Chairman of the Panel of Judges will be the head of the Organisers (most often an Air Model Association).

The Flight Director suggests the tasks to the Panel of Judges, controls the effective progress of the competition and ensures the proper application of the rules.

For national competitions, one Judge is required. For international competitions, two judges are required. For World and Continental Championships, a senior judge must be appointed to supervise the judges and the assistants.

The senior judge should be selected from the list of persons who are nominated by NACs for their proficiency and experience and approved by the FAI/CIAM.

The judges may get help from assistants (measuring, timing) provided that these assistants are qualified or trained for the activity they have to perform.

Any decision from the Panel of Judges is obtained by majority vote and in the case of a tie the Chairman makes the final decision.

The judges and the assistants must inform the Flight Director of any concern observed during the competition.

7.1.9 Competitor and Helpers

Each competitor may compete with one or two balloons. A competitor competing with two balloons may use only one frequency. Only one balloon may be used during a task.

A balloon may not be shared with other competitors.

A competitor may be helped by one or several helper(s). The helpers may act during inflating, during take-off and after recovery of the balloon but not during flight.

7.1.10 Safety Rules

The handling of highly flammable gas (including liquid phase) requires strict observation of the safety rules.

The organisers and the members of the Jury must always observe, comply with and apply the safety rules and ensure that competitors, organisers and any other person on the flying site complies with the safety rules. The Jury will summarily disqualify, without right of appeal, any competitor who infringes or ignores the safety rules and will exclude from the flying site any other person who deliberately infringes or ignores the safety rules.

Specific attention must be drawn to:

- fire risks, personal risks, environmental risks;
- electric lines, roads, railways, houses, farms, crops etc;
- restricted or protected areas (military sites, fuel storage sites etc).

Each competitor must have his own safety equipment (gloves, extinguisher).

7.1.10.1 Hot Air Balloon

The cylinders must comply with the national regulations. The cylinders must have a security gauge. Pressure testing can be requested in some countries. The cylinders must be cleaned periodically but proof of the cleaning/testing is not requested. . Suspect cylinders must be rejected.

The competitor must be able to stop any flight presenting risk to the public or to the environment. The balloon must have a safety system allowing cessation of flight as required (such as: cut of lighter, cut of gas flow, time cut of burners etc). Additional equipment can be requested by national rules, and/or local rules.

A common electric mass is recommended (suspension of envelope, loading unit, cylinders, gauges, radio receiver). The propeller of the inflating unit must be protected.

7.1.10.2 Refuelling Area

The Organisers must nominate a person to be responsible for the refuelling area. This person has full authority to avoid/stop refuelling/emptying whenever the safety rules are not implemented or followed.

The area must be a restricted area (allowed personnel only, no smoking, no naked flames), well ventilated and isolated from the public, the inflating area and the take-off area. The area must not have any place where gas can accumulate. The area must allow fast evacuation.

The refuelling/emptying is under the sole responsibility of the competitor. Smoking, the use fire lighters, testing of burners and the running of electronic equipment such as, but not limited to, radio equipment, cameras and phones are strictly forbidden in the refuelling/emptying area. Specific equipment allowing several competitors to refuel can help and speed up the operation. An earth linkage is suggested. Gloves should be worn during refuelling.

7.1.10.3 Take-off and Flight Area

Free flights are not allowed prior to sunrise or after sunset.

Flights are not allowed if wind speed exceeds 2 m/s measured at 2 m above the ground at the take-off area.

Suitable extinguisher(s) must be available.

7.1.11 Competition Rules

7.1.11.1 Organisation

Official national competitions are organised by recognised national air models organisations and must be declared to the national air models association.

Official World or Continental competitions must be approved by CIAM Plenary.

It is the competitor's responsibility to obtain the latest issue of the competition rules.

The Organisers are responsible for the control of the equipment, weight of the balloon (full gas included), safety, frequencies and insurances. This should be undertaken by the organisers prior to competitors beginning the first task.

7.1.11.2 Competitors

Unless specific conditions apply, entry is closed the day prior to the beginning of the competition.

By his entry, the competitor recognises he accepts, and will comply with, the competition rules and safety rules. The competitor must comply with the national regulations for air models such as (but not limited to): authorisations, pilot degree, insurances, radio equipment, gas handling, balloon features (volume, weight, radio equipment etc). Unless with specific agreement obtained from the authorities, the radio frequencies must fit the regulations of the organising country.

A competitor is taking part in the competition as soon as he takes part in one task.

7.1.12 General Rules During Tasks

7.1.12.1 Hot Air Balloon

No outboard heating or refuelling is allowed during flight.

Out of specific tasks (ie circle) the balloons should have no material link with the ground (free flight).

The balloon must not transmit any positioning or flight information to the competitor or to the helper(s).

The lowest part of the balloon (except radio antenna) determines the point of contact with the ground (landing).

No structural changes are allowed except for safety equipment and radio receiver.

Prior to each task, removable weights may be added or subtracted.

7.1.12.2 Flight Rules

The Flight Director chooses the take-off area based on the task to be performed and on the weather conditions. He must clearly advise the competitors of his choice. This area may be different from the inflating area.

Unless otherwise advised by the Flight Director prior to the beginning of a task, the competitor may restart his flight provided the target is still open, the marker has not been dropped and no landing has taken place. Restart is considered a new take-off and should be performed from the take-off area. If several attempts are allowed only the last one is considered for scoring purposes.

During any task, the competitor is allowed to follow his balloon and to receive external advice.

Take-off from outside the take-off area is a zero flight for the competitor.

After leaving the take-off area, any contact of any part of the balloon with any person or the ground is considered a ground contact. Nevertheless, under specific weather conditions, some bounces may be accepted when leaving the take-off area. Contact with trees, poles, lines or buildings is not considered as ground contact. During a flight, deliberate contact of a balloon with other balloons is not allowed and penalties up to zeroing the flight of the offending competitor can be applied.

Unless a competitor has notified his decision to restart his flight, any contact from the competitor (or from helper) with the balloon prior to dropping or landing is a zero flight.

Marking (marker on the ground) or landing should occur before the target closes otherwise the competitor will receive a zero flight score. The marker must be on the ground for the flight to count for scoring. If the dropping of the marker fails, the competitor may replace the marking with a landing. The first contact with the ground is then retained. No complaint will be accepted for the unexpected dropping of the marker.

The position of ground contact by the balloon is solely the decision of the judge(s).

Any displacement of the marker, or of the landing position, by the competitor or by his helper(s) disqualifies the competitor for the whole competition. This disqualification will appear in the results and the Jury of the competition. After dropping the marker, or after positioning of the landing, the balloon should be quickly drawn away to allow the other competitors to score under normal conditions.

The task of the competitor is completed by the target closing, or the marking, landing or withdrawal of the balloon.

7.1.12.3 Tasks

Prior to the beginning of a task, the Flight Director must clearly inform the competitors of the type of task, the take-off area and of the management of the timing (flight opening, end of take-off time, target opening, target closing). These times are advised using any convenient system (horn, loud-speaker etc).

The opening of the flight must be advised early enough to allow the competitors an immediate take-off after flight opening. The competitor is free to decide when he will take off provided he does it during the allowed period.

The Flight Director may:

- cancel a task if the weather conditions do not allow a normal and equivalent flight between the competitors;
- not validate a task if all competitors receive a zero "flight score" (see paragraph 7.1.13.1).

7.1.13 Explanations and Protests

A competitor may ask for explanations from the Flight Director. He is allowed to verify (or let verify) his own results and the related calculations. If he disagrees with the results or if he contests attitudes or decisions, he may present a protest to the Panel of Judges. This protest must be in writing and accompanied by a fee equal to the amount of the competition entry fee. The fee is returned only if the protest is upheld. A protest related to the final results should be submitted by the competitor two weeks, at the latest, after the publication of the final results.

7.1.14 Results

7.1.14.1 Basic Score

For each task, the competitor gets a basic score, which is the total of the flight score and of several bonuses (one take-off bonus, one or several intermediate bonus(es) and one precision bonus).

The maximum flight score is 1000 points.

The bonuses (take-off, intermediate, precision) are 100 points each.

The "flight score" is based on distance or on time measurements.

The flight score is zero if:

- take-off is out of the take-off area
- the drop of the marker or landing is out of the target opening time.

(a) Distance

The maximum measured distance is clearly advised by the Flight Director before the task begins. This distance is adapted to the local conditions and to the measurement units.

The use of a laser measurement unit is suggested.

The distance is rounded to the closest rounding.

Maximum measured distance	Rounding	Loss of points from max flight score	Precision bonus if
100 m	10 cm	1 point / 10 cm	distance < 100 cm
50 m	5 cm	1 point / 5 cm	distance < 50 cm
10 m	1 cm	1 point / 1 cm	distance < 10 cm or in the container (outdoor circle)
5 m	0.5 cm	1 point / 0.5 cm	distance < 5 cm or in the container (indoor circle)

b) Time

The time is calculated using only entire tenths of a second.

7.1.14.2 Calculated Score

The aim of this calculation is to give the same weight to all the tasks of a competition.

For each task, the best competitor obtains a calculated score of 1000. The calculated score of the other competitors is a ratio to the basic score of the best competitor:

Calculated score = 1000 x (basic score of competitor/basic score of the best competitor)

The ranking of each task is based on the calculated scores.

7.1.14.3 General ranking

If the competition has three or more tasks, the lowest normalised score for each competitor is discarded. Otherwise, all the normalised scores are retained.

The general ranking is obtained from the total of all the retained calculated scores.

7.1.14.4 Competition points

For each competition in which he participates, a competitor gets competition points equal to the total of his normalised scores divided by the number of tasks of the competition.

The yearly total of the competition points can be used (per se or not) for an annual ranking of the competitors.

7.1.15 Potential Tasks

(Not limited to those described here)

7.1.15.1 Target

Prior to the flight, the Flight Director places, or permits to be placed, a target where he wants on the flight area. The competitor takes off from a limited take-off area and should drop/land as close as possible to the target.

7.1.15.2 Hesitation Waltz

Prior to the flight, the Flight Director places, or permits to be placed, several targets on the flight site. The minimum distance between the targets should be double the maximum measured distance.

The competitor takes off from a limited take-off area and should drop/land as close as possible to the target he chooses.

7.1.15.3 Back Home

Prior to the flight, the Flight Director places, or permits to be placed, a target where he wants on the flight area.

The competitor takes off from a large take-off area allowing the competitor to choose a suitable take-off place. He must drop/land as close as possible to the target.

7.1.15.4 Fox

A first balloon (fox) is provided and flown by the organisers (not by a competitor). The fox takes off when all the competitors are ready for take-off. The target is either the dropped marker of the fox or the landing position of the fox (to be defined prior to starting the task). The flight of the competitors is opened a short time after the take off of the fox (30 seconds is suggested). The competitor decides when he will take off. He must drop/land as close as possible to the target.

7.1.15.5 Line

Prior to the flight, the Flight Director defines the target as a physical line on the ground.

The competitor takes off from the take-off area and must drop/land as close as possible to the target.

7.1.15.6 Area

Prior to the flight, the Flight Director defines a specific area on the ground (ie sport place). The competitor takes off from the take-off area and must drop in the defined area and then land in the area. The objective is to get the maximum distance between drop and land. The competitor is not allowed to restart his flight.

The maximal distance (decimetres) is not limited. The distance to the target is directly used to get the points of flight. There is no precision bonus.

7.1.15.7 Stationary

The aim is to remain at a constant height from the ground for the maximum measured time.

The height is defined by the Flight director by using a rope. This rope is fixed to the basket by the competitor. The length of the rope must be short (around 25 cm) for indoor flights and longer (around 1 m) for outdoor flights. The free end of the rope must have a small weight to ensure the rope remains taut.

The competitor decides the beginning of the time to be counted. The time is stopped either by contact of the basket with the ground or by the rope losing contact with the ground.

The maximum measured time is 250 seconds. Each tenth of second is 0.4 point. There is no precision bonus.

7.1.15.8 Circle

A circle is marked on the ground (10 metres diameter indoor and 20 metres diameter outdoor).

The target is a container (around 5 cm diameter indoor and around 10 cm diameter outdoor) placed at the centre of the circle. The competitor guides his balloon toward the target using a rope which length is equal to the diameter. The rope is fixed to the basket. The competitor is not allowed to enter the circle or to hold the rope in any other way than at the end (flight score = zero). The flight time is limited to 5 minutes starting when the marker enters the circle.

The precision bonus is obtained if the marker is dropped and remains in the container.

7.1.15.9 Combined tasks

Combined tasks are made up of several tasks performed during the same flight.

The Flight Director must clearly advise the combination and flight timing.

For each task, the 3 types of bonus are applicable (unless there are restrictions in the tasks).