Mallilennokit ry

INDOOR RC FLYING SCALE MODELS

Rules for Competitions in Finland 2007

January 7 2007

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1 GENERAL RULES AND STANDARDS

1.1 Indoor RC Scale Class

Indoor RC Scale Class (IRCS) is a Finnish class for radio-controlled indoor flying scale models.

IRCS rules are based on FAI Sporting Code for Flying Scale Model Aircraft (F4). IRCS rules are, however, intended for indoor flying and they are in many aspects easier to follow than the international FAI F4C rules. IRSC is a class for beginners and experts alike. With an excellent flying score a competitor is able to compensate shortcomings in static judging.

1.2 Definition of Scale Model Aircraft

A scale model aircraft shall be a reproduction of a heavier than air, fixed wing (airplane) or rotary wing (helicopter), man-carrying aircraft. To indicate the subject full-size aircraft being modelled, the word “prototype” may be used.

1.3 Model Aircraft and Radio Equipment

Maximum flying weight of the model, including the source of energy, is 1000 g. The competition organiser may, however, according to their judgement, prohibit a dangerous model to participate the competition, regardless of the model’s compliance with the weight limit.

The model may be entirely built by the competitor or it may be based on a kit. Also the so called ARF-models may be used.

Internal combustion engines are not allowed.

Automatic flight stabilizing devices (e.g. gyros) are not allowed.

1.4 Competition Programme

Indoor RC Scale competition programme consists of a static judging and three (or, in some cases, two) flights.

Normally, three flights are flown. The points of the two best flights are added to the final result. The organiser may arrange for only two flights e.g. due to a tight schedule. In this case the points of both flights are added to the final results.

The organiser should try to arrange the static judging before the flights to avoid the influence of eventual flight damages to the static judging.

1.5 Judges

The organiser of an RC Indoor Scale competition shall appoint, in co-operation with the Finnish Organisation for Flying Scale Models (Mallilennokit ry), two judges to do the static judging and another two to judge the flying. In Finnish Championships the judges must be approved by the F4C subcomittee of the Finnish Aviation Association. It is recommended that in competitions held in Finland the judges come from various clubs. Of each pair of judges one judge may come from the organising club.

1.6 Remarks

a) All model aircraft shall become airborne in the manner of their prototype.

b) In the absence of suitable water surface conditions, model aircraft of seaplanes are permitted to use wheels or wheeled dollies for take-off. The release or dropping of a dolly immediately after take-off will not therefore be penalised. Deviation from scale because of the inclusion of permanently attached wheels, skids or similar non-prototype devices in the model aircraft structures will not be taken into consideration in static judging

c) No parts of a model aircraft, except propeller and spinner may be removed, nor may anything except a dummy pilot and antenna be added externally to the model aircraft, between scale judging and flying. Bombs, drop-tanks, etc. must be presented for static judging, but may be replaced before flying by simpler and repairable examples of the same shape, colour, size and weight.

Any infringement will result in disqualification. Additional non-prototype air inlets entries are permitted, provided they are covered by movable hatches for static judging; these hatches may be moved or opened manually prior to flight, or if in flight by means of radio control. Necessary repairs due to flight damage are permitted, but the maximum weight limit still applies.

The general rule is that the appearance of the model aircraft in flight must not be unduly affected.

d) A flying propeller of any form or diameter may be substituted for a scale propeller. The size, shape and colour of the spinner may not be changed. Substitution for a scale propeller relates only to powered propellers that were intended to propel the subject aircraft. If a model aircraft of a multi-engined aircraft uses non-powered (windmilling) propellers, these may not be changed between static and flying. Features such as for example, the small generator propeller on the nose of an aircraft such as a Me163, may likewise not be changed for flying propellers.

e) Metal bladed flying propellers are forbidden.

f) Explosives must not be dropped.

g) If, in an open cockpit model, a dummy pilot is not fitted, the K-factor of Realism of Flight shall be reduced to six (6). The dummy pilot may be present during static judging but will not be taken into account.

h) A measurement of weight may be undertaken in connection with static judging or immediately after the first flight of each Model aircraft. If found to be overweight, then zero points will be awarded for that flight and the model aircraft must be re-weighed after each subsequent flight.

1.7 Number of Model Aircraft

Each competitor may compete with up to two model aircraft. The score of the model with better final result is the competitor’s score.

1.8 Helpers

Each competitor is permitted one (1) helper during a flight. Helper must not touch the transmitter during an official flight. If a helper touches the transmitter the flight is scored zero.

1.9 Organisation of Scale Events

The organiser establishes the order of the static judging and flying in a neutral way.

The Chief Judge has the right to make decisions concerning safety. E.g. he may order a safety inspection of model aircraft.

In every competition there must be a jury. Jury consists of at least two people, the Director of the Event and Chief Judge.

Eventual protests must be filed in writing. The time limit for protests is determined by the organiser, generally starting from the time of publication of the final results. The protest fee is set by the organiser and it must not exceed the participation fee multiplied by 5. The protest fee is refunded if the protest is accepted.

1.10 Scoring

Each static item and flight manoeuvre will be awarded marks from 0 to 10, by each of the judges. Static items are judged using increments of half a mark and flight manoeuvres using

increments of one mark.These marks are multiplied by the appropriate K-factor in each case and added together. Items and corresponding K-factors are described in paragraphs 2.2 and 3.4.

The scores of static judging and all flights are normalised, separately, giving one hundred (100) points to the best performer. The score of the remaining competitors is calculated in proportion to the above mentioned best performer.

The final score is calculated by adding the normalised scores of the static judging and two flights together. If three flights have been flown the flight with the least score is ignored for every competitor.

If two competitors get equal final score the winner is determined by the flight score.

2 STATIC JUDGING

2.1 Documentation (Proof of Scale)

Proof of scale is the responsibility of the competitor. The extend of the documentation is not limited and there are no requirements for minimum documentation.

The exact name and model aircraft designation of the prototype shall be indicated on the entry form.

The scale of the model aircraf may be freely chosen. The scale shall be indicated in the entry form.

It is recommended that the documents folder includes the following documents:

a) **3-view drawing** with wing span at least 200 mm.

b) **Photographs.** The photographs may be color or black and white prints. They should be chosen to enable judging. Photographs are primary documents in case there are differences between drawings and photograps. At least one photograph should be of the particular prototype aircraft

c) **Colours and markings.** Proof of colour may be a real sample of the prototype (a piece of fabric covering). As this is seldom possible, a printed colour chart may be used. The chart must be originated from a credible source e.g. well known aviation magazine or an aviation history book. A color print photograph mentioned in b) above may also act as a proof of colour.

The competitor must give the judges a declaration about his/her own effort in building the model. An oral declaration is adequate.

2.2 Judging for Fidelity to Scale and Craftmanship

	K-factor
1. Scale accuracy	
Side view	9
End view	9
Plan view	9
2. Documents	
Photographs	3
3-view drawings	2
Proof of colours and markings	2
3. Colours and markings	4
4. Realism	4
5. Craftmanship	8
Total	50

The judging is done entirely at a distance of 3 m. Details not visible at this distance do not affect in judging.

2.3 Static Scoring

The points awarded by each judge are multiplied by the appropriate K-factors and the results are added together.

The static judges may discuss with each other while judging.

3 FLIGHTS

In judging the flight manoeuvres the restrictions of the flying space are to be taken into account. It is the competitor's responsibility to inform the judges in advance about any manoeuvre he intends to fly in deviant manner.

3.1 Official Flights

a) In a competition three flights are executed. Of these three flights two best scoring ones are taken into account in final results. The organiser has, however, right to limit the number of flights to two due to e.g. tight schedule. In this case the points of both flights are added to the final results. The organiser must provide every competitor equal possibilities to the official flights.

b If a competitor is unable to start or complete a flight and, in the opinion of the Contest Director, the cause is outside the control of the competitor, the Contest Director may, at his discretion, award the competitor a reflight. The Contest Director shall decide when the reflight shall take place.

c) An official flight commences at the earliest of the following:

- The competitor announces the beginning of the first manoevre (take-off).

- Two minutes after the competitor is instructed to start his flight.

If not otherwise agreed with the Chief Judge all manoeuvres must be performed parallel with the judges' line such that if any part of the manoeuvre is performed behind the judges' line it will score zero. Flying above spectators is in no case allowed. If a model aircraft is in the opinion of the Judges or Contest Director unsafe, or being flown in an unsafe manner, they may instruct the pilot to land.

The competitor must stay, with the radio transmitter, in the dedicated area during the flight. Contest Director informs the pilot if his model aircraft is flying outside the allowed flying area. Contest Director keeps record of these occurrences.

3.2 Flying Time

A competitor will be advised that he will be required to start his flight not less than 5 minutes before the instruction to start.

Timing of the flight will commence when the official flight commences.

The competitor will be allowed 4 minutes to complete his flight. If, however, the speed of the model aircraft is too low to be able to finish the flight in given time, the competitor may, before the flight, apply an extension to the flying time from the Chief Judge. The Judge shall award the extra time if the application is justified.

No points will be awarded for any manoeuvre that is not completed at the end of the time allowed.

3.3 Starting Time

If the model aircraft is not airborne within 2 minutes after the official flight and timing commence, the official flight will end and no points will be awarded for the flight.

Due to an unexpected fault in the model aircraft the competitor may ask for a reflight within 2 minutes from the official flight commence. The Chief Judge may, at his discretion, award the competitor a reflight.

3.4 Flight manoeuvres

Manoeuvre	K-factor
1. Take-off	8
2. Straight flight	2
3. Figure Eight	4
4. Descending 360° Circle	4
5. Option	4
6. Option	4
7. Option	4
8. Option	4
9. Approach and Landing	8
10. Realism of Flight	8
Total	50

The options selected may be any manoeuvres appropriate for the prototype.

The competitor must give the options and the order of them in writing to the judges. The competitor must also in advance declare the nature of his flight to the judges.

Each manoeuvre must be announced prior to commencement and called on commencement by the word ”NOW”. Completion of each manoeuvre must also be announced by the word ”FINISHED”.

The size and geometry of the manoeuvres may be adapted to the space available. For example, the landing may not take place in the centerline of the hall, or a rectangle may be flown symmetrically in respect to the judges. However, these deviations must be agreed with the judges in advance.

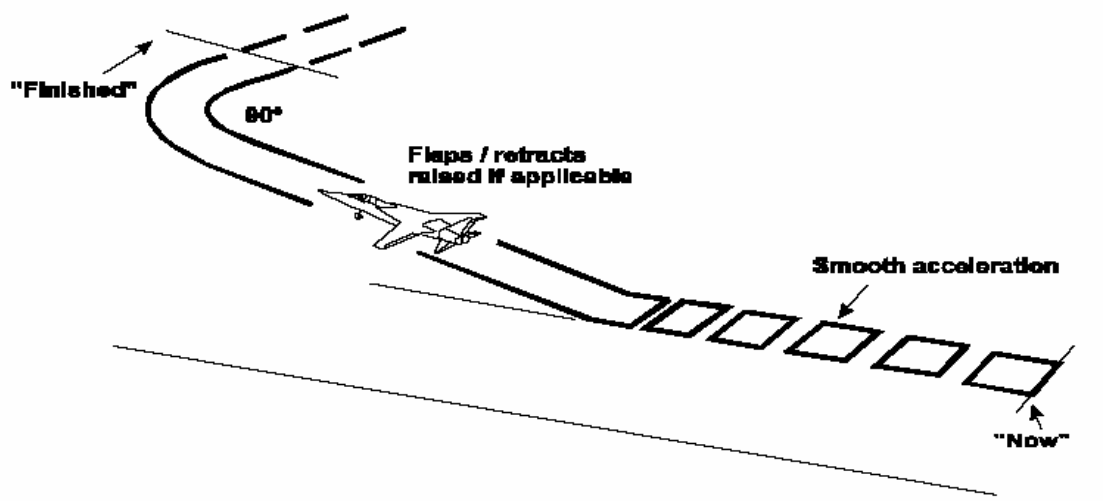
3.4.1 Mandatory Manoeuvres

3.4.1.1 Take-off

Description of take-off presented in this paragraph do not apply helicopters. It is the helicopter pilot’s responsibility to inform the judges in advance about the intended take-off procedure.

The model aircraft should stand still on the ground without being held. The take-off should take place in the direction agreed with the judges.If the model aircraft is touched after the word ”NOW” has been called the manoeuvre will score zero. The model should then accelerate in straight path to a realistic speed and lift gently from the ground, climb at an angle consistent with that of the prototype. The take-off is completed after the model aircraft has turned 90 degrees.

Flaps and retractable landing gear, if applicable, must be retracted during the climb-out.



Errors:

1. Model touched after calling ”NOW” (zero marks).

2. Swings on Take-off (a slight swing with other than a tricycle undercarriage is acceptable as the aircraft tail is raised).

3. Take-off run too long or too short.

4. Unrealistic speed / too rapid acceleration.

5. Inappropriate attitude at lift-off for undercarriage configuration.

6. Not a smooth lift-off.

7. Climb rate wrong (too steep or too shallow).

8. Nose attitude wrong during climb (nose too high or too low).

9. Wheels not raised if applicable.

10. Significant wing drop.

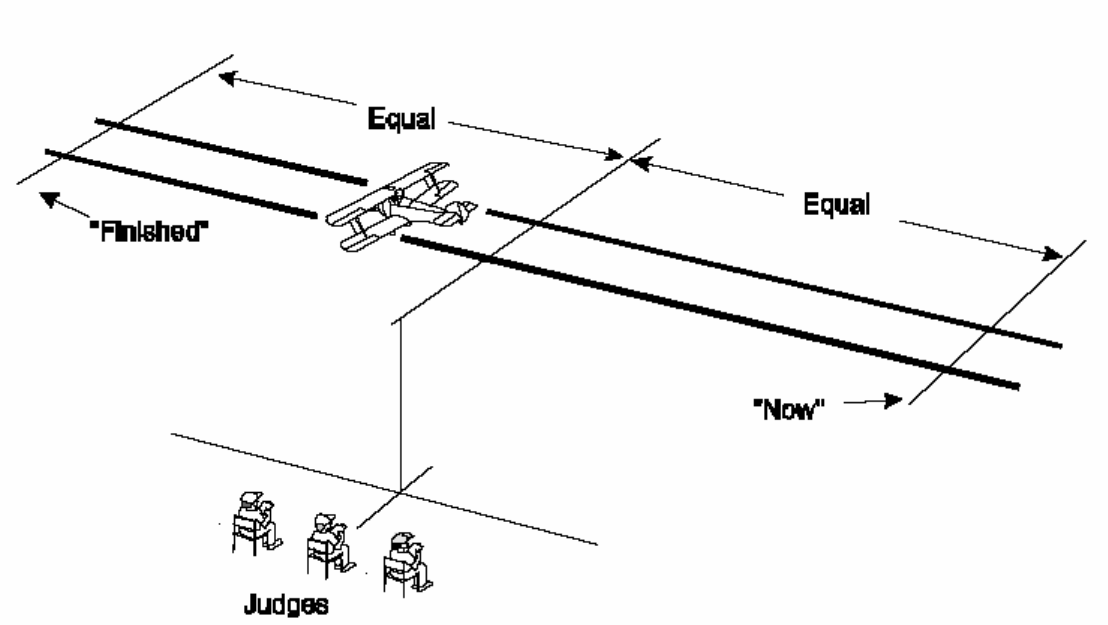
11. Climb-out track not same as take-off run.

12. Unrealistic rate of turn onto “crosswind” leg.

13. The intended 90° turn is not 90°.

3.4.1.2 Straight flight

Model aircraft should make a straight and level flight, centered on the judges’ position. The straight part of the flight should be as long as possible considering the space available, in any case several seconds.



Errors:

1. Not a straight course.

2. Not constant height.

3. Not pass over the landing area.

4. Not parallel with the judges’ line.

5. Too short a distance (too long is not an error).

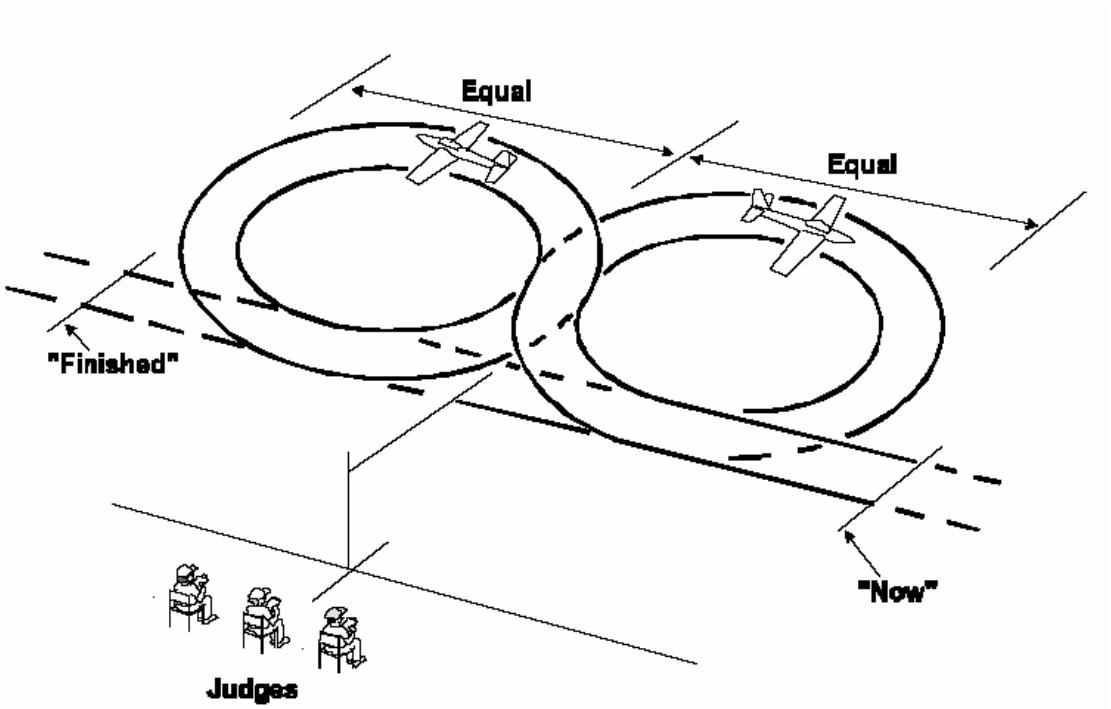
6. Model aircraft flight path not smoothand steady.

7. Too far away, too close, too high, too low.

3.4.1.3 Figure Eight

The model aircraft approaches in straight and level flight on a line parallel with the judges' line, and then a one-quarter circle turn is made in a direction away from the judges' line. This is followed by a 360-degree turn in the opposite direction, followed by a 270-degree turn in the first direction, completing the manoeuvre on the original approach line.

The intersection (mid point) of the manoeuvre shall be on a line that is at right angles to the direction of entry and passes through the centre of the judges' line.



Errors:

1. Entry into first circle not at right angles to original flight path.

2. Circles unequal size.

3. Circles misshapen.

4. Constant height not maintained.

5. Intersection not centred on judges' position.

6. Entry and exit paths not on same line.

7. Entry and exit paths not parallel with judges' line.

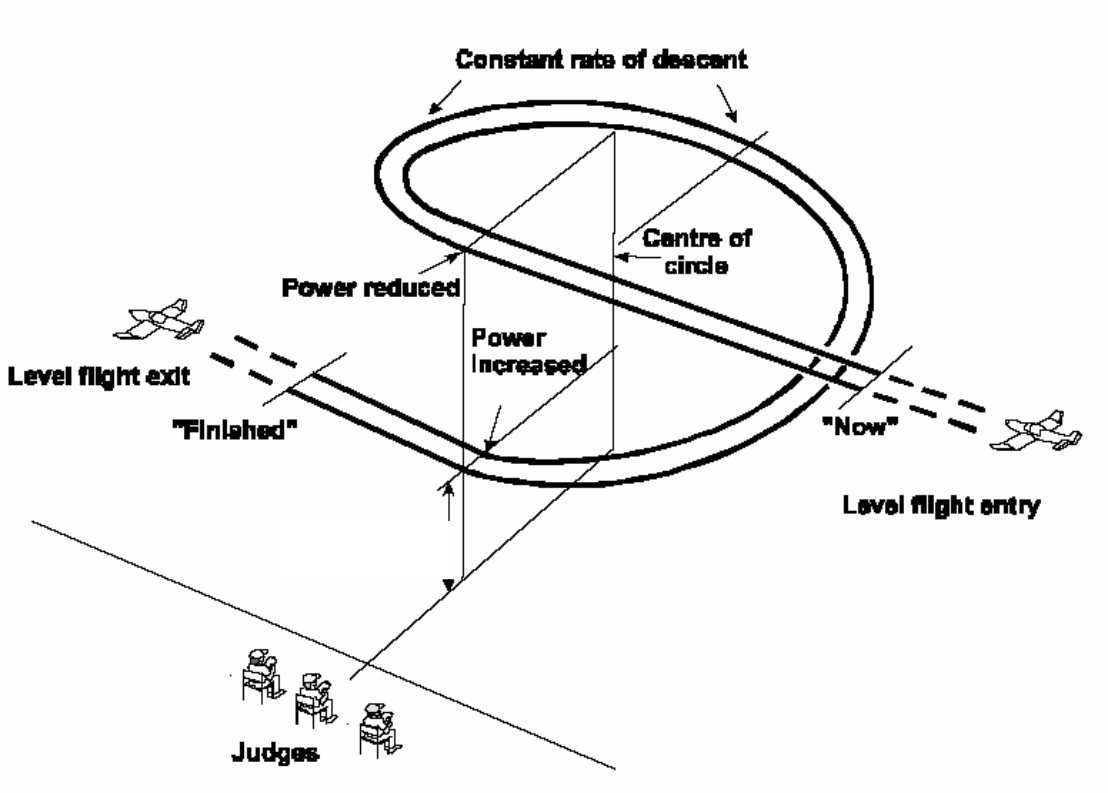
8. Overall size of manoeuvre not realistic for prototype.

9. Model aircraft flight path not smooth and steady.

10. Too far away/too close/too high/too low.

3.4.1.4 360° Descending Circle at Constant Low Throttle Setting

Commencing from straight and level flight, the model aircraft performs a gentle 360° descending circle over the landing area, in a direction away from the judges, at a constant low throttle setting. The manoeuvre terminates at a maximum height of 2 metres, resuming straight and level flight on the same path.



Errors:

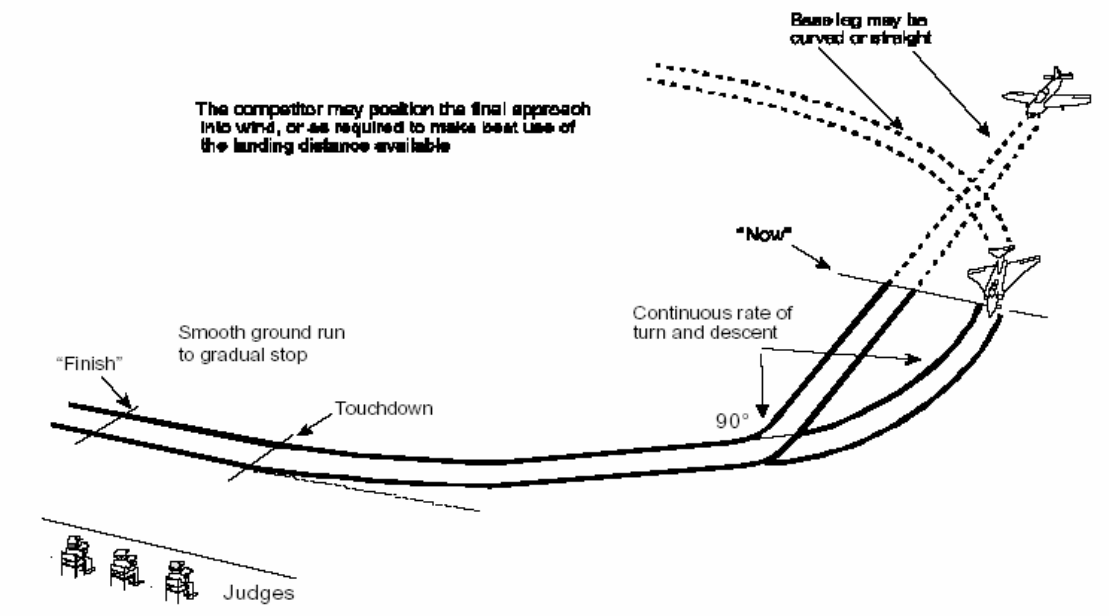
1. Rate of descent not constant.
2. Descent too steep.
3. Throttle setting not constant or low enough.
4. Circle misshapen.
5. No significant loss of height.
6. Model aircraft does not descend to 2 metres or below.
7. Circle not centered on judges' position.
8. Entry and exit paths not parallel with the judges' line.
9. Start and finish not called in straight and level flight.
10. Too far away, too close.

3.4.1.5 Approach and Landing

Description of approach and landing presented in this paragraph do not apply helicopters. It is the helicopter pilot's responsibility to inform the judges in advance about the intended landing procedure.

The manoeuvre commences by descending from base leg. Prior to this point the model aircraft may complete any form of appropriate circuit to achieve a landing configuration.

The base leg may be either straight or curved as required by the pilot. From the start position the model aircraft completes the turn through 90 degrees onto final approach. The model aircraft should round out smoothly, adopting the attitude applicable to the specific type and touch down without bouncing before smoothly rolling to a stop. An aircraft with conventional landing gear will make a three-point landing or will land on the main wheels and then gently lower the tail, as appropriate to the prototype. An aircraft with tricycle landing gear will land on the main wheels first and then gently lower the nosewheel.



Errors:

1. Manoeuvre does not commence on base leg.
2. Turn onto final approach not constant rate or not 90°.
3. Descent from base leg not smooth and continuous.
4. Model aircraft does not achieve correct landing approach prior to touchdown.
5. Model aircraft does not round out smoothly.
6. Model aircraft bounces.
7. Drops a wing during landing.
8. Touches wing tip on ground.
9. Does not come to a gradual and smooth stop after landing.
10. Does not adopt landing attitude appropriate to subject type.
11. Model aircraft runs erratically or turns after landing.
12. Model aircraft noses over (note 30% penalty if only nose-down - zero if it over-turns).

Note: A crash landing scores zero points, but if the model aircraft makes a good landing and then stops nose down towards the end of the landing run, then the landing marks that would have been otherwise awarded should be reduced by 30%.

If the nose down situation is solely the result of the roughness or seams of the floor, the above down marking will not apply.

Model aircraft with retractable landing gears, landing with one or more gears retracted should have the landing points reduced by 30%.

All landings ending with the model aircraft on its back will be considered a crash landing.

3.4.2 Optional Manoeuvres

The optional manoeuvres may be any manoeuvres appropriate for the prototype aircraft.

The flight may include only one optional manoeuvre demonstating mechanical functions of the aircraft, e.g. demonstrating rectractable landing gear. Manoeuvres m, n, o and p in the list below belong in this category. Manoeuvre q may belong into this category, too.

The competitor may select the oprional manoeuvres and the order in which they are to be flown. These must be shown on the score sheet and given to the judges before each flight. This order must be adhered to and any manoeuvre flown out of sequence will score ZERO.

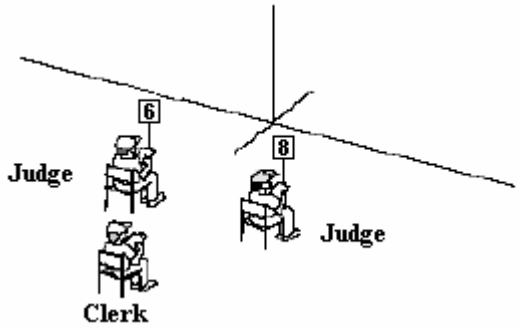
Examples of optional manoeuvres below. Most of the manoeuvres are described in FAI F4C Sporting Code.

a) Chandelle
b) Flight in triangular circuit
c) Flight in rectangular circuit
d) Flight in a straight line at constant height (maximum 1.5 m)
e) 360° ascending circle
f) Wingover
g) Horizontal circle
h) Procedure turn
i) Overshoot
j) Touch and go
l) Side slip
m) Extend and retract flaps
n) Extend and retract landing gear
o) Parachute
p) Dropping of bombs or fuel tanks:
q) Manoeuvre defined by the competitor
r) Flight in a straight line with one engine throttled (multi engine model)
s) Stall turn
t) Immelmann turn
u) Loop
v) Roll
w) Snap roll
x) Split S
y) Cuban eight
z) Half Cuban eight
å) Spin
ä) Inverted flight

3.5 Marking (flight points)

Each manoeuvre will be awarded marks from 0 to 10, using increments of one mark, by each of the judges during the flight. The manoeuvres must be performed in a plane and at a height that will allow them to be seen clearly by the judges. The non-observance of this rule will be penalised by loss of points.

The judges are seated apart from each other and may not discuss during the flight. "Realism of Flight" may be discussed by the Judges after completion of the flight. If, however, one of the Judges is considered a trainee Judge, the Jury of the competition may allow the Judges to be seated closer and discuss during the flight.



To make the contest more spectator friendly, the organiser may, if practical, arrange the indicating of the flight marks in the following way: During the flight a Records Clerk is seated behind the Judges. The Judges indicate the marks they award by raising an appropriate

number plate clearly visible to the Clerk and spectators immediately after each flight maoeuvre (see diagram above).

The marks given by the judges are multiplied by the appropriate K-factor in each case and summed up. The Clerk records the marks accordingly.

3.6 Safety

If a model aircraft is in the opinion of the Judges or Contest Director unsafe, or being flown in an unsafe manner, they may instruct the pilot to land immediately.

4 JUDGES' GUIDE FOR STATIC JUDGING

Before static judging commences the judges should review the whole entry at a distance not closer than 3 metres in order that a standard be established for grading the points to be awarded.

The documentation presented by the competitor should enable the Judges to judge all items mentioned in paragraph 2.2.

The judging is done entirely at a distance of 3 m. Details not visible at this distance do not affect in judging. No measurements are taken.

4.1 Colour and Markings

Correct colour may be established from colour photographs, from accepted published descriptions, from samples of original paint, or from accepted published colour drawings. Also check colours of national markings, lettering and insignia. Camouflage colour schemes should show the correct degree of merging of the shades.

Consideration should be given to the greater effort involved in reproducing multi-coloured finishes (or polished metal finish) compared to models which feature only one or two basic colours. Insignia and markings should be taken in account in this consideration.

Check the position and size of all markings and lettering. Check that the style and thickness of all letters and figures are correct. Check that any trim strips are of the correct dimensions and are correctly positioned. Check camouflage patterns.

Insignia and markings should be taken into account in judging both the accuracy and complexity of the model aircraft.

4.2 Realism and Craftmanship

The texture and appearance of the surface of the model should be a good reproduction of that of the prototype. Fabric covered types should be covered in the correct material, and the outline of stringers and wing ribs should be visible.

The appearance of the finish of the model should look realistic, weathering and signs of regular use are visible at a distance of 3 m. Pay attention to the right glossiness of the finish, too.

A well-documented highly detailed model should score proportionately more than a model with little detail (provided that the details are large enough to be visible at a distance of 3 m), even if the full-size prototype is itself sparsely detailed.

Consideration should be given to the competitor's own effort in building the model. The competitor gives an oral declaration about this matter. For example, a model built by other than the competitor or bought ready should not be awarded marks for craftmanship.

5 JUDGES' GUIDE – FLYING SCHEDULE

All flying manoeuvres must be judged bearing in mind the performance of the full size prototype. The aim of the scale flight schedule is to recreate the flight characteristics and

realism of the full-size aircraft. Judges must not therefore confuse scale contests with aerobatics contests

The errors mentioned under each manoeuvre in paragraph 3.4.1 cannot be an exhaustive list of all possible faults. They are intended to show the sort of mistakes that are likely during that manoeuvre. These errors examine each manoeuvre from three aspects:

1. The shape, size and technical requirements of the intended manoeuvre.

2. The positioning of the manoeuvre relative to the judges position or other datum.

3. The scale realism achieved relative to the subject aircraft.

It remains the responsibility of the judges to decide upon the importance of each error and deduct marks accordingly, always taking into account the characteristics of the full size aircraft.

Each manoeuvre must be announced prior to commencement and called on commencement by the word “NOW". All flying manoeuvres must be announced upon completion by the word "FINISHED".

The flying judges will be seated alongside the landing area in a line parallel with the larger dimension of the hall. This axis will be referred to as the “judges’ line”.

Unless there is a conflict with safety (e.g. the location of the spectators), and if the form and size of the space allows, take-offs and landings should be performed parallel to the judge line. This provision will also apply to manoeuvre Touch-and-Go since this consists of both a landing and take-off.

If any part of the manoeuvre is performed behind the judges’ line it will score ZERO. In the interests of safety, any manoeuvres overflying a designated area behind the judges’ line laid out for the protection of spectators, officials and other competitors or helpers, will score ZERO. If a model aircraft is in the opinion of the Judges or Contest Director unsafe, or being flown in an unsafe manner, they may instruct the pilot to land.

The positioning and the space occupied by individual manoeuvres should be proportional to that expected in a full size display typical to each prototype. Judges should down mark manoeuvres as too high, too low, too far away, or too close if they consider the positioning to be so.

“Realism in Flight" should be discussed by all judges after completion of the flight and they should attempt to arrive at an agreed score for this item. At the end of each flight, the Chief Judge must check all score sheets for completeness.