



# FAI Sporting Code

*Fédération  
Aéronautique  
Internationale*

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## Section 4 – Aeromodelling

### Volume F5

R.C. Electric Powered Model Aircraft

2005 Edition

Effective 1st January 2005

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## VOLUME F5

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

<sup>2</sup> FAI Sporting Code, General Section, Chapter 3, para 3.1.3.

<sup>3</sup> FAI Statutes, Chapter 1, para 1.8.1

<sup>4</sup> FAI Statutes, Chapter 5, para 5.1.1.2; 5.5; 5.6 and 5.6.1.6

<sup>5</sup> FAI Bylaws, Chapter 1, para 1.2.1

<sup>6</sup> FAI Statutes, Chapter 2, para 2.3.2.2.5,

<sup>7</sup> FAI Bylaws, Chapter 1, para 1.2.3

<sup>8</sup> FAI Statutes, Chapter 5, para 5.1.1.2; 5.5; 5.6, 5.6.1.6

<sup>9</sup> FAI Sporting Code, General Section, Chapter 3, para 3.1.7

<sup>10</sup> FAI Sporting Code, General Section, Chapter 1, paras 1.2. and 1.4

<sup>11</sup> FAI Statutes, Chapter 5, para 5.6.3

<sup>12</sup> FAI Bylaws, Chapter 1, para 1.2.2

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**THIS EDITION INCLUDES THE FOLLOWING AMENDMENTS MADE TO 2005 CODE**

Paragraph	Plenary meeting approving change	Brief description of change	Change incorporated by
5.5.4.1 b)		Correction of error for minimum surface area	F5 S-C Chairman 20/06/05
5.5.6.2 a)		Correction of error for maximum surface loading	
5.5.6.9 f)		Correction of error for scoring re failing to complete the flight	

**RULE FREEZE FOR THIS VOLUME**

With reference to paragraph A.12 of Volume ABR :

In all classes, the four 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. This means that in Volume F5 changes can be next agreed at the Plenary meeting 2008 for application from January 2009.

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

## **VOLUME F5: TECHNICAL REGULATIONS FOR RADIO CONTROLLED ELECTRIC POWERED MODEL AIRCRAFT**

### **5.5. CATEGORY F5 - RADIO CONTROLLED ELECTRIC POWERED MODEL AIRCRAFT**

#### **5.5.1 GENERAL RULES**

##### **5.5.1.1 Definition of Electric Powered Model Aircraft**

Model aircraft in which lift is generated by aerodynamic forces acting on surfaces remaining fixed in flight except control surfaces and which performs manoeuvres controlled by the pilot on the ground, using radio control, or by rotating surfaces in case of helicopters. The power pack for the electric motor may not have any fixed connection to the ground or another model aircraft in the air. Recharging of the powerpack during flight by solar cells is permitted.

##### **5.5.1.2 Builder of the Model Aircraft**

Rule B.3.1. of Section 4b (builder of the model aircraft) is not applicable to category F5.

##### **5.5.1.3. General Characteristics of RC Electric Powered Model Aircraft F5**

(for helicopters see para 5.5.5.3)

Maximum total area ..... 150 dm<sup>2</sup>

Maximum weight ..... 5 kg

Loading ..... 12 to 75 g/dm<sup>2</sup> (for Pylon see para 5.5.6.2)

- a) The power source shall consist of any kind of rechargeable batteries (or secondary cells), the maximum no load voltage must not exceed 42 volts. In case the voltage is measured, this shall be done at the moment the preparation time for the pilot starts. After the measurement has been taken, the pilot is allowed 5 minutes preparation time as per 5.5.2.4.
- b) Battery specifications in F5B, F5D and F5F are written in the special rules of this classes.
- c) Mechanical or chemical modification of the individual cells, e.g. to reduce their weight, is not allowed except that insulation sleeves of individual cells may be changed.
- d) Any device for the transmission of information from the model aircraft to the pilot is prohibited.

##### **5.5.1.4 Number of model aircrafts**

The competitor may use two model aircraft, three in pylon, in the contest. The competitor may combine the parts of the model aircraft during the contest, provided the resulting model aircraft conforms to the rules and that the parts have been checked before the start of the contest.

##### **5.5.1.6 Competitor and Helper**

Each competitor must operate his radio equipment personally. Each competitor is permitted two helpers and the team manager.

## **5.5.2. CONTEST RULES**

### **5.5.2.1 Definition of an Official Flight**

During a two (2) minute starting period, the competitor is allowed an unrestricted number of attempts, hand launches or starts from the ground. An attempt starts when the model aircraft is released by the competitor or his helper(s). After the first attempt, it is no longer allowed to take another model aircraft. The timekeeper will start his stopwatch at each attempt. After two minutes, no further launching or takeoff is allowed and the flight is being considered as official, the model aircraft being airborne or not. The pilot may repeat a second two-minute starting period only if:

- a) The competitor cannot perform a flight due to outside interference verified by the organizer.
- b) No scoring was made for reasons outside the control of the competitor.

In such cases, the flight may be repeated at any other time decided by the Contest Director.

### **5.5.2.2 Cancelling of a Flight and Disqualification**

The flight is annulled:

- a) If the pilot uses a model aircraft not conforming with the CIAM rules. In the case of intentional or flagrant violation of the rules, in the judgement of the Contest Director, the competitor may be disqualified.
- b) If the model aircraft loses any part during the flight time. The losing of a part during landing (i.e. contact with the ground or an other obstacle) during the flight due to a collision with an other model is not taken into account;
- c) If the model aircraft was already used by another competitor at the same contest;
- d) If the pilot uses more than two helpers;
- e) If any part of the model aircraft does not come to rest and remain at rest within 100 metres from the landing spot. For powered gliders, this rule applies only after the duration and landing task has started.
- f) If for powered gliders the duration and landing task has not been started and also the landing does not occur on the designated flying side of the security line and within 100 m from the intersection of that line with Base A or B.
- g) If in contrast with the declaration of the competitor the model aircraft carried more than the allowed number of cells as power source for the motor or the voltage exceeds 42 volts.
- h) The competitor is disqualified if the model aircraft is controlled by anyone other than the competitor.
- i) If the model aircraft touches either the competitor or his helper during landing manoeuvres, no landing points will be given.

### **5.5.2.3 Organisation of the Contest**

For transmitter and frequency control see Section 4b, Para B.8.

The official in charge will issue the transmitter to the competitor only at the beginning of his preparation time, according to 5.5.2.4.

### **5.5.2.4 Organisation of Starts**

The competitors shall be combined in groups, in accordance with the radio frequencies used, to permit as many flights simultaneously as practical. The combination is organised in such a way that, as far as possible, there are no pilots of the same nation or team in one group. The flying order of different groups is also established in accordance with the frequencies used. The competitors are entitled to five minutes of preparation time before they are called for the start.

### 5.5.2.5 Judging

The organiser must appoint a panel of at least three judges of different nationalities who are selected from the official CIAM Judges List.

**Note:** These General Rules and Contest Rules are applicable to the F5 Classes Aerobatics (5.5.3.), Motor Gliders (5.5.4.), Helicopters (5.5.5.) and Pylon Race (5.5.6.).

## 5.5.3 CLASS F5A ELECTRIC POWERED AEROBATICS MODEL AIRCRAFT

### 5.5.3.1 General

These rules for contests with electric powered aerobatic model aircraft will use the advantages and peculiarities of the electric powered propulsion. Those contests could take place near settlements p. e. on sport fields and recreation areas.

General rules 5.5.1 and Contest rules 5.5.2 are applicable except otherwise stated.

### 5.5.3.2 Organisation of F5A Contests

#### a) Starting Order

The starting order for the first round will be established by random draw. The starting order for the second round will follow the inverted ranking list. In each case, frequency will not follow frequency and team members will be separated by at least one competitor. The starting order for the final round will be established by a second random draw

#### b) Number of Flights

Competitors will have at least three preliminary flights with the same schedule. The top ten on or the first third of the competitors of ranking list, whichever is less, after the three preliminary rounds, will fly with a different schedule two final rounds combined with music.

#### c) Number of Attempts

Each competitor is entitled to one attempt for each official flight and there is an official flight when an attempt is made whatever the result.

#### d) Course Layout

The course layout depends on the size of contest site and consists of a box of 150 x 150 x 150 meter maximum and 100 x 100 x 100 meter minimum. The competitor while flying must stay in the middle of base b of the box on the spectators side. Judges must seat 3 to 5 meters behind the competitor. Base b is also the safety line. The landing field is 50 to 100 m long, 8 to 10 m wide and parallel to base b.

#### e) Definition of an Official Flight

During a two (2) minute starting period, the competitor is allowed an unrestricted number of attempts (hand launches or on undercarriage). It is allowed to use the second model aircraft. After the two minute limit, no further take-off may happen and the flight is considered as official, whether the model aircraft is airborne or not.

#### f) Execution Time

The flight must be completed in 6 minutes including the 2 minute starting period. If the model aircraft lands after 6 minutes, 50 points will be deducted from the score. The same penalty is given, if the music is longer than 6 minutes. Time starts with an audio signal or with the beginning of the music (decision by the flightline director) and ends when the model aircraft touches the ground.

#### g) Classification

The addition of the 2 best preliminary flights and the average of the two final rounds will count for the final classification.



### 5.5.3.3 Schedule of Manoeuvres

#### a) Composition of Schedule

Each competitor chooses for his preliminary flights a maximum of 8 and for the final flight a maximum of 12 manoeuvres out of the catalogue (5.5.3.4). The schedules for the preliminary flights must be provided by the competitors and collected by the organizer one hour before the first round will begin. The turn-around manoeuvres are free and must not be printed. The schedule for the final flights must be printed by the competitors, together with his music cassette to the organizer after the results of the preliminary rounds are displayed. The choice of the music is free.

#### b) Execution of Manoeuvres

The manoeuvres must be executed in the centre of the box in front of the judges during an uninterrupted flight in the order in which they are listed by the competitor. Each (centre) manoeuvre must be performed approximately between 50 and 120 meters in front of the competitor. Rolls and knife edge flights must be executed along a line parallel to base b, other manoeuvres can be flown also perpendicular to base b. Each manoeuvre starts and ends in a horizontal line on the same heading.

### 5.5.3.4 Judging

#### a) Judges Panel

The organizer must appoint a panel of four or five judges, for international competitions preferably of different nationalities and who are selected from the official CIAM Judges list.

Before every competition there shall be a briefing for the judges. Also warm-up flights shall be flown by a competitor that is determined by a random draw and is not in the first five of the flight order.

#### b) Marking System

Each flight may be awarded by each judge with marks between 0 and 10 as follows:

<div style="text-align: center;">K-Faktor</div> <div style="text-align: left;">Principles of judging</div>	Preliminary flights		Final flights	
	K max.	Max. points	K max.	Max. points
Precision of each manoeuvre, perfection	25 (max. 8 manoeuvres)	250	50 (max, 12 manoeuvres)	500
Over all impression (incl. turn-arounds, take-off and landing) display of manoeuvres landing in – or outside of the landing field	25 (20 without landing gear)	250 (200)	25 (20 without landing gear)	250 (200)
Harmony, rhythm, and gracefulness			25	250
TOTAL	50 (45)	500 (450)	100 (95)	1'000 (950)

### 5.5.3.5 A Turn-around manoeuvres

#### a) Principle

Turn-around manoeuvres connect one center manoeuvre with the following center manoeuvre. They are free and shall be combinations of all possibilities of manoeuvres or parts of manoeuvres. I.e. Turns Humpty Bumps, Loops, Spins, etc.

#### b) Positioning

All turn-around manoeuvres shall be flown inside the box. The turn-around manoeuvres and the center manoeuvres must be separated by a horizontal line a minimum of 10 meters.

#### c) Judging

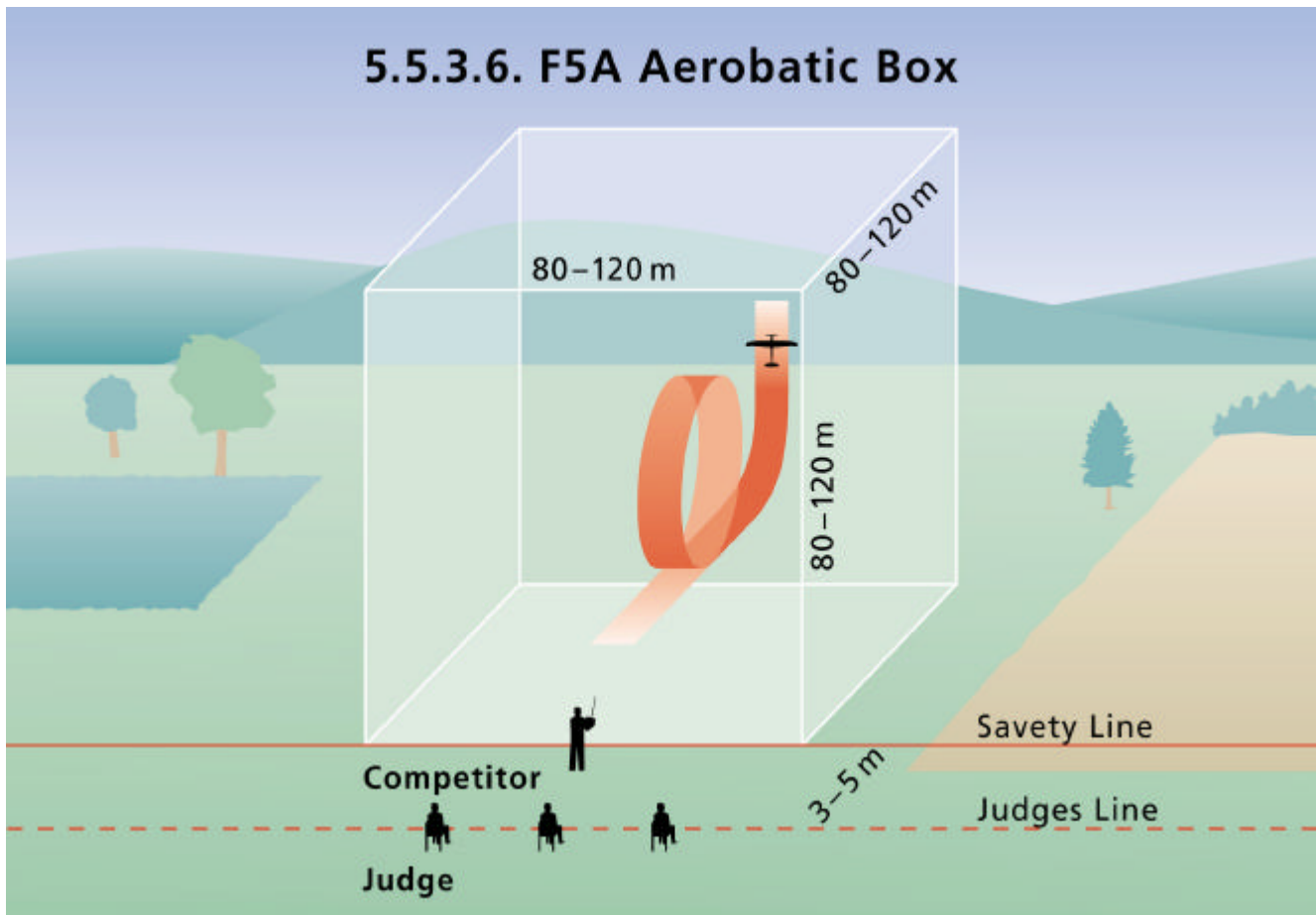
The turn-around manoeuvres must not be judged separately. The performance of this manoeuvre will count for the overall impression. Also flying outside of the box will downgrade the overall look.

### 5.5.3.5 B Manoeuvres

No.	Basic Manoeuvre	K	Option 1	K	Option 2	K	Option 3
1.	Loopings positive (min. 2)	2	With roll(s)	3	With snap	4	Rosette
2.	Loopings negative (min. 2)	3	With roll(s)	4	With snap	5	Rosette
3.	Square Looping	3	With 2 half rolls	4	With 4 half rolls	5	With 4 full rolls
4.	Cuban-Eight	3	Horizontal square eight	4	Vertical square eight	5	Vertical square eight with two half rolls
5.	Roll(s)	2	Two rolls	3	Slow roll	4	2 rolls in opposite
6	Pointed roll (min.2 points)	3	4-points	4	8-points	5	4-reverse point roll
7	Knife edge	3	Reversed with half roll	4	Reversed with full roll	5	Reversed with ½ snap
8	Rolling circle with 4 half rolls	4	With 4 full rolls	5	With 4 full rolls in opposite	7	With one roll
9	Spin	1	3 turns	2	2 turns in opposite	3	3 turns inverted
10	Immelman	2	Combined with half rolls	3	Combined with full rolls	4	Combined with roll and snap
11	Humpty bump positive	2	Humpty bump negative	3	Humpty bump negative or positive combined with half and pointed rolls	4	Humpty bump negative or positive combined with roll(s) and snap
12	Torque rolls (min. 1)	3	Two	5	Three	6	More than three
13	Top hat positive with 2 half rolls	3	Positive with full rolls	4	Negative with half or pointed rolls	5	Negative with full roll and snap
14	Stall Turn	2	With half rolls up and down	3	With full rolls up and down	4	With roll up and snap down

**Manoeuvre Drawings see Annex 5 A**

### 5.5.3.6. F5A Aerobatic Box



## 5.5.4 CLASS F5B ELECTRIC POWERED MOTOR GLIDERS

### 5.5.4.1. Definition

a) Definition: This contest is a multi-task event for RC Electric Powered Motor Gliders including two tasks.

- 1) Distance
- 2) Duration and landing

These two tasks are executed without interruption in one flight. A minimum of two and a maximum of 8 flights must be flown. If more than three flights are flown, the lowest score of each competitor will be discarded.

b) Model Aircraft specifications:

Minimum weight without battery .....900 g

Type of battery.....Nid or NiMH

Maximum size of (only) cylindrical cells.24 mm diameter, 45 mm length (includ. pole)

Maximum number of cells .....16

**Minimum** surface.....26.66 dm<sup>2</sup>

Maximum surface loading.....75 g/dm<sup>2</sup>

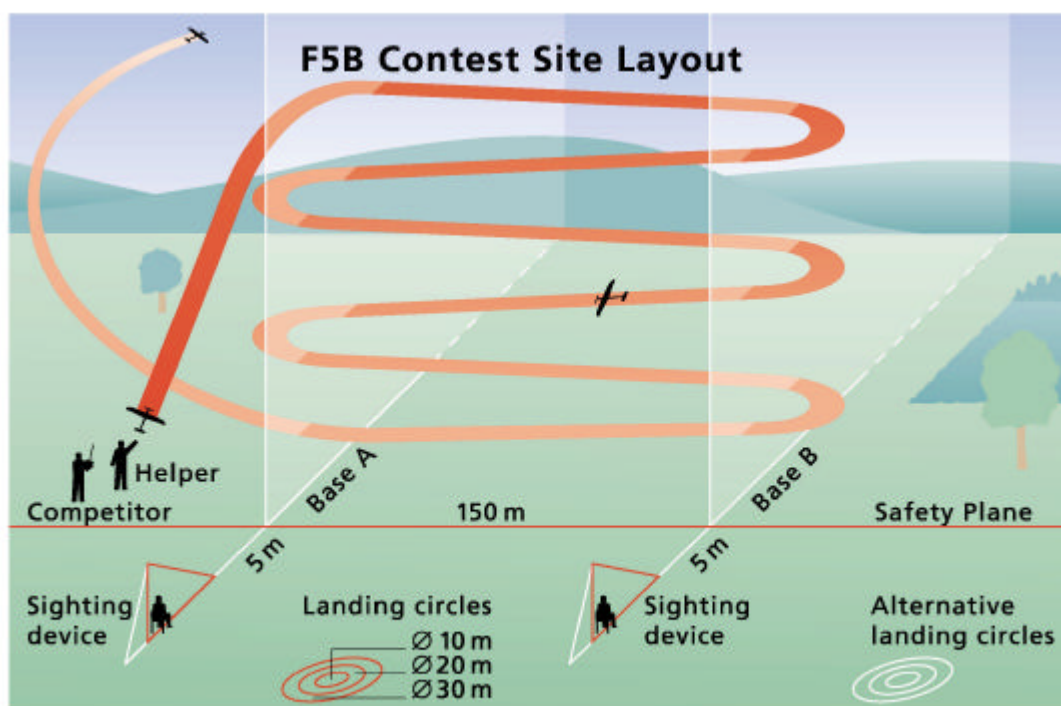
- c) Starting order: the starting order for the first round will be established by random draw. For the next rounds the starting order will follow the reversed ranking list. Frequency will not follow frequency and team member will not follow team members.

#### 5.5.4.2 Course Layout and Organisation

- a) Two imaginary vertical planes at a distance of 150 m from each other determine turnlines and are named Base A and Base B. A safety plane is established perpendicular to these planes. The safety plane is endless. The sighting devices used to detect the crossing of the Bases A and B are placed at a distance of 5 m from the safety plane.
- b) For landing, the organiser must provide three concentric circles 30, 20 and 10 m in diameter, located at a place on the field where no danger of collision exists with model aircraft simultaneously flying either the distance.

##### 5.5.4.2.A F5B Contest Site Layout

Base B can either be to the left or right of Base A.



#### 5.5.4.3. Scoring

- a) For each flight the total score is compiled by adding the partial score A and B for each competitor;
- b) The individual result of each round is normalised to the points of the best competitor of that round.

$$P_{\text{round}} = 1000 \times \frac{\text{Individual points}}{\text{Points of the best competitor}}$$

The normalised points shall be recorded to the first decimal number.

- c) In order to decide the winner when there is a tie, the best discarded flight shall be taken into account.

#### **5.5.4.4 Launching**

- a) Before launching, the competitor has to show to his timekeeper how he controls his motor(s) on his transmitter (on, off, reversing);
- b) The launch will occur within 10 m from Base A;
- c) The model aircraft is released into flight directly from the hands of the competitor or his helper, without assistance. The model aircraft shall not be launched from a height greater than the flier's normal reach above the ground.

#### **5.5.4.5 Distance Task**

- a) This task begins when the mode aircraft releases handlaunched and ends after 200 seconds. Time of release is to be taken by one timekeeper.  
This task must be carried out with at least two climbs with motor running however no more than ten climbs with the motor running are allowed. No points will be awarded for the legs completed after an eleventh or more climb with motor running.  
The competitor has to decide how much time he will use for each climb (motor run) and how much for gliding.
- b) Starting and stopping the motor must be announced to his timekeepers;
- c) When after stopping the motor the model aircraft first crosses the Base A in the direction of Base B, the timekeeper starts counting the legs. The model aircraft must complete as many legs as possible from the starting point Base A to the Base B and return;
- d) Restarting the motor stops counting the legs, as does the expiration of the 200 seconds.
- e) A timekeeper announces to the competitor when his model aircraft crosses the Base A and a flagman or audio system is used to signal crossing of Base B. The absence of a signal will indicate that the model aircraft has failed to correctly cross the base. The instruments used to check the crossing of the vertical plane must assure the parallelism of such planes.  
During the scoring in this task, flying with any part of the model aircraft on the forbidden side of the safety plane will give ZERO points for the whole flight, distance and duration.
- f) The competitor, his helper(s) and the team manager must remain at Base A until the distance part of his flight is completed. Nobody, other than the flagman, may stay in the B line and give signals.
- g) Every completed leg will be awarded 10 points. When the model aircraft fails to complete at least one leg after either of the first two climbs, 30 points will be deducted from the score of this task;
- h) After 200 seconds of this task, which will be indicated by an audio signal, the duration task begins immediately.

#### **5.5.4.6. Duration and Landing Task**

- a) This task must be completed within 600 seconds from the moment the audio signal is given;
- b) The competitor has to decide how much and how often he will switch on the motor;
- c) The gliding-time timekeeper (1) starts his stopwatch every time the motor is switched off. Gliding time ends either when the motor is switched on again or when the model aircraft comes to rest after landing. The competitor must announce the switching on and switching off of his motor to the timekeeper with the word "ON" and "OFF";
- d) Gliding time is cumulative and one point will be awarded for each full second the model aircraft is gliding;
- e) One point will be deducted for each full second flown in excess of 600 seconds;
- f) Additional points will be awarded for landing; when the model aircraft comes to rest in the 30 m circle, 10 points will be given while coming to rest in the 20 m circle gives 20 points, and when coming to rest in the 10 m circle 30 points will be given. The distances are measured from the centre of the circle to the nose of the model aircraft;
- g) No additional points will be awarded if the landing occurs more than 630 seconds after beginning of this task (as per 5.5.4.6.a) ).

#### **5.5.4.7 Site**

The competition must be held at a site having reasonable level terrain with a reasonable low probability of slope or wave soaring.

### **5.5.5. CLASS F5C ELECTRIC POWERED HELICOPTERS**

#### **5.5.5.1 Definition**

An R/C electric powered helicopter is a heavier-than-air aircraft that derives all of its lift and horizontal propulsion from a rotor system(s) rotating about a nominally vertical axis (or axes). This rotor system is driven with an electric powered motor. Fixed horizontal supporting surfaces up to four per cent of the swept area of the lifting rotor(s) are permitted. A fixed or controllable horizontal stabiliser of up to two per cent of the swept area of the lifting rotor(s) is permitted. Ground effect machines (hovercraft), convertiplanes or aircraft that hover by means of propeller slipstream(s) deflected downward are not considered to be helicopters.

#### **5.5.5.2 Builder of the Model aircraft**

Paragraph B.3.1 of Section 4b (Builder of the model aircraft) is not applicable to class F5C.

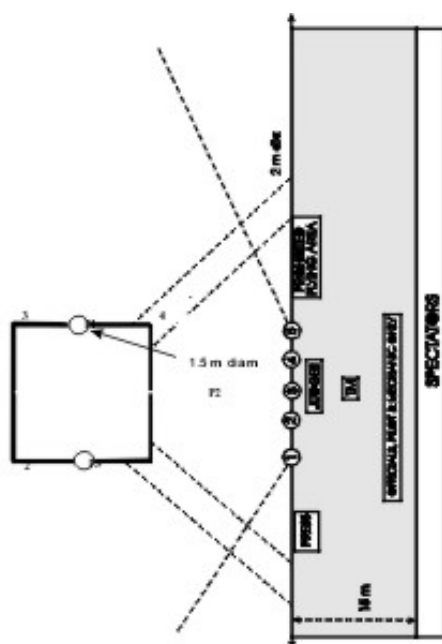
#### **5.5.5.3 General Characteristics of R/C Electric Powered Helicopters**

- a) AREA: The swept area of the lifting rotor cannot exceed 300 dm<sup>2</sup>. For helicopters with multiple rotors whose rotor shafts are more than one rotor diameter apart the total swept area

of both rotors cannot exceed  $300 \text{ dm}^2$ . For helicopters with multiple rotors whose shafts are less than one rotor diameter apart the swept area of both rotors ( counting the area of superposition only once) cannot exceed  $300 \text{ dm}^2$ .

- b) WEIGHT: The weight of the model aircraft is not limited.
- c) POWER SOURCE: The power source for the electric motor shall consist of 30 or fewer rechargeable cells. Primary, that is, non-rechargeable cells are prohibited. The no-load voltage of the power pack must not exceed 42 volts. No battery change is allowed during the flight. In case the voltage is measured, this shall be done at the moment the preparation time for the pilot starts. After the measurement has been taken, the pilot is allowed 5 minutes preparation time as per 5.5.5.12
- d) GYROS: An electronic rate gyro is permitted on the yaw axis only.
- e) ROTOR BLADES: All-metal main or tail rotor blades are prohibited.
- f) Any device for the transmission of information from the model aircraft to the pilot is prohibited.

#### 5.5.5.4



#### 5.5.5.5 Number of helpers

Each competitor is allowed only one mechanic/caller. The mechanic/caller must announce the name, start and finish of each manoeuvre. He may inform the pilot of wind direction, remaining flight time, proximity to prohibited areas and intrusions into the flight area. The mechanic/caller must not act as a coach and is not allowed to operate the radio equipment of the competitor.

Team managers may observe the flight from a position 5 metres behind the judges and away from the start box. Team managers may serve as a mechanic/caller if no separate person is available for this task.

#### 5.5.5.6 Number of model aircraft

The number of model aircraft eligible for entry is two (2). Model aircraft 1 and 2 may only be exchanged within the start box..



#### **5.5.5.7 Number of flights**

At Continental and World Championships, each competitor is entitled to four (4) official preliminary flights. After completion of the preliminary flights, the top 10 placing or twenty per cent (whichever is greater) of the competitors are entitled to three fly-off flights. At national and Open International competitions the preliminary/fly-off system is not mandatory.

#### **5.5.5.8 Definition of an official flight**

There is an official flight when the competitor is officially called. The flight may be repeated at the Contest Director's discretion when for any unforeseen event outside the control of the competitor, the model aircraft fails to make a start, such as:

- a) the flight cannot safely be made within the allowed time limit;
- b) the competitor can prove that the flight was hindered by outside interference;
- c) judging was impossible for reasons beyond the control of the competitor (model aircraft, battery or radio failures are not considered to be outside the control of the competitor). In such cases the flight may be repeated immediately after the attempt, during the same round or at the end of the round, at the discretion of the Contest Director.

#### **5.5.5.9 Scoring**

Each manoeuvre is given a score between 0 and 10 (including half) points by each judge. This score is multiplied with the K- factor of the manoeuvre. A new score sheet is issued for each competitor for each round. Only the competitor's number (no name or nationality) will appear on the score sheet. Any manoeuvre not completed shall be scored zero (0) points. There shall be an official located on the field where any flight over the prohibited area can be observed. The prohibited area is the shaded area in Figure 5.5.5.4.A, behind the judges' line. The area extends to infinity to the left, right and rear. A visual or audible signal shall be given to indicate such overflights. Competitors overflying this area will be penalised by scoring zero (0) points for the current flight. However, the judges shall score all manoeuvres. If an infringement has been made, the scores will be deleted from all score sheets after the flight. In addition, there shall be no score when:

- a) the competitor flies a model aircraft that has been flown in the same competition by another competitor, or flies a model aircraft that does not comply with the definition and general characteristics of a radio controlled electric powered helicopter as stated in 5.5.5.3.;
- b) the competitor does not deliver his transmitter to the impound or operates his transmitter during a round without permission;
- c) the competitor starts his model aircraft outside the start box;
- d) the competitor gets his transmitter from the impound before he is officially called.

#### **5.5.5.10 Classification**

After the completion of four official (preliminary) rounds, the best three scores will be used to determine the team standings. The top 10 or twenty per cent (whichever is greater) of all competitors (rounded up in the case of an odd number) then compete in three fly-off rounds to determine the final individual classification. The results of the best three preliminary rounds (normalised to 1000 points) will count as one score. This score, plus the three fly-off scores provide four scores with the best three to count for the final individual classification. The fly-offs to determine the individual classification are required only for Continental and World Championships. If the competition is interrupted during the preliminary rounds, the final classification will be determined by counting all completed preliminary rounds and dropping the lowest. If the competition is interrupted during the fly-off rounds, the final individual classification

will be determined by counting all completed rounds plus the results from the preliminary rounds. All scores each round will be normalised by awarding 1000 points to the highest scoring flight.

The remaining scores are then normalised to a percentage of the 1000 points in the ratio of actual score over the score of the winner of the round. If only one round is possible then the classification will be based on that one round.

For example:

$$\text{Points}_{(x)} = \frac{\text{Score}_{(x)}}{\text{Score}_{(w)}} \times 1000$$

Where  $\text{Points}_{(x)}$  = Points awarded to competitor x

$\text{Score}_{(x)}$  = Score of competitor x

$\text{Score}_{(w)}$  = Score of winner of the round

Ties for any of the first three places will be broken by counting the highest throwaway score. If the tie still stands a "sudden death" fly-off must take place within one hour.

#### 5.5.5.11 Judging

At Continental and World Championships the organiser must appoint a panel of five judges for each round. The judges shall preferably be of different nationalities and be elected from a list of persons who are approved by the National Airsports control and the CIAM. The final score of each flight is obtained by deleting the highest and lowest scores for each manoeuvre from the five judges. At open or other International Competitions the number of judges may be reduced to a minimum of three with no throwaway scores.

- a) There shall be training flights for judges with a debriefing session immediately before a Continental or World Championships.
- b) The scoring system must be organised in such a way that the competitors and spectators can clearly see the scores awarded by all judges after each flight. The score sheet notation must be written by the judges themselves.

#### 5.5.5.12 Organisation

TRANSMITTER AND FREQUENCY CONTROL (See Section 4b, Paragraph B.8)

##### FLIGHT ORDER

The flight order for the first preliminary round will be determined by a random draw, taking into account that frequency will not follow frequency and team member will not follow team member of the same team. The flight order for rounds two, three and four will start at the first, second and third quarter of the initial order. The flight order for each fly-off round will be established by a separate random draw.

##### FLIGHT PREPARATION

A competitor must be called at least five minutes before he is required to enter the start box. A start box two metres in diameter will be provided away from the flight line, spectators, competitors and model aircraft (see Figure 5.5.5.4A). For security reasons, the battery pack must be connected only when the model aircraft is in the start box. When the previous competitor's flight time reaches five minutes the flight line director gives a signal. The competitor is given five minutes to make last minute adjustments. The model aircraft may be hovered in the start box only up to eye level and must not be rotated beyond 180 degrees left or right relative to the competitor. If the model aircraft is rotated beyond 180 degrees the flight is terminated. If the competitor is not ready after the five minutes preparation time, he is allowed to complete his adjustments in the start box; however, his flight time will have started at the end of the five minutes interval. When the previous competitor has terminated his last manoeuvre, the flight line director gives the signal that the competitor may leave the start box. He or his helper may carry the model aircraft directly to the central helipad.

## FLIGHT TIME

The flight time of nine minutes begins when the competitor leaves the start box with the permission of the flight line director and the judges or if the five minute preparation time has ended. If the allotted time expires before the schedule is completed, the remaining manoeuvre(s) will be scored zero and the competitor is required to land his model aircraft as soon as possible.

## RESTRICTIONS

The competitor may carry or fly his model aircraft directly to (and land on) the central helipad after he leaves the start box. If the model aircraft is not carried by the competitor or his helper, it must be flown with the skids or landing gear at eye level without practicing manoeuvres (no rotations beyond 180 degrees relative to the competitor). Once the model aircraft is on the central helipad, no more adjustments are permitted and the flight must be started.

### 5.5.5.13 Manoeuvre Schedules

The flight program for each round consists of a maximum of six (6) manoeuvres out of the 18 proposed in the following two lists. The pilot must select two manoeuvres from list 1 (hovering manoeuvres) and two manoeuvres from list 2 (aerobatic manoeuvres). Two more manoeuvres may be selected from list 1 and/or list 2. Each manoeuvre is assigned a K-factor to be used as multiplication factor for the scores between 0 and 10 given by the judges (see 5.5.5.9. Scoring).

#### List 1 (hovering manoeuvres)

11: Hovering, 5 seconds	K = 1
12: Lateral hovering	K = 2
13: Tail-in Circle	K = 3
14: Hovering M	K = 3
15: Vertical Triangle	K = 4
16: Node	K = 4
17 : Pirouette	K = 4
18: 4-point Pirouette	K = 5
19: Nose-in circle	K = 6

#### List 2 (aerobatic manoeuvres)

21: Horizontal flight	K = 1
22: Horizontal circle, radius 25 m	K = 2
23: Looping,	K = 3
24: Landing with 180 degree Turn	K = 3
25: Pushover	K = 4
26: Split-S	K = 4
27 : Autorotation	K = 4
28: Roll	K = 5
29: Autorotation with 180 degree turn	K = 6

### F5C Manoeuvre drawings see Annex 5 B

### 5.5.5.14 Performance of the Schedules

At the beginning of each flight, when the pilot or his helper has prepared the model aircraft on the central helipad, the judges are informed of the manoeuvre numbers and names in the order the pilot plans to fly them. The order announced at the beginning of the flight is determined by the pilot respecting the following rules:

- All hovering manoeuvres must be in one sequence.
- All aerobatic manoeuvres must be in another sequence.
- The order of the two sequences is determined by the pilot.
- Once the order of the manoeuvres is announced to the judges and the flight has started, it may not be changed.
- The pilot may select different manoeuvres for every round.

For any of the manoeuvres, the competitor must stand in the 1,5 metre circle (labelled P1 - P3 in Figure 5.5.5.4A, Contest Area Layout) assigned to the corresponding manoeuvre (see Description of Manoeuvres in Annex 5 B). The pilot may choose to stand somewhere else (two (2) points downgrade) and he may also follow the model aircraft (score divided by two (2)). See Annex 5 C.

The pilot must execute each announced manoeuvre only once during a flight. The name (number) and start and finish of each manoeuvre must be announced by the competitor or his caller. A manoeuvre performed out of sequence will result in a zero score for that manoeuvre.

Before the start of the first hovering manoeuvre the competitor must land the model aircraft on the central helipad and reposition it once. The model aircraft may face left or right but must be parallel with the judges' line. The manoeuvres must be executed as announced before starting the flight. If the model aircraft is repositioned between hovering manoeuvres the next manoeuvre will receive a zero score.

All aerobatic manoeuvres must be performed in an airspace that will them to be clearly seen by the judges. This airspace is defined by a field of view up to 60 degrees above the horizon and between lines 60 degrees to the right and left of judges 1 and 5. The non-observance of this rule will be penalised by a loss of points. The aerobatic manoeuvres must be performed in a smooth flowing sequence, with a manoeuvre performed on each pass before the judges. There are no restrictions on turnaround manoeuvres. During the aerobatic manoeuvre sequence, the competitor is allowed only two passes before the judges without executing a manoeuvre (free passes). After the third free pass, all following aerobatic manoeuvres will be scored zero points.

#### **5.5.5.15 Manoeuvre descriptions**

Refer to Annex 5 C

#### **5.5.5.16 Judges' Guide**

For the Class F5C, see Annex 5 D, F5D Judges' Guide

### **5.5.6. F5D ELECTRIC POWERED PYLON RACING MODEL AIRCRAFT**

#### **5.5.6.1 General**

General Rules 5.5.1. and Contest Rules 5.5.2. are applicable except where otherwise stated.

#### **5.5.6.2 Technical Specifications**

##### **a) *Model Aircraft***

Minimum weight.....1'000 g

Maximum surface loading.....65 g/dm<sup>2</sup>

##### **b) *Battery***

Battery is limited by either weight or number of cells.

Type of battery.....NiCd or NiMH

○ Maximum weight.....425 g incl. soldering, insulations, cables and connectors.

○ Maximum number of only cylindrical cells..... 7; maximum size .....1/1 SubC

*Definition of SubC size:*

Maximum diameter: 24 mm

Maximum length (including pole): 45 mm

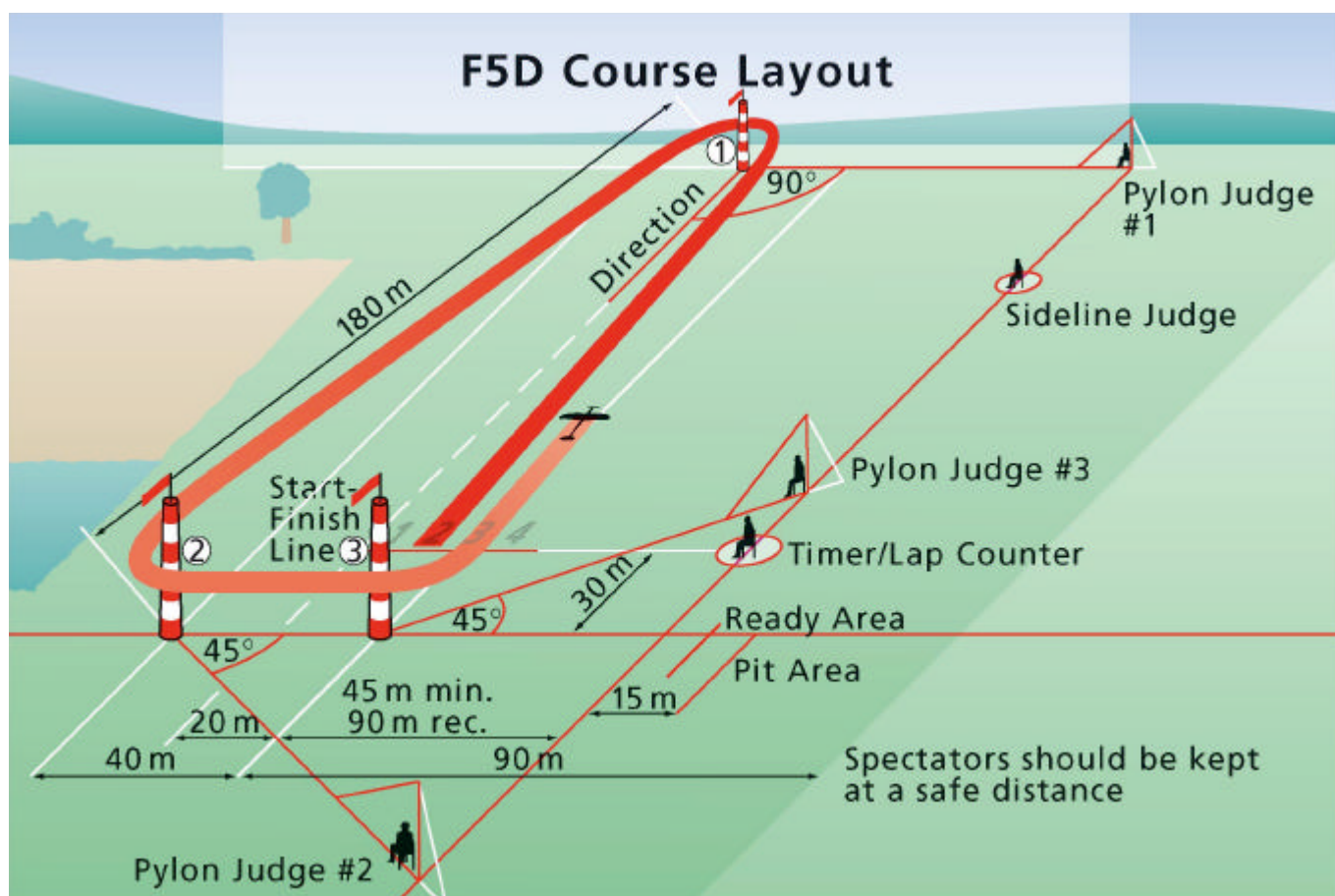
- c) Each competitor may use a maximum of three model aircrafts during the contest.
- d) Any one model aircraft may not be used by more than one team, nor may roles be interchanged in a team.

**5.5.6.3 Safety rules**

- a) All officials (timekeepers, lap counters and pylon judges) must stay in a minimum of 45 m outside of the course on the spectators side.
- b) A Sideline Judge will be posted in the front on the pit area on the spectator side of the racing course. The Sideline Judge will record as an infringement, any over flight of the pit or spectator areas.
- c) All officials on the race course and all competitors must wear a crash helmet with a chin strap.
- d) The racecourse specification may be modified in the interest of safety.
- e) The contest director has the right to request any competitor to make a flight to demonstrate the airworthiness of his model aircraft and/or his ability to fly the airplane around the course. If during the race, the contest director considers any model aircraft to be flying erratically, dangerously or so low as to endanger the other competitors, callers and officials, he may disqualify the competitor from that heat or from all heats and require the model aircraft to be landed immediately. Persistent flying below the top of the pylons may be considered dangerous.
- f) For transmitter and frequency control see Section 4b, Para. B.8. Heats shall be arranged in accordance with the radio frequencies in use to permit simultaneous flights. Each competitor has to introduce two different frequencies, distant of a minimum of 20 kHz, which he must be able to use on all the model aircraft entered in the contest.

**5.5.6.4 Racing Course Specification**

The triangular course will be laid out as follows: the distance between pylon No. 1 and No. 2 is 180 m. The distance between pylon No.1 and No. 3 is also 180 m. The distance between pylon No. 2 and pylon No. 3 is 40 m. The start/finish line is some 30 m from No. 3 in the direction of No. 1. The course is ten (10) laps with individual length of 400 m. Total distance length is 4 km. The race starts at the start/finish line. All takeoffs will be hand launched; no mechanical device will be used. The race is terminated at the start/ finish line 10 full laps later. The pylons must have a minimum height of 4 m and maximum of 5 m.



#### 5.5.6.5 Helper/Caller

- All competitors must be accompanied by only helper (caller/mechanic) for reasons of safety. The caller can be the team manager, another competitor from the same team, or a third party. The pilot or mechanic of one team may act as helper in one or more other teams.
- He may release the model aircraft at the start and give the pilot verbal information regarding the flying course of his model aircraft and official signals.
- In all cases the caller must be the holder of an FAI licence not necessarily issued by the NAC of the pilot and must have paid the entry fee.

#### 5.5.6.6 Officials

- Each competitor shall be assigned four (4) officials during each heat:
- One official, the timekeeper/lap counter will time the competitor's aircraft for the required ten laps. In doing so, he will count the laps flown and advise the pilot by visual or audio system when he has completed the necessary ten laps. He will keep the recorded time on his timing device until he has entered the time on the score sheet.
- At the No.1 pylon there will be one official as pylon judge and signaller for each competitor in the heat. The pylon judge/signaller will stand perpendicular to the direction of the course on the safety side of the course. Each pylon signaller will have a distinctive colour allocated, and the contest director will arrange for each model aircraft to be identified by one pylon judge - signaller before the start of every heat.

- d) The pylon judge - signaller will have his flag in a ready position, or his light off as the aircraft reach midcourse between No. 3 and No. 1 pylons, or earlier. At the instant the model aircraft draws level with the No.1 pylon he will briskly lower his flag or switch his light on. There will be no pilot's helpers at any of the pylons.
- e) Note: Signals may be coloured flags, lights or shutters.
- f) Pylon judge No. 2 is placed behind the base of the triangle at a safe distance in a 45 degrees angle to the line between pylon 2 and 3.
- g) Pylon judge No. 3 is placed at a safe distance in a 45 degrees angle to the line between pylon 2 and 3 in the direction of pylon No. 1.
- h) The judges at the No. 2 and No. 3 pylons will record pylon cuts (infringement). At the end of each race the sideline and pylon Judges will inform the starter of any infringements by any competitor.
- i) The starter is in charge of each heat. He will first ensure that all competitors and officials are ready to commence. Each signaller will have a flag or light of a distinctive colour. The starter will arrange for each model aircraft to be identified by one signaller before the start of any heat. A radio operation check from each competitor will be made prior to identification.

#### **5.5.6.7 Starting procedure**

- a) Starting positions in all races will be determined by draw with No.1 position being closest to the No. 2 pylon. Model aircraft will be flagged off the starting line at 1 second intervals with timing commencing when the model aircraft crosses the start/finish line.
- b) A maximum of one minute will be allowed after identification of all model aircraft of the heat at which point the race will commence. A competitor whose model aircraft is not ready to fly at the end of the one minute period, will be disqualified from the heat.
- c) No competitor shall be permitted to launch once the first model aircraft has passed the start/finish line heading from No. 1 to No. 2 pylon on the first lap and no time shall be given him for that heat.
- d) After the starting flag has dropped, any contact between two model aircraft shall be considered a collision and the model aircraft involved must land immediately. The Contest Director is required to give such competitors a second opportunity to record a score in that round, provided that in his opinion the aircraft is still airworthy or the competitor has an airworthy reserve model aircraft.
- e) A penalty will be incurred if the competitor releases the model aircraft before the drop of the starter's flag, cuts a pylon or flies outside the sideline. Two infringements constitute disqualification for that flight.

#### **5.5.6.8 Operation of the race**

- a) All laps are to be flown counter-clockwise with turns to the left.
- b) At the completion of the ten laps, the lap counter/timekeeper must immediately instruct the competitor to remove his aircraft from the course.
- c) In the event of a malfunction of the timing, lap counting, signalling or such equipment which is the responsibility of the organisers, the competitor(s) affected by such malfunction shall be given the opportunity to record a score for that round.
- d) The loss of any part of the model aircraft after the drop of the flag and before the motor stops disqualifies the model aircraft for that flight except as a result of a collision when Para. 5.5.6.7, d applies.

#### 5.5.6.9 Scoring

- a) As many heats as practical will be flown but at least three.
- b) The flight of each model aircraft shall be timed with electronic stopwatch or timing device measuring to at least 1/10 second by a lap counter/timekeeper. Timing shall start when the model aircraft crosses the start/finish line for the first time.
- c) The lap counter/timekeeper stops his stopwatch or timing device after ten laps have been completed by the competitor. The elapsed time of each competitor will be transmitted, supervised by the Contest Director (CD), from the stopwatch or timing device into the competitor's score sheet.
- d) At the completion of each heat, the pylon and side-line judges notify the CD as to which model aircraft have infringed. The CD then advises the person who is responsible for the score sheet of those who will record the total number of infringements for each competitor on the individual score sheet.
- e) The score sheets are then processed by a scorer who will:
  - if one infringement has incurred, add 10% of the flyer's time for ten laps to give the corrected time;
  - if two or more or intentional infringements were incurred, cancel the flight;
  - round the competitor's corrected time to the nearest 1/10 of a second.
- f) Points shall be awarded after each race as follows:
  - the competitor's score is his corrected time in seconds to the first decimal place;
  - if a competitor fails to complete his flight or is disqualified the score shall be **200**.
- g) The winner of the event is the competitor who has accumulated the lowest score after the conclusion of all heats. If four or more rounds are flown, each competitor's worst score shall be discarded. If nine or more rounds are flown, each competitor's worst two scores shall be discarded.
- h) If time permits, and there is no frequency conflict, ties for first, second and third place shall be resolved by a fly-off race. If not, the places are shared.



### **5.5.7 F5E – Solar Powered Model aircraft (provisional)**

Same rules as F5B, except:

#### **5.5.7.1 Model Aircraft specifications**

Power source.....solar cells only

Maximum surface.....75 dm<sup>2</sup>

Maximum voltage.....42 V

No kind of buffer in the power system may be used.

#### **5.5.7.2 Distance Task**

The Distance Task must be completed within 600 seconds from the moment the model aircraft is hand launched.

### **5.5.8 F5F – 10 Cell Motor Gliders (provisional)**

Same rules as F5B except:

#### **5.5.8.1 Model Aircraft specifications:**

Minimum weight (ready to fly)...1500g

Minimum surface area.....36 dm<sup>2</sup>

Maximum surface loading.....75 g/dm<sup>2</sup>

Type of battery.....NiCd or NiMH

Maximum number of cells.....10

Size of only cylindrical cells....1/1 SubC

Definition of SubC size:

Maximum diameter: 24 mm

Maximum length (including pole): 45 mm

### **5.5.9 F5G – Big Gliders (provisional)**

#### **5.5.9.1 Definition**

This contest is a duration and landing event for electric powered semi scale gliders.

#### **5.5.9.2 Model aircraft specifications:**

Minimum wingspan.....3.75 m

Maximum weight.....7.5 kg

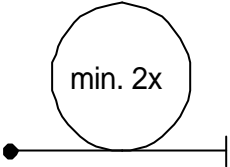
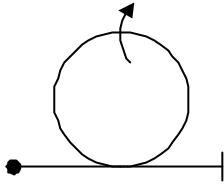
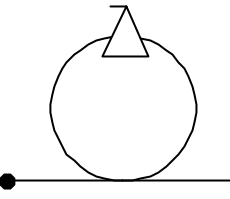
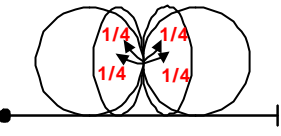
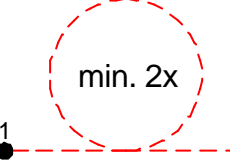
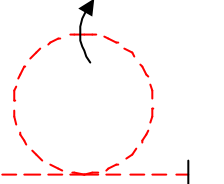
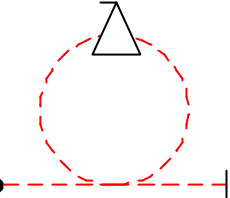

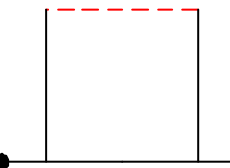
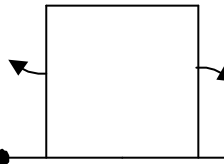
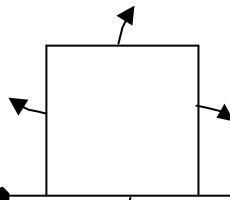
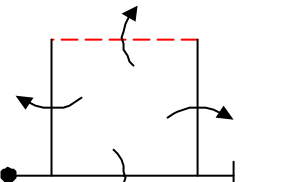
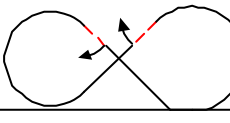
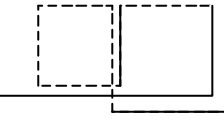
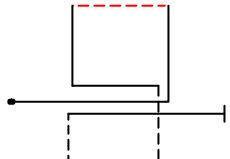
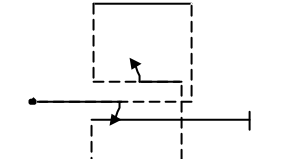
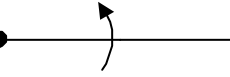
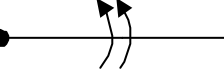
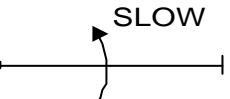
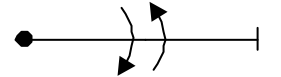




### 5.5.9.3 Duration and landing task

- a) The duration task consists of 600 seconds gliding time and 30 seconds additional (free) motor run time.
- b) The duration task starts from the moment the model aircraft is hand launched or started by a rubber catapult and ends with the first touch of the ground.
- c) If more than 60 seconds motor run time are used, one point will be deducted for each full second flown in excess of 600 seconds.
- d) The competitor has to decide how much and how often he will switch on the motor.
- e) Gliding time is cumulative and one point will be awarded for each full second the model aircraft is gliding.
- f) Additional points will be awarded for landing; when the model aircraft first touches the ground in one of the three concentric landing circles as follows:
  - 30 m diameter circle.....10 points
  - 20 m diameter circle.....20 points
  - 10 m diameter circle.....30 points

No additional points will be awarded if the landing occurs more than 630 seconds after beginning of this task.

# ANNEX 5A

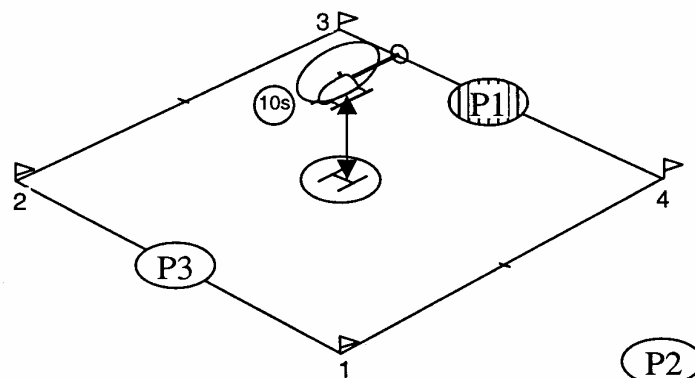
## F5A Manoeuvre drawings

No.	Basic Manoeuvre	Option 1	Option 2	Option 3
1				
2				
3				
4				
5				
6				

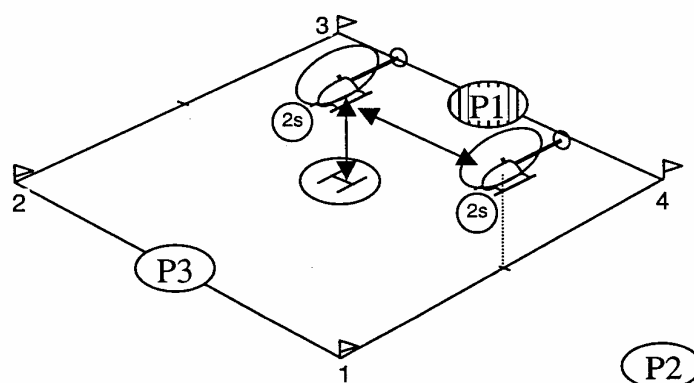
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14				

### 5F.3 Pictures of manoeuvres

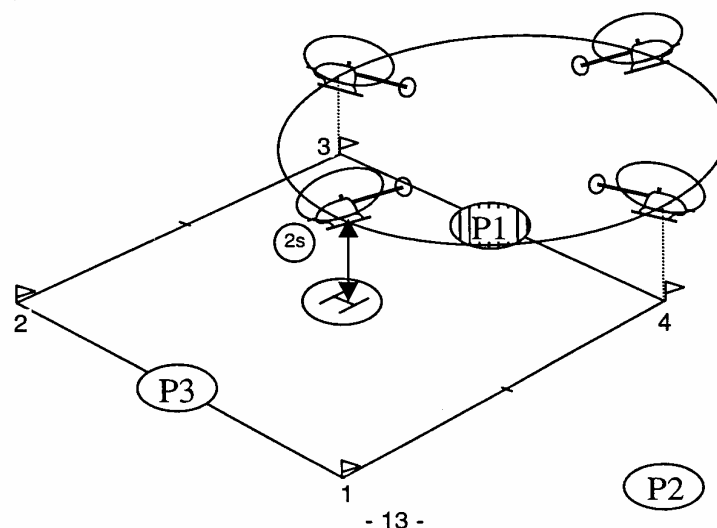
#### 11: Hovering



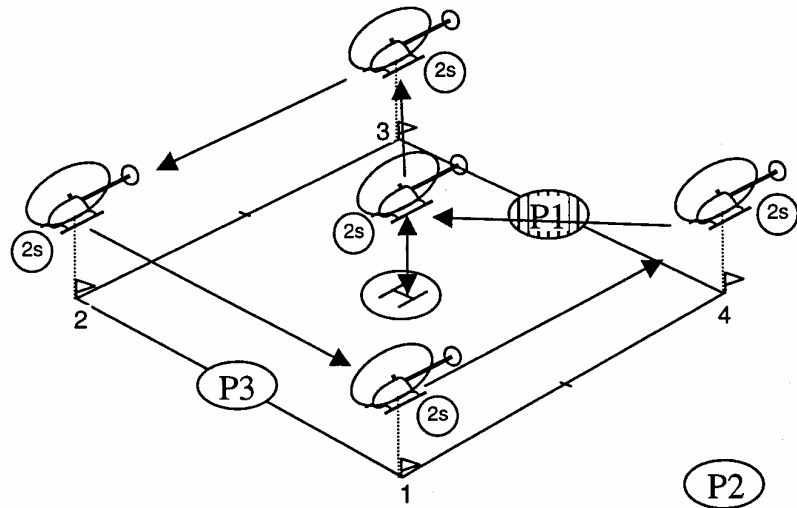
#### 12: Lateral hovering



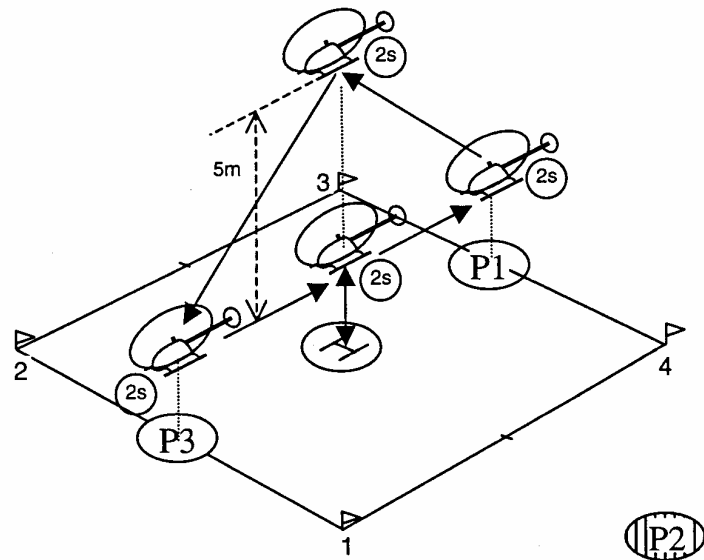
#### 13: Tail-in Circle



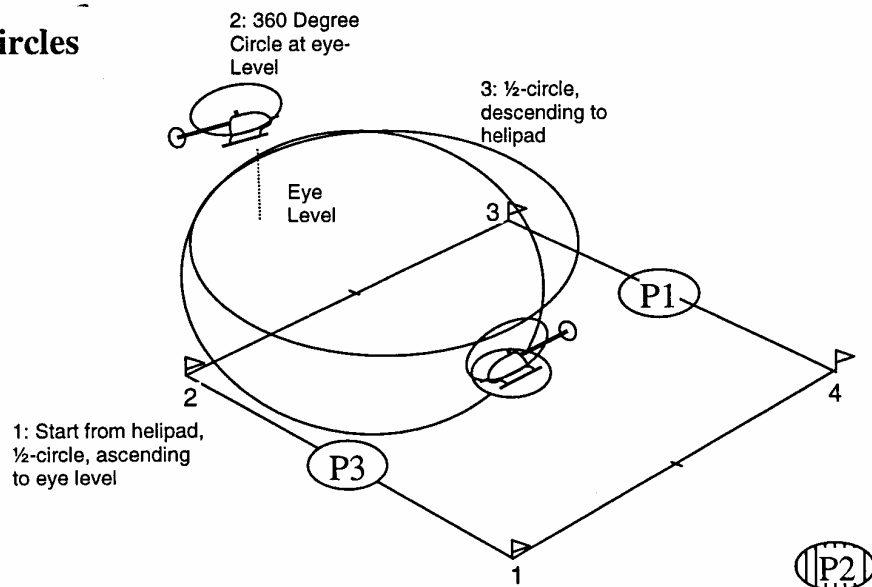
## 14: Hovering M



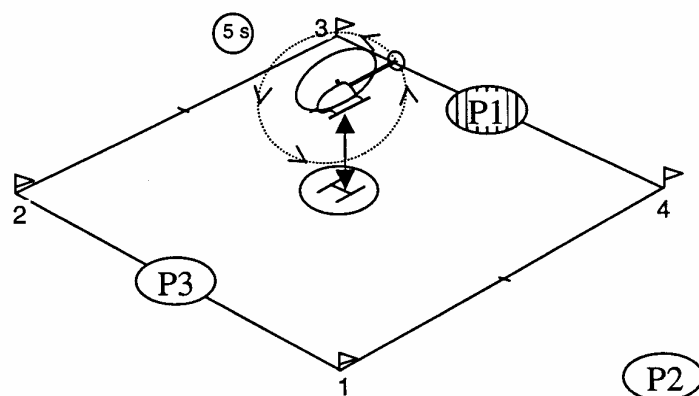
## 15: Vertical Triangle



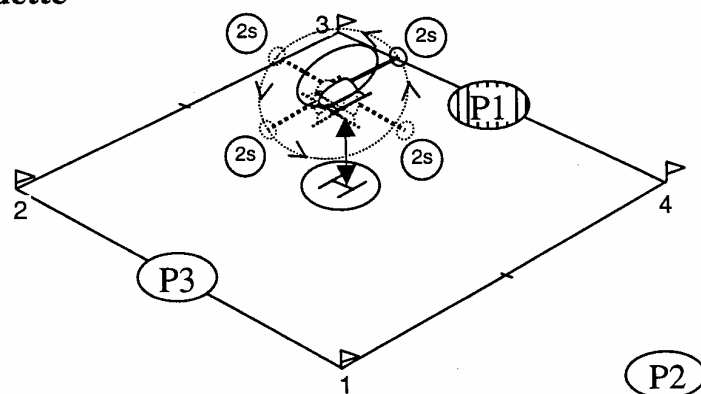
## 16: Circles



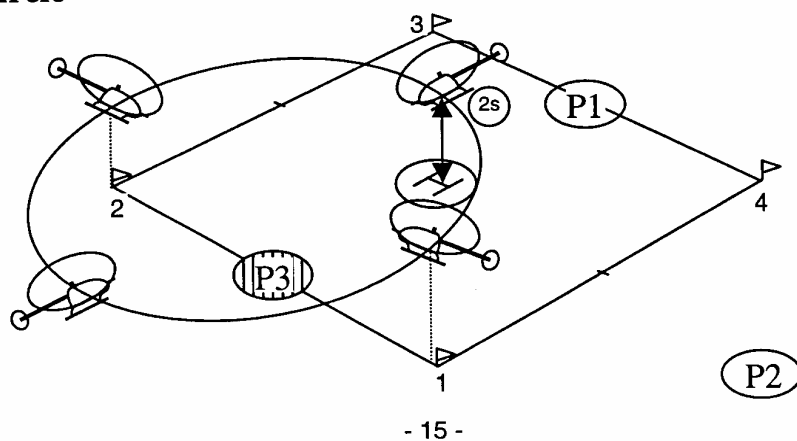
## 17: Pirouette



## 18: 4-Point Pirouette

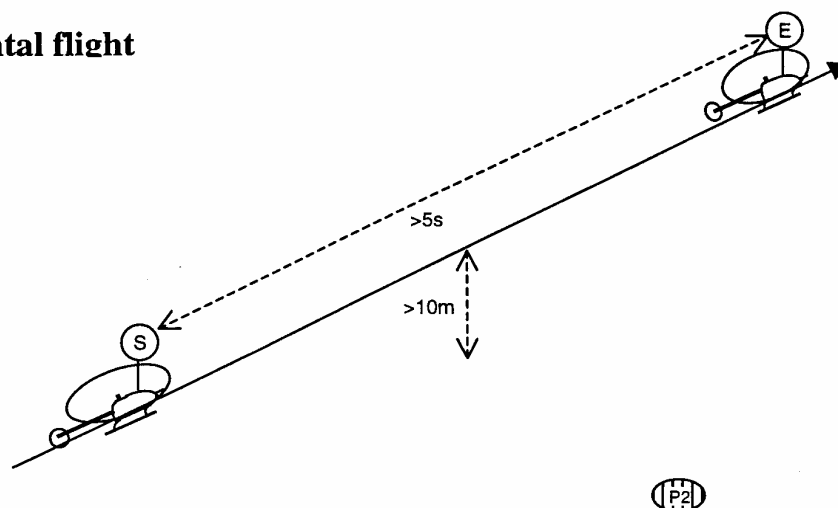


## 19: Nose-in circle

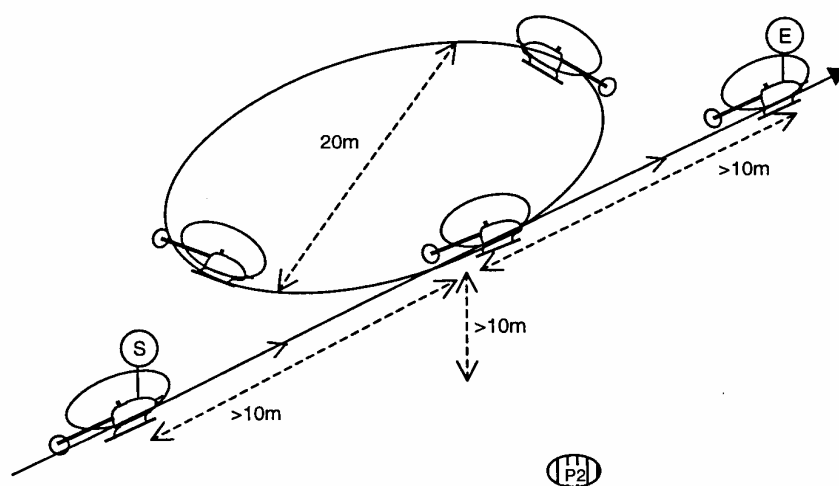


- 15 -

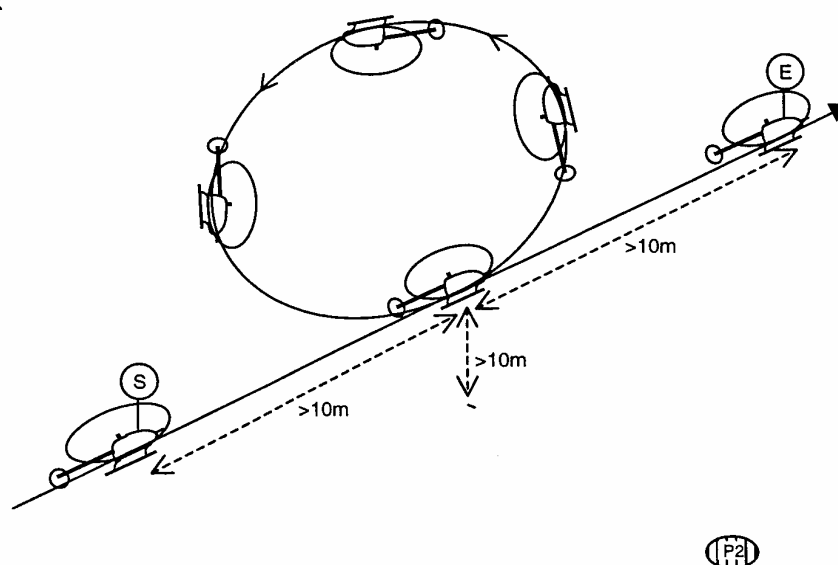
## 21: Horizontal flight



## 22: Horizontal circle

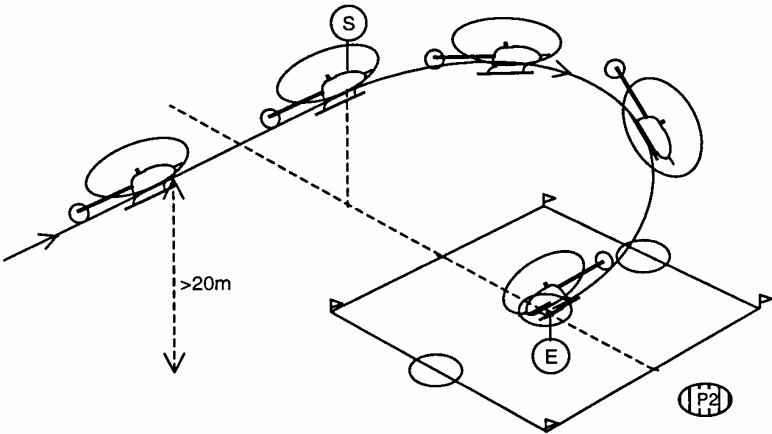


## 23: Looping

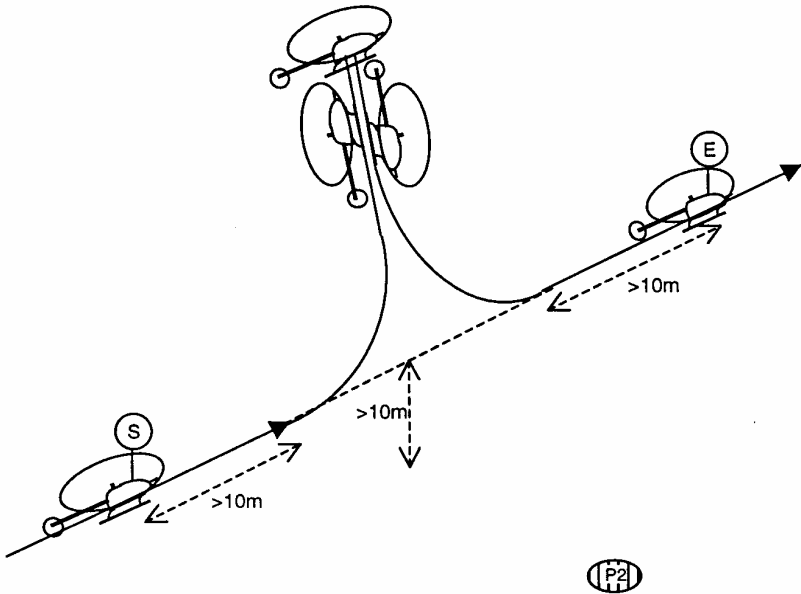




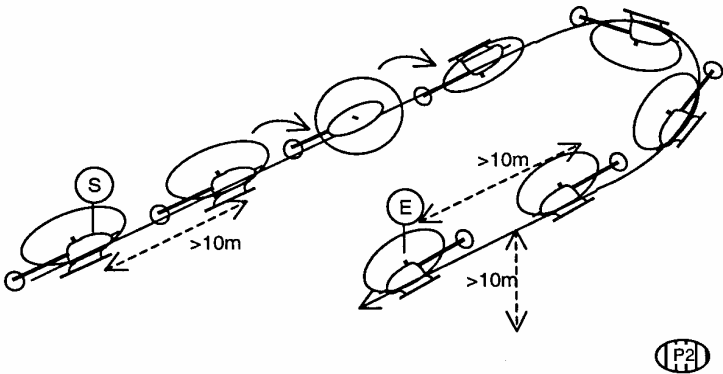
**24: Landing with 180 Degree Turn**



**25: Pushover**



**26: Split-S**



## **ANNEX 5 C**

### **F5C MANOEUVRE DESCRIPTIONS**

#### **5 B.1 GENERAL**

The following descriptions apply to all manoeuvres. If they are not executed as described, the score must be downgraded. If a manoeuvre is unrecognisable the score shall be zero (0) points. The hovering manoeuvres must be started with the nose of the model aircraft facing left or right and must be flown as a unit (the starting heading must be the same for each hovering manoeuvre). The competitor must stand in the 1,5 metre diameter circle assigned to the manoeuvre and stay there until the manoeuvre is finished. If the competitor does stand somewhere else than in the circle assigned to the manoeuvre he is executing, the score is downgraded by two (2) points for this manoeuvre. If a competitor quits his place during a manoeuvre (that is, follows the model aircraft) the score of the corresponding manoeuvre is divided by two (2). The competitor may change his position and switch engine power off while moving between every manoeuvre without being downgraded. The flight time clock is not stopped during the repositioning of the pilot.

One (1) point shall be deducted from the maximum score of ten (10) for each of the following criteria if not true:

General criteria for hovering manoeuvres:

- Ascents from and descents to, the central helipad must be vertical and continuous.
- Landings must be smooth and centred on the helipad.
- During all aerobatic manoeuvres the competitor must maintain his model aircraft above a minimum altitude of 10 metres.
- Aerobatic manoeuvres must be centred within the 120 degree horizontal field of view.
- Aerobatic manoeuvres must be executed in parallel to the judges' lines.
- Aerobatic manoeuvres flown at a distance greater than 100 metres from the judges' line will be downgraded.

The F3C Judges' Guide provided in Annex 5E is applied for Class F5C as well.

#### **5 B.2 Description of manoeuvres**

In case of a dispute the following text takes precedence over the pictorial form of the figures in 5F.3. The scoring of the manoeuvres is based on the description below. To reach the maximum score, the pilot must fulfill the general criteria in 5F.1 for each manoeuvre as well.

**11: Hovering, 10 Seconds, K = 1**

Position of pilot: Point P1. Model aircraft takes off from central helipad, climbs vertically to eye level and stops. Model aircraft hovers for ten seconds and then descends to a smooth landing on the central helipad.

Points will be subtracted for the following reasons:

- 1) The model aircraft hovers for less than 10 seconds.
- 2) The model aircraft quits its position while hovering.
- 3). Tail does not stand still or not point at the competitor.

**12: Lateral hovering, K = 2**

Position of pilot: Point P1. Model aircraft takes off from the central helipad, climbs vertically to eye level and stops. It then hovers laterally 5 metres until it reaches the line of the 10 X 10 metres square being nearest the judges. There it stops and hovers for 2 seconds. The model aircraft then hovers laterally until it is above the central helipad where it stops and hovers for 2 seconds. It will then descend and land smoothly on the central helipad.

Points will be subtracted for the following reasons:

- 1) Model aircraft is not always parallel to the judges' line.
- 2) Stop is not positioned exactly above the line of the 10 X 10 metre square.

**13: Tail-in Circle, K = 3**

Position of pilot: Point P1. Model aircraft takes off from central helipad, climbs vertically and stops. Then it begins hovering to the left or to the right, performing a circle with a radius of 5 m. When it reaches the central helipad, the model aircraft stops before descending and landing smoothly on the central helipad.

Points will be subtracted for the following reasons:

- 1) The tail of the model aircraft does not always point to the pilot.
- 2) The radius of the circle is not constant.
- 3) Speed and/or height is not constant while performing the circle.

**14: Hovering M, K = 3**

Position of pilot: Point P1. Model aircraft takes off from central helipad, climbs vertically to eye level and stops. Then it begins hovering to flag 4 (or 3) where it stops. The model aircraft then hovers forward following the line of the 10 X 10 metre square until it reaches flag 1 (or 2) and stops. It hovers laterally to flag 2 (or 1) and stops, before hovering backward to flag 3 (or 4) and stopping. The model aircraft then hovers to the central helipad where it stops before descending and landing smoothly on the central helipad.

Points will be subtracted for the following reasons:

- 1) The model aircraft is not parallel to the judges' line during the whole manoeuvre.
- 2) The stops are not performed exactly over the flags.
- 3) Hovering speed and/or height is not constant during the manoeuvre.

**15: Vertical Triangle, K = 4**

Position of pilot: Point P2. The model aircraft takes off from the central helipad and climbs vertically to eye level and stops. Model aircraft then flies backwards from the central helipad to the line of the 10 X 10 metres square and stops. Model aircraft then climbs forward at 45 degrees to an altitude 5 m above eye level directly over the central helipad and stops. Model aircraft then descends forward at 45 degrees to eye level directly over the opposite line of the 10 X 10 metres square and stops. Model aircraft then flies backwards to central helipad, stops and descends to a smooth landing on the central helipad.

Points will be subtracted for the following reasons:

- 1) Ascent and/or descent was not at 45 degrees.
- 2) The model aircraft did not maintain lateral position during the manoeuvre.
- 3) The stops are not exactly above the lines of the 10 X 10 Metres square or above the central helipad.
- 4) The model aircraft was not parallel to the judges' line during the manoeuvre.

**16: Circles. K = 4**

Position of pilot: Point P2. The model aircraft takes off from the central helipad, constantly ascending while describing a 180 degree circle with a diameter of 5 metres. When it reaches the middle of a line between flags 2 and 3, it is at a height of 5 metres. The model aircraft now starts a 360 degree circle with a diameter of maximum 10 metres, staying at 5 metres height. When this circle is completed, a 180 degree circle with radius 5 metres is performed while descending to the central helipad where it lands smoothly.

Points will be subtracted for the following reasons:

- 1) Model aircraft does not ascend or descend constantly while performing the 180 degree circles.
- 2) Model aircraft is too fast (this is a hovering manoeuvre).
- 3) Nose does not always point into flight direction.
- 4) Radius of 360 degree circle is more than 10 metres.

**17: Pirouette, K = 4**

Position of pilot: Point: P1. The model aircraft's tail must point to the pilot's position. Model aircraft takes off from the central helipad, climbs vertically to eye level and stops. It then performs a pirouette that lasts at least 5 seconds. The model aircraft then stops before descending and landing smoothly on the central helipad.

Points will be subtracted for the following reasons:

- 1) The model aircraft does not keep its position directly over the central helipad while performing the pirouette.
- 2) The pirouette is terminated in less than 5 seconds.
- 3) The pirouette is not performed at a constant speed and/or height.

**18: 4-Point Pirouette, K = 5**

Position of pilot: Point P1. The model aircraft's nose must point to the pilot's position. Model aircraft takes off from the central helipad, climbs vertically to eye level and stops. It then performs a 4-point pirouette, stopping for two seconds after each 90 degrees. When pointing with the nose to the pilot again, it stops before descending and landing smoothly on the central helipad.

Points will be subtracted for the following reasons:

- 1) The model aircraft does not keep its position directly over the central helipad.
- 2) The pirouette is not interrupted for at least two seconds after each 90 degrees.
- 3) The pirouette is not performed at a constant speed and/or height.

**19: Nose-in circle, K = 6**

Position of pilot: Point P3. The model aircraft nose must point to the pilot's position. Model aircraft takes off from the central helipad, climbs vertically to eye level and stops. Then it begins hovering to the left or right, performing a nose-in circle with a radius of 5 m. When it reaches the central helipad, the model aircraft stops before descending and landing smoothly on the central helipad.

Points will be subtracted for the following reasons:

- 1) The nose of the model aircraft does not always point to the pilot.
- 2) The radius of the circle is not constant.
- 3) Speed and/or height are not constant while performing the circle.

**21: Horizontal flight,  $K = 1$**

Position of pilot: Point P2. The model aircraft flies straight and level in at least 10 metres above ground for a minimum of 5 seconds with a speed requiring less collective pitch than hovering would.

Points will be subtracted for the following reasons:

- 1) Model aircraft does not fly a constant parallel line to the judges.
- 2) Height of model aircraft is not constant and/or less than 10 metres.
- 3) Speed of model aircraft is not constant and/or too slow.

**22: Horizontal circle, Radius 25 m,  $K = 2$**

Position of pilot: Point P2. The model aircraft flies straight and level for at least 10 metres with a speed requiring less collective pitch than hovering would. It then performs a horizontal circle with a radius of 25 metres.

Points will be subtracted for the following reasons:

- 1) Height of the model aircraft is not constant and/or less than 10 metres.
- 2) Speed of the model aircraft is not constant and/or too slow.
- 3) Circle is not round.

**23: Looping,  $K = 3$**

Position of pilot: Point P2. Model aircraft flies straight and level for a minimum of 10 metres. It then climbs for a loop while maintaining direction of flight. The model aircraft ends the loop and flies straight and level again for about ten metres on the same heading and altitude as at the start of the manoeuvre.

Points will be subtracted for the following reasons:

- 1) Loop is not round.
- 2) The finish of the loop ends on a different altitude or heading than the start.
- 3) Speed is not constant during the loop.
- 4) The model aircraft drifted toward or away from the judges.

**24: Landing with 180 Degree Turn,  $K = 3$**

Position of pilot: Point P2. Model aircraft flies at an altitude of no less than 20 meters. Manoeuvre begins when the model aircraft, crosses an imaginary plane that extends vertically upward from a line drawn from the centre judge out through the central helipad. The model aircraft must be descending at this point and the 180 degree turn must start. Turning and descending rate must be constant from this point to a point just before touchdown on the helipad. The flight path of the model aircraft must appear as a semi-circle of any radius when viewed from above, starting at the vertical plane and ending at a line drawn from the centre judge through the central helipad. The scoring criteria are the same as for figure 29 (Autorotation with 180 degree turn).

Points will be subtracted for the following reasons:

- 1) Model aircraft made a hard landing.
- 2) Model aircraft landed while it still had forward speed.
- 3) Model aircraft did not perform an exact 180 degree turn
- 4) Model aircraft did not maintain a constant rate of descent during the 180 degree turn.
- 5) Model aircraft did not maintain a constant turning rate during the 180 degree turn.
- 6) The flight path was stretched visibly to reach the helipad or the square (2 points deduction).
- 7) Model aircraft hovers more than briefly prior to landing.

**25: Pushover, K = 4**

Position of pilot: Point P2. Model aircraft flies straight and level for a minimum of 10 metres, then climbs vertically with a smooth 90 degree curve. When it comes to a stop a push over to hovering position should be made. After a brief hover, the model aircraft performs a new pushover to a vertical descent followed by a smooth 90 degree curve and a 10 metres straight flight at the same altitude as the start.

Points will be subtracted for the following reasons:

- 1) Climb and descent are not vertical.
- 2) The model aircraft does not hover on top of the manoeuvre.
- 3) Entry and exit of the manoeuvre are not at the same level.
- 4) The manoeuvre is not positioned at the middle of the line of the 10 X 10 metres square.

**26: Split-S, K = 4**

Position of pilot: Point P2. Model aircraft flies straight and level for a maximum of 10 metres, executes a half roll to the inverted position while maintaining the nose in the direction of flight. After a short straight flight segment, it performs a half inside loop and flies straight and level for a minimum of 10 metres.

Points will be subtracted for the following reasons:

- 1) No straight segment after half roll.
- 2) Exit heading is not opposite of entry heading.
- 3) Half loop did not start at the midline of the 10 X 10 metres square.

**27: Autorotation, K = 4**

Position of pilot: Point P2. The model aircraft flies at an altitude of no less than 20 metres and on a heading parallel to the flight line. The engine is powered off and the model aircraft performs an autorotation with a smooth constant rate of descent directly to the central helipad. The manoeuvre must be entered from forward flight. The descent path and the orientation of the model aircraft must be parallel to the flight line (including landing and the final stopped position). The scoring criteria are the same as for Figure 29 (Autorotation with 180 degree turn).

Points will be subtracted for the following reasons:

- 1) Model aircraft made a hard landing.
- 2) Model aircraft landed while it still had forward speed.
- 3) Flight path was stretched visibly to reach helipad or square (2 points deduction).
- 4) Model aircraft hovers more than briefly prior to landing.
- 5) Engine was still running during manoeuvre (zero score).

**28: Roll, K = 5**

Position of pilot: Point P2. Model aircraft flies straight and level for a minimum of 10 metres. Model aircraft executes a roll in either direction around an axis which coincides with the line of flight.

Points will be subtracted for the following reasons:

- 1) Model aircraft drifted toward or away from the judges.
- 2) Roll and/or flight speed is not constant.
- 3) The model aircraft loses altitude during the roll.
- 4) Inverted position during the roll is not centred in front of the judges.

**29: Autorotation with 180 Degree Turn, K = 6**

Model aircraft flies at a minimum altitude of 50 metres. Manoeuvre begins when the model aircraft crosses an imaginary plane that extends vertically upward from a line drawn from the centre judge out through the central helipad. Model aircraft must be in the autorotative state when it cuts this plane; the engine must be off at this point and the model aircraft must be descending. The 180 degree turn must be started at this point and the turning

and descending rate must be constant from this point to a point just before touchdown on the helipad. The flight path of the model aircraft must appear as a semi-circle of any radius when viewed from above, starting at the vertical plane and ending at a line drawn from the centre judge through the central helipad.

**Scoring criteria:**

The maximum score of 10 points can be achieved only when the model aircraft makes a smooth touchdown on the central helipad with the skids or landing gear completely inside the 1,5 m circle and parallel to the judges' line. A maximum score of 9 points can be obtained with a perfect landing inside the 1,5 m circle but with part of the landing gear touching the circle (rotor shaft must point to inside of the circle when viewed from above). If the model aircraft makes a perfect landing inside the 10 m square, the manoeuvre can achieve a maximum score of 8 points. If a model aircraft makes a perfect landing outside the 10 m square, a maximum score of 5 points can be awarded. If the flight path is stretched (flying parallel to the ground and/or the judges' line) to reach the square, line or helipad, the manoeuvre will be downgraded by two points.

Points will be subtracted for the following reasons:

- 1) Model aircraft made a hard landing.
- 2) Model aircraft landed while it still had forward speed.
- 3) Model aircraft did not perform an exact 180 degree turn.
- 4) Model aircraft did not maintain a constant rate of descent during the 180 degree turn.
- 5) Model aircraft did not maintain a constant turning rate during the 180 degree turn.
- 6) Flight path was stretched visibly to reach helipad or square (2 points deduction).
- 7) Model aircraft hovers more than briefly prior to landing.
- 8) Motor was still running during the manoeuvre

## ANNEX 5 D

### F5C JUDGES' GUIDE

#### General rules for the F5C elemental manoeuvres

At the beginning of each flight, when the pilot or his helper has prepared the model aircraft on the central helipad, the judges are informed of the manoeuvre numbers and names in the order the pilot plans to fly them. The order announced at the beginning of the flight is determined by the pilot respecting the following rules:

1. All hovering manoeuvres must be in one sequence.
2. All aerobatics manoeuvres must be in another sequence.
3. The order of the two sequences is determined by the pilot.
4. Once the order of the manoeuvres is announced to the judges and the flight has started, it may not be changed.
5. The pilot may select different manoeuvres for every round.

For any of the manoeuvres, the competitor must stand in the 1.5 meter circle (labelled P1-P3 in Figure 5.4.A – F5C Contest Area Layout) assigned to the corresponding manoeuvre (see description of manoeuvres in annex 5F). The pilot may choose to stand somewhere else (2 (two) points downgrade) and he may also follow the model aircraft (score divided by 2 (two)).

#### SCORING HOVERING MANOEUVRES

##### 11. Hovering, 10 Seconds (K=1)

#	Element	Max. Score
1	Lift off to eye level	2
2	Model aircraft does not hover 10 seconds over pad	2
3	Model aircraft does quit the position while hovering	2
4	Descend to pad	2
5	Overall impression	2

##### 12: Lateral hovering (K=2)

#	Element	Max. Score
1	Lift off to eye level, 2 seconds stop over pad	2
2	Laterally hover to the line of the 10 x 10 m square (near the judges)	2
3	2 seconds hover over line, laterally hover to the pad	2
4	2 seconds hover over pad, descend to pad	2
5	Overall impression	2



13: Tail-in circle (K=3)

#	Element	Max. Score
1	Lift off to eye level, 2 seconds stop over pad	2
2	Performing the circle with 5m radius	2
3	The model aircraft's tail does not always point to the pilot	1.5
4	Model aircraft speed and/or height is not constant while performing the circle	1.5
5	2 seconds stop over pad, descend to pad	2
6	Overall impression	1

14: Hovering M (K=3)

#	Element	Max. Score
1	Lift off to eye level, 2 seconds hover over pad	1
2	Hover to the flag 4 (or 3), 2 seconds stop	1
3	Hover to flag 1, 2, 3 (or 4), 2 seconds stop at each flag	3
4	2 seconds stop over pad, descend to pad	1
5	Hovering speed and height is not constant	1
6	Model aircraft is not parallel to the judge's line during the whole manoeuvre	1
7	Overall impression	2

15: Vertical Triangle (K=4)

#	Element	Max. Score
1	Lift off to eye level, 2 seconds hover over pad	2
2	Backward hover, 2 seconds stop over P1	1
3	45 Degree ascend, 2 seconds hover over pad	1.5
4	45 degree descend, 2 seconds hover over P2	1.5
5	Backward hover, 2 seconds hover over pad	1
6	Descend to pad	1
7	Overall impression	2

16: Circles (K=4)

#	Element	Max. Score
1	Ascend with 180 degree circle to eye level over flag 2	2
2	360 degree circle over flag 3, centre pad and flag 2	2
3	Descend with 180 degree circle to the centre pad	2
4	Ascend and descend is not constant during 180 degree circle	1.5
5	Speed during 360 circle is not slow and constant	1.5
6	Overall impression	1

17: Pirouette (K=4)

#	Element	Max. Score
1	Lift off to eye level, 2 seconds hover over pad	1.5
2	360 degree pirouette	1
3	2 seconds hover over pad and descend to pad	1.5
4	Pirouette is terminated in less than 5 seconds	2
5	Pirouette is not performed in a constant speed and/or height	1.5
6	Model aircraft is moving around during the pirouette	1.5
7	Overall impression	1

18: 4-Point Pirouette (K=5)

#	Element	Max. Score
1	Lift off to eye level, 2 second hover over pad	1.5
2	4 x 90 degree pirouette with 2 second stop	3
3	2 second hover over pad and descend to pad	1.5
4	Model aircraft does not keep it's position over pad	1
5	Pirouettes are not performed in a constant speed and/or height	1
6	Model aircraft is moving around during the whole manoeuvre	1
	Overall impression	1

19: Nose-in circle (K=6)

#	Element	Max. Score
1	Lift off to eye level, 2 seconds hover over pad	2
2	Performing the nose-in circle	2
3	Model aircraft's nose does not always point to the pilot	1.5
4	Model aircraft's speed and/or height is not constant while performing the circle	1.5
5	2 seconds hover over pad and descend to pad	2
6	Overall impression	1

21: Horizontal flight (K=1)

#	Element	Max. Score
1	Model aircraft does not fly a constant, parallel line to the judges	3
2	Height of the model aircraft is not constant or less than 10m	3
3	Speed of the model aircraft is not constant and/or too slow	1
4	Straight flight is less than 5s	1
5	Overall impression	2

22: Horizontal circle, radius 20m (K=2)

#	Element	Max. Score
1	10 meter level entry	1
2	Circle with 20m diameter	3
3	10m level exit	1
4	Height of the mode is not constant and less than 10m	1
5	Speed of the model aircraft is not constant or too slow	1
6	Position of the performed circle is not on the centreline of the 10 x 10 m helipad	1
7	Overall impression	2

23: Looping (K=3)

#	Element	Max. Score
1	10 meter level entry	1
2	Loop	2
3	10m level exit	1
4	The loop ends at a different point than it started	1.5
5	Speed is not constant during loop	1
6	Model aircraft drifted toward or away from the judges	1.5
7	Overall impression	2

24: Landing with 180 degree turn (K=3)

#	Element	Max. Score
1	180 degree descend to the centre pad	3
2	Landing*	5
3	Overall impression**	2

\* Includes:

Max. score = 5..... landing inside 1.5 meter circle

Max. score = 4..... landing with skids/landing gear touching inside circle

Max. score = 3..... landing inside 10 x 10m square

Max. score = 0..... landing outside 10 x 10m square

\*\* Includes:

Constant rate of descent, constant turning rate

25: Pushover (K=4)

#	Element	Max. Score
1	10 meter level entry	1
2	Vertical climb	1.5
3	Stall/pushover/2 second stop	3
4	Vertical dive	1.6
5	10 meter level exit	1
6	Overall impression	2

26: Split-S (K=4)

#	Element	Max. Score
1	10 meter level entry	1
2	Half roll	1
3	Recognisable inverted flight	2
4	Inside half loop	2
5	10 meter level exit	1
6	Half loop did not start at the midline of the 10 x 10m square	1
7	Overall impression	2

27: Autorotation (K=4)

#	Element	Max. Score
1	Straight constant descent to the centre pad	2
2	Landing	3
3	Model aircraft landed while it still had forward speed	1
4	Model aircraft hovers more than briefly prior to landing	1
5	Model aircraft is not descending parallel to the judge's line	1
6	Overall impression	2

28: Roll (K=5)

#	Element	Max. Score
1	10 meter level entry	1
2	Roll	2
3	10 meter level exit	1
4	Model aircraft drifter toward or away from the judges	1.5
5	The model aircraft loses altitude during the whole manoeuvre	1.5
6	Inverted position during roll is not centered in front of the judges	1
7	Overall impression	2

29: Autorotation with 180 degree turn (K=6)

#	Element	Max. Score
1	180 degree descending autorotation turn	3
2	Landing*	5
3	Overall impression**	2

\*Includes:

Max. score = 5.....landing inside 1.5 meter circle

Max. score – 4.....landing with skids/landing gear touching inside circle

Max. score = 3.....landing inside 10 x 10m square

Max score = 0.....landing outside 10 x 10m square

\*\*Includes: Constant rate of descent, constant turning rate.

## **ANNEX 5 E**

### **RULES FOR ELECTRIC FLIGHT (F5B, F5D) WORLD CUP EVENTS**

#### **1. General Rules**

- 1.1. The General Rules for FAI World Cup with all the principle points concerning the responsibility and the organisation of World Cup are written in the FAI Sporting Code, Section 4b, B.2.5.
- 1.2. The Open International Contest that could be nominated by the F5 Subcommittee as a World Cup contest are described in the FAI Sporting Code Section 4a (A.9) and 4b (B.2.1.).

#### **2. Procedure for nomination of World Cup Contests**

- 2.1. The Electric Flight World Cup will be organised in classes F5B (gliders) and F5D (pylon racing model aircraft) during the years in which there are no World Championships.
- 2.2. Requests for open international contests that are planned as World Cup contests must be checked by the Subcommittee Chairman before they will be published in the FAI International Contest Calendar.
- 2.3. Contests that are not published in the Contest Calendar could not be World Cup contests.
- 2.4. The Subcommittee Chairman collects results of each competition, produces and distributes the World Cup positions.
- 2.5. Both World Cups will be awarded at the CIAM Plenary meeting to winners or delegates of their NACs.

#### **3. Classification**

- 3.1. During a year, a maximum of three (3) contests will be counted. If a competitor flies in more than three contests, his three (3) best results will be allocated.
- 3.2. Not more than two (2) contests could be counted in the same country.
- 3.3. Points awarded at a World Cup Contest  
1st place = 100 points, 2nd place = 75 points, 3rd place = 60 points, 4th place = 50 points, 5th place = 40 points, 6th place = 30 points, etc.  
 $54 \text{ points} - R = \text{World Cup points}$  (R = individual ranking).