

FÉDÉRATION AÉRONAUTIQUE INTERNATIONALE

**SPORTING CODE
SECTION IV**



2004 Edition

Effective January 1st, 2004.

**VOLUME F4
FLYING SCALE MODEL AIRCRAFT**

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F4C - RADIO CONTROL SCALE

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VOLUME F4
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FEDERATION AERONAUTIQUE INTERNATIONALE
Avenue Mon Repos 24, 1005 LAUSANNE, Switzerland

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¹ FAI Statutes, Chapter 1, para. 1.6

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

³ FAI Statutes, Chapter 1, para 1.8.1

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

⁵ FAI Bylaws, Chapter 1, para 1.2.1

⁶ FAI Statutes, Chapter 2, para 2.3.2.2.5,

⁷ FAI Bylaws, Chapter 1, para 1.2.3

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

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

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

¹¹ FAI Statutes, Chapter 5, para 5.6.3

¹² FAI By laws, Chapter 1, para 1.2.2

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THIS EDITION INCLUDES THE FOLLOWING AMENDMENTS MADE TO 2001/2002 CODE

Paragraph	Plenary meeting approving change	Brief description of change	Change incorporated by
6.2.1.	2001	A SENTENCE IS ADDED TO PARA 6.2.1 AND 6.3.1 ABOUT TURBINE ENGINES AND NOISE MEASUREMENT READING: <u>“TURBINE ENGINES WILL NOT BE SUBJECT TO NOISE MEASUREMENT.”</u>	Narve Jensen
6.3.1.			
6.1.4. (6 th para)	2002	ADD: <i>“Within each panel of Judges (Static and Flying), there must be a common language.”</i>	Narve Jensen
6.1.4. (8 th para)	2002	ADD: “one in the static panel and one in the flight judges panel”	Narve Jensen
6.2.1.	2002	ADD sub b) to turbines and change old b) to c)	Narve Jensen
6.2.3.	2002	ADD: <i>and 6.2.7.O Taxi demonstration).</i>	Narve Jensen
6.2.11.	2002	Amend F4B Circle definition	Narve Jensen
6.3.8.	2002	CHANGE: passes over spectators TO: Crosses the Judges Line ADD: Exceptions from this rule are manoeuvres 6.3.1. Take-Off, 6.3.6.10 Landing and 6.3.7.m. Touch & Go. These manoeuvres have the right to be performed into wind as long as they do not overfly the spectator area. Spectators being anyone else than competitor, helper and officials at the flight line	Narve Jensen
6B.1. (7 th para)	2002	ADD: Competitor steps outside the 1.5 metre radius “Pilot’s Circle” will carry a warning by the Circle Marshall to the Competitor, but no penalty. If the Competitor steps outside the 3.0 metre radius “Penalty Circle” the manoeuvre will score ZERO.	Narve Jensen
6B.1.	2002	ADD AT THE END: After each flight, the Chief Judge will record any non-standard event that causes downgrading or loss of flight points. As examples: Missed figures, figures flown out of order, out of time, stepping outside the penalty circle, missing dummy pilot or crash landing, etc....	Narve Jensen
6B.2.6.8.	Missprint	The marks for engine <u>sound</u> should.....	Narve Jensen
6B.2.7.d.	2002	CHANGE TO: If bombs are carried internally, bomb-bay doors must be open and be closed after the drop. If bombs or fuel tanks are carried externally, they must be fitted in the correct position and in the correct manner. Dropping should be in the manner of the prototype. Dropping should be within clear view of the Judges and centred on the Judges position. Any special features of the manoeuvre should be declared to the Judges beforehand	Narve Jensen
6C.1.	2002	ADD AT THE END: After each flight, the Chief Judge will record any non-standard event that causes downgrading or loss of flight points. As examples: Missed figures, figures flown out of order, out of flight time, flying behind the ”Judges’ Line”, missing dummy pilot or crash landing	Narve Jensen

6C.3.6.11.	2002	DELETE: This should be discussed by all judges after completion of the flight and they should attempt to arrive at an agreed score for each item.	Narve Jensen
6C.3.6.11.	Missprint	The marks for engine <u>sound</u> should therefore.....	Narve Jensen
6C.3.6.11.	Missprint	Change: Realism in flight.....K=2 to <u>K=3</u> ref. 6.3.6.11.	Narve Jensen
Add new CLASS 6.4	2003	Outdoor Free Flight Scale F4A provisional class	Narve Jensen
New ANNEX 6D	2003	Judges Guide F4A Free Flight power	Narve Jensen

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 F4 changes can next be made at the 2004 Plenary meeting for application from January 2005.

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

VOLUME F4

F4B, CONTROL LINE SCALE

F4C, RADIO CONTROL SCALE

PART SIX - TECHNICAL RULES FOR FLYING SCALE MODEL AIRCRAFT CONTESTS

6.1 GENERAL RULES AND STANDARDS FOR STATIC JUDGING OF SCALE MODEL AIRCRAFT

6.1.1. Definition of Scale Model aircraft:

A scale model aircraft shall be a reproduction of a heavier than air, fixed-wing, man-carrying aircraft. The aim of scale contests is to recreate the accurate appearance and realism of the full-size aircraft as best appropriate to each model aircraft class. This shall apply equally to static judging and flight performance.

Note: To indicate the subject full-size aircraft being scale modelled, the word "prototype" may be used.

6.1.2. System of Rules

Rules are numbered as follows:

- 6.1. General rules and standards for judging Fidelity to Scale
- 6.2. Control Line Flying Scale Model aircraft
- 6.3. Radio Controlled Flying Scale Model aircraft

6.1.3. Competition Programme:

A competition programme for a particular event shall consist of part 6.1 plus the regulations for the specific event. Rules for the C/L events shall consist of 6.1. plus 6.2. and for the R/C events, shall be 6.1. plus 6.3.

The C/L event will commence with static judging, flying will start upon completion of this.

The R/C event will commence with flying on the first day of competition, with static judging commencing after the first model aircraft has been flown. Thereafter flying and static judging will be carried out concurrently, model aircraft being flown before being presented for static judging. No competitor will be required to fly more than one flight before being static judged.

6.1.4. Judges

The organiser of a Scale C/L World or Continental Championship (F4B) shall appoint five judges, of whom three will be nominated to do the static judging, but all five will judge the flying once static judging is complete.

The organiser of Scale R/C World or Continental Championship (F4C) shall appoint three (or six for two panels) judges to do static judging, plus a separate panel of five to judge the flying.

At other international flying Scale competitions, panels of three judges may be used for both flying and static.

Within each class (F4B and F4C) all the judges (static and flying) must be of a different nationality and selected from a list submitted by their NAC and approved by the CIAM.

In the case of World and Continental Championships, the flight and static judges panels shall contain at least one member of the Scale CIAM sub-committee. The CIAM Bureau must approve the two panels of judges prior to the World or Continental Championships.

Within each panel of Judges (Static and Flying), there must be a common language.

If there are more than 60 competitors in a World or Continental Championship, the organiser shall use two separate panels for static judging. If there are more than 40 competitors, the organisers are encouraged to use two separate panels for judging. Each panel will consist of three judges. The first panel will judge the points Scale Accuracy (6.1.10.1 – Side view, End view and Plan view). On completion of this, the second panel will judge the remaining aspects. (6.1.10. 2 - 6.)

When using two separate panels for static judging, the organiser is allowed to use two judges of the same nationality, one in the static panel and one in the flight judges panel

6.1.5. Coefficient

Where a K-factor (K) is noted, scores shall be awarded from 0 to 10 inclusive using increments of half a mark. The score shall then be multiplied by the K-factor (K).

6.1.6. 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 the scoring of Fidelity to Scale and Craftsmanship.
- 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 in flight by means of radio control. Necessary repairs due to flight damage are permitted, but the maximum weight limit still applies. 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.

Note: 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 the pilot of the prototype is visible from the front or from the side during flight, a dummy pilot of scale size and shape must be equally visible during flight in the model aircraft. If such a pilot is not fitted, the total flight score shall be reduced by 10%. The dummy pilot may be present during static judging but will not be taken into account.
- h) A measurement of weight must be undertaken immediately after the first flight of each Model aircraft. No modification of the model aircraft except exhausting of fuel and cleaning of the model aircraft is allowed, but any items which were dropped during the official flight (e.g. bombs, tanks), must be replaced on the model aircraft. If found to be overweight, then zero points will be awarded for that flight and the model aircraft must be reweighed after each subsequent flight. The officials responsible for weighing the model aircraft and the device to be used shall be available to all competitors for weighing prior to the first flight of the contest. The tolerance of the weighting equipment to be added to the maximum weight (i.e. C/L model aircraft max weight 6 kg, weight tolerance 15 grams gives total allowed weight of 6.015 Kg as maximum).
- i) Any model aircraft that, in the opinion of the judges or the Contest/Flight Line Director, appears to be noisy in flight will have to submit to a noise check after that flight. Turbine powered model aircraft are exempt from such noise checks. For details see sections 6.2.1 (F4B) and 6.3.1 (F4C). The organiser must provide all competitors with the possibility to conduct noise checks prior to the competition if competitors so request.

6.1.7. Number of Model aircraft

Each competitor may compete only with one model aircraft in any one category, Control Line or Radio Control.

6.1.8. Helpers

Each competitor is permitted one helper during the competition. In the case of multi-engines model aircraft one additional helper is permitted to assist in the starting of engines. For radio control events no helper may touch the transmitter during an official flight except for assisting in starting engine(s).

The timekeeper is responsible for watching that helpers do not touch the transmitter once the first manoeuvre has been called. If a helper touches the transmitter the flight is scored zero.

6.1.9. Documentation (Proof of Scale)

6.1.9.1. Proof of scale is the responsibility of the competitor.

6.1.9.2. The exact name and model aircraft designation of the prototype shall be indicated on the entry form, on the score sheet, and also in the "Proof of Scale" presentation.

6.1.9.3. The scale to which the model aircraft is built is optional, but it must be stated in the "Proof of Scale" presentation.

6.1.9.4. To be eligible for Fidelity to Scale points the following documentation must be submitted to the judges: -

a) Scale Drawings:

An accurate 3-view scale drawing of the full-size aeroplane, having a minimum span of 250 mm, and a maximum span of 500 mm. The drawings must be submitted in triplicate. Unpublished drawings by the competitor or other draftsman are not acceptable unless certified accurate in advance of the contest by an authoritative source such as the respective National Scale Committee or equivalent, builder of original aircraft, or other competent authority.

b) Proof of Colour:

Correct colour may be established from colour photographs, from accepted published descriptions if accompanied by colour chips certified by a competent authority, from samples of original paint, or from accepted published colour drawings, e.g. "Profile" type publications.

c) Photographic evidence:

At least three photographs or printed reproductions of the prototype, including at least one of the actual subject aircraft being modelled are required. Each of these photographs or printed reproductions must show the complete aircraft, preferably from different aspects. These main photos must be submitted in triplicate, the second and third copies may be photocopies.

d) Aircraft speed:

The cruising or maximum speed of the subject aircraft must also be included in the documentation, and repeated on all flight score sheets before each official flight starts.

e) Competitor's declaration:

The competitor must supply a declaration listing all components of the model aircraft he did not make himself. The competitor must also sign a declaration that he is the builder of the model aircraft entered. If found in violation the competitor may be disqualified from the contest.

6.1.10. Judging for Fidelity to Scale and Craftsmanship

K - Factor

1. Scale Accuracy	
Side view	10
End view	10
Plan view	10
2. Colour	
Accuracy.....	2
Complexity	1
3. Markings	
Accuracy.....	4
Complexity	2
4. Surface texture and realism.....	8
5. Craftsmanship	
Quality.....	7
Complexity	3
6. Scale detail	
Accuracy	5
Complexity	3
<u>Total:</u>	<u>K = 65</u>

Items 1 to be judged at a minimum distance of 3m in F4B, and 5m in F4C, from the nearest part of the model aircraft. Judges must not touch the model aircraft.

6.1.11. Static Scoring

For Flying Scale Contests the combined Fidelity to Scale and Craftsmanship points shall be the aggregate sum of points awarded by the three static judges. These static points shall be used for final scores classification only when the model aircraft has completed an official flight.

6.1.12 Organisation of Scale Events

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

The flying and static order of the various countries and competitors will be established by means of a draw before the start of the contest. Team Managers shall nominate their individual team members' order as first, second or third.

The flight order of the competitors will not be changed unless, in the case of R/C events, the organisers need to do so to avoid frequency clashes. There shall be no substitution of one team member's slot for another team member's slot.

The second flight round will start one-third the way down the flying order. The final round will be flown in ascending order with regard to the preliminary placing after two flight rounds and static.

Competitors must be called at least seven minutes for F4B and five minutes for F4C before they are required to occupy the starting area (see 6.2.4 flying time F4B).

6.2. CLASS F4B - CONTROL LINE FLYING SCALE MODEL AIRCRAFT

6.2.1. General Characteristics

Maximum surface area: 150 dm²

Maximum weight: The weight of the complete model aircraft in flying condition without fuel, but including any dummy pilot, shall not exceed 6 kg (except a model aircraft of a prototype using more than one motor which shall not exceed 7 kg).

Maximum loading: 150 g/dm²

Motive Power: a) Rockets or pulse jets may not be used.

b) The maximum thrust for a turbine motor shall be 10 kg.

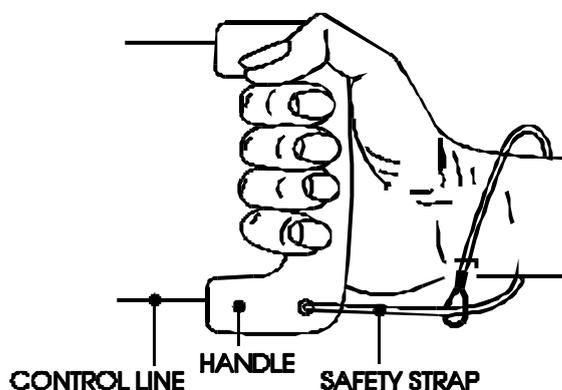
c) Electric motors: Maximum no load voltage of power source 42 volts.

If a model aircraft appears to be noisy in flight, the Judges or Contest / Flightline Director can demand a noise test. The transmitter and the model aircraft will then be impounded by the flightline official immediately following the flight. No modification or adjustment to the model aircraft shall be permitted other than refuelling. If the model aircraft features variable pitch propeller(s), the noise test will cover the total variation of pitch. The model aircraft shall be tested by a noise steward and in the event the model aircraft failing the noise test will be retested by a second noise steward, using a second noise meter. If the model aircraft fails the retest, the score for the preceding flight shall be zero. The sonometers must be of good quality with a test system (reference noise).

The maximum noise level will be 96 dB(A) measured at 3 metres from the centre line of the model aircraft with the model aircraft placed on the ground, over concrete or macadam, at the flying site. With the motor running at full power, measurement will be taken 90 degrees to the flight path on the side chosen by the competitor and downwind from the model aircraft. The microphone will be placed on a stand 30 cm above the ground in line with the motor(s). No noise reflecting objects shall be nearer than 3 metres to the model aircraft or the microphone. If a concrete or macadam surface is not available then the measurement may be taken over bare earth or very short grass, in which case the maximum noise level will be 94 dB(A). In the case of multi-engine model aircraft, the noise measurement will be taken at 3 metres from the closest engine to the noise meter and the maximum noise level will be the same as for single engine model aircraft. Turbine engines will not be subject to noise measurement.

6.2.2. Control Mechanism

Before each flight the entire mechanism including control line and their attachments to the model aircraft and the control handle, shall be subject to a pull test equal to 5 times the weight of the model aircraft, as recorded at Processing, with a maximum of 25 kg. Control line length (central point of handgrip to vertical centre line of model aircraft) shall be not less than 15 metres or more than 21,5 metres. A safety strap connecting the competitor's wrist to the control handle must be provided by the competitor.



HAND AND SAFETY STRAP FIGURE

6.2.3. Official Flights

- a) Each competitor will be called to fly three times. To be eligible for flight points for that flight he must execute an official flight within the required time limit (see 6.2.4.) on each occasion.
- b) If a competitor is unable to start or complete a flight and, in the opinion of the Contest / Flightline Director the cause is outside the control of the competitor, the Contest / Flightline Director may, at his discretion, award the competitor a reflight. The Contest / Flightline Director shall decide when the reflight shall take place.
- c) An official flight commences at the earliest of the following:-
 - i) The competitor signals to the timekeeper that he is commencing to start his motor(s).
 - ii) Two minutes after the competitor is instructed to start his flight (see 6.2.4.).
 - iii) An official flight is terminated when the model aircraft lands and stops, except during the option 6.2.7.J (Touch and Go and 6.2.7.O Taxi demonstration).

6.2.4. Flying Time

Competitors must be called at least 7 minutes before they are required to occupy the starting area. Each competitor shall have 9 minutes to complete each flight programme. Time shall start when the competitor begins to crank the motor, or two minutes after entry to the starting area, whichever is the first. The model aircraft must become airborne within the first five minutes (plus one minute for each additional, in excess of one). No points may be scored after the expiration of the time limit (9 minutes plus one for each added motor).

6.2.5. Starting Time

- a) If the model aircraft is not airborne within the 5 minutes, plus one minute for each additional motor, the competitor must immediately make room for the next competitor. If the motor(s) stop after take-off has begun but before the model aircraft is airborne, it may be restarted within the 5 minutes starting period.
- b) There is only one attempt allowed to repeat the take-off.

In the case of a repeated attempt, no points will be assigned for the take-off.

Note: In this case, rule 6.2.5.a. still applies.

6.2.6. Flight

The manoeuvres must be executed in the order listed below. Between the end of one manoeuvre and the start of the next one, the competitor must fly the model aircraft a minimum of two laps

- | | | |
|----------|---|-------|
| 6.2.6.1. | Take-off | K = 8 |
| 6.2.6.2. | 5 laps of straight level flight | K = 5 |
| 6.2.6.3. | Optional demonstration..... | K = 8 |
| 6.2.6.4. | Optional demonstration..... | K = 8 |
| 6.2.6.5. | Optional demonstration..... | K = 8 |
| 6.2.6.6. | Optional demonstration..... | K = 8 |
| 6.2.6.7. | Landing..... | K = 9 |
| 6.2.6.8. | Realism in flight | |
| | a) Engine noise (realistic tone and tuning).... | K = 3 |
| | b) Speed of the Model aircraft | K = 4 |
| | c) Smoothness of flight..... | K = 4 |

Note: The scale of the model aircraft and the cruising speed or maximum speed of the prototype must be stated on the flight scoring form.

6.2.7. Optional Demonstrations

The competitor must be prepared, if required by the judges, to give evidence that the options selected are typical and within the normal capabilities of the aircraft subject type modelled.

The selected options must be given to the judges in writing before take-off. The options may be flown in any order but the order must be marked on the score sheet and any manoeuvre flown out of order will be marked ZERO.

Not more than two drop options may be nominated.

Any model aircraft that flies with wheels down whereas the prototype actually features retractable landing gear shall have the total flight score reduced by 25%.

Only one attempt is permitted for each manoeuvre, the only exception is the procedure of getting a model aircraft airborne, as defined in 6.2.5.b.

All options carry a K factor of 8.

FOUR optional demonstrations must be selected from the following list:

A Multi-engine option – in order to qualify for full multi-engine points, all engines must run for the complete flight. Should any engine cut prematurely, then the marks will be reduced accordingly.

Note - The K Factor of 8 applies to any multi-engine subject. No points are awarded for each individual engine.

B Retract and extend landing gear.

C Retract and extend flaps.

D Drop bombs or fuel tanks.

E High flight over 30° line angle.

F One inside loop.

G Three inverted laps.

H Wingover.

I Figure eight.

J Touch and go.

K Lazy Eight

L Parachute drop.

M 1st Flight function by subject aircraft.

N 2nd Flight function by subject aircraft.

Competitors may demonstrate up to two different flight functions of their own choice, but must be prepared to supply evidence that each function was performed by the prototype modelled. Competitors must indicate to the Flight Judges the nature of the demonstration(s) before going to the flight line).

O Taxi demonstration

P Overshoot

6.2.8. Marking (flight points):

Each manoeuvre may be awarded marks between 0 and 10, using increments of half a mark, by each judge during the flight. The marks are multiplied by a coefficient that varies with the difficulty of the manoeuvres.

6.2.9. Flight Score:

At World and Continental Championships, or whenever using five flight judges, the highest and lowest judge's score for each manoeuvre will be deleted. The remaining three judges' scores will then count towards the final score.

The flight score shall be the sum of the points awarded by all three judges in 6.2.6.

6.2.10. Final Scoring :

Add points earned in 6.1.10. to the average score of the two best flights under 6.2.9. If the competitor has achieved only one flight, the points awarded for that flight will be divided by two.

If for any cause beyond the control of the organisers (e.g.. B.11.1.) less than three official rounds can be flown, the scoring shall be completed as follows :

- a) If two rounds are flown, the average of the two flights as in 6.2.9 is used.
- b) If only one round is flown, the single flight score of that one round is recorded.
- c) The scores in an official round can be recorded only if all competitors had equal opportunity for a flight in that round.

6.2.11. Flying Area

Contest organisers should clearly mark the following circles on the ground.

- 1) The pilot's circle - radius 1.5 metres

This is the area in which a competitor should remain. A warning will be given by the Circle Marshal if the competitor steps outside this 1.5 metre radius "Pilot's Circle", but no penalty will be incurred.

- 2) The penalty circle - radius 3.0 metres

If the competitor steps outside this 3.0 metre "Penalty Circle", the manoeuvre will score ZERO.

- 3) The flying area circle - radius 26 metres

This is the extent of the flying area when a model aircraft using the longest lines is flown from the edge of the penalty circle);

- 4) The safety area circle - radius 29 metres

This is the area defined as item (3) above plus a further all round safety zone of 3 metres width.

In addition, contest organisers should provide a minimum of 1 (ideally 2) <Ready Boxes>, plus 1 <Exit Box>, all immediately adjacent to the flying circle. All these Boxes should, like the flying circle itself, be clearly separated from access by the general public, and each of these Boxes should be clearly marked on the ground and have sufficient length for 1 model aircraft complete with full length lines attached.

6.3. CLASS F4C - RADIO CONTROLLED FLYING SCALE MODEL AIRCRAFT

6.3.1. General Characteristics

Maximum surface area: 250 dm²

Maximum weight of the complete model aircraft without fuel in flying condition including any dummy pilot: 12 kg

Model aircraft using electric motors as a power source shall be weighed without batteries used for those motors.

Motive Power:

- a) Rocket or pulse jet engines may not be used.
- b) The maximum thrust for a turbine motor shall be 10 kg.
- c) Electric motors; maximum no load voltage of power source: 42 volts.

If a model aircraft appears to be noisy in flight, the Judges or Contest / Flightline Director can demand a noise test. The transmitter and the model aircraft will then be impounded by the flightline official immediately following the flight. No modification or adjustment to the model aircraft shall be permitted other than refuelling. If the model aircraft features variable pitch propeller(s), the noise test will cover the total variation of pitch. The model aircraft shall be tested by a noise steward and in the event the model aircraft failing the noise test it will be retested by a second noise steward, using a second noise meter. If the model aircraft fails the retest, the score for the preceding flight shall be zero. The sonometers must be of good quality with a test system (reference noise).

The maximum noise level will be 96 dB(A) measured at 3 metres from the centre line of the model aircraft with the model aircraft placed on the ground, over concrete or macadam, at the flying site. With the motor running at full power, measurement will be taken 90 degrees to the flight path on the side chosen by the competitor and downwind from the model aircraft. The microphone will be placed on a stand 30 cm above the ground in line with the motor(s). No noise reflecting objects shall be nearer than 3 metres to the model aircraft or the microphone. If a concrete or macadam surface is not available then the measurement may be taken over bare earth or very short grass, in which case the maximum noise level will be 94 dB(A). In the case of multi-engine model aircraft, the noise measurement will be taken at 3 metres from the closest engine to the noise meter and the maximum noise level will be the same as for single engine model aircraft. Turbine engines will not be subject to noise measurement.

Radio Equipment

The use of automatic attitude or motion stabilisation devices (e.g. gyros) is forbidden.

6.3.3. Official Flights

- a) Each competitor will be called to fly three times, and must execute an official flight within the required time limit (see 6.3.4.) on each occasion to be eligible for flight points for that flight.
- b) If a competitor is unable to start or complete a flight and, in the opinion of the Contest / Flightline Director, the cause is outside the control of the competitor, the Contest / Flightline 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:
 - i) The competitor signals to the timekeeper that he is commencing to start his motor(s).
 - ii) Two minutes after the competitor is instructed to start his flight.
 - iii) An official flight is terminated when the model aircraft lands and stops, except during the option 6.3.7.M. (Touch and Go).

6.3.4. Flying Time

- a) A competitor will be advised that he will be required to start his flight not less than 5 minutes before the instruction to start.
- b) The competitor will then be instructed to start his flight.
- c) Timing of the flight will commence when the official flight commences (see 6.3.3.c.).
- d) The competitor will be allowed 14 minutes in the case of an aerobatic prototype, or 17 minutes in the case of a non-aerobatic prototype, to complete his flight.
- e) In the case of a multi-engined model aircraft, the time allowed in (d) above will be increased by one minute for each additional motor.
- f) No points will be awarded for any manoeuvre that is not completed at the end of the time allowed.

6.3.5. Starting Time

- a) If the model aircraft is not airborne within 7 minutes, plus one additional minute for each extra engine, after the official flight and timing commence, the official flight will end and no points will be awarded for the flight.
- b) If the motor(s) stops after the take-off has commenced, but before the model aircraft is airborne, the motor(s) may be restarted. There is only one attempt allowed to repeat the whole procedure. In the case of a repeated attempt, no points will be assigned for the interrupted manoeuvre.

Note: In this case rule 6.3.5(a) still applies.

6.3.6. Flight

6.3.6.1.	Take-off	K = 8
6.3.6.2.	Straight flight	K = 2
6.3.6.3.	Figure Eight	K = 6
6.3.6.4.	Descending 360 ^O Circle	K = 6
6.3.6.5.	Option	K = 4
6.3.6.6.	Option	K = 4
6.3.6.7.	Option	K = 4
6.3.6.8.	Option	K = 4
6.3.6.9.	Option	K = 4
6.3.6.10.	Approach and Landing.....	K = 10
6.3.6.11.	Realism of flight	
	a) Engine sound (realistic tone & tuning).....	K = 2
	b) Speed of the model aircraft	K = 4
	c) Smoothness of flight	K = 4
	d) Size of manoeuvres	K = 3
	Total	K = 65

Notes: The scale of the model aircraft and the cruising or maximum speed of the prototype must be stated on the score sheet.

Only one attempt is permitted for each manoeuvre, the only exception is the procedure of getting a model aircraft airborne, as defined in 6.3.5.b.

6.3.7. Optional Demonstrations

Competitors must be prepared, if required by the judges, to give evidence that the options selected are typical and within the normal capabilities of the aircraft subject type modelled. Only one manoeuvre involving the demonstration of a mechanical function may be included in a competitor's choice of options. These include (options B, C, D, L, and, if applicable, P or Q).

Selection must be given to judges in writing before taking off. The options may be flown in any order. (Options A, N, R, S, T and W are for model aircraft of non-aerobatics aircraft only). The order in which the optional manoeuvres are flown must be marked on the score sheet and any manoeuvre flown out of order will be marked zero.

A	Chandelle	K = 4
B	Retract and extend landing gear	K = 4
C	Retract and extend flaps	K = 4
D	Dropping of bombs or fuel tanks	K = 4
E	Stall turn	K = 4
F	Immelmann turn	K = 4
G	One loop.....	K = 4
H	Split S (Reversal).....	K = 4
I	Cuban eight	K = 4
J	Normal spin (three turns)	K = 4

K	Roll	K = 4
L	Parachute.....	K = 4
M	Touch and go.....	K = 4
N	Overshoot	K = 4
O	Side slip to left or right.....	K = 4
P	1 st Flight function by subject aircraft	K = 4
Q	2 nd Flight function by subject aircraft	K = 4
	<i>Competitors may demonstrate up to two different flight functions of their own choice, but must be prepared to supply evidence that each function was performed by the prototype modelled. Competitors must indicate to the Flight Judges the nature of the demonstration(s) before going to the flight line).</i>	
R	Flight in triangular circuit	K = 4
S	Flight in rectangular circuit	K = 4
T	Flight in a straight line at constant height (maximum height 6 metres)	K = 4
U	Flight in a straight line with one motor throttled (for multi-engined model aircraft only)	K = 4
V	Lazy Eight	K = 4
W	Wingover.....	K = 4
X	Inverted flight.....	K = 4

6.3.8. Marking (flight points)

Each manoeuvre will be awarded marks from 0 to 10, using increments of half a mark, by each of the judges during the flight. These marks are multiplied by the appropriate K - factor in each case.

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.

There shall be a flagman at the site to indicate by visual and acoustic signal if and when the model aircraft crosses the Judges Line. If this happens before a manoeuvre is completed, ZERO points shall be given for this manoeuvre. Exceptions from this rule are manoeuvres 6.3.1. Take-Off, 6.3.6.10 Landing and 6.3.7.m. Touch & Go. These manoeuvres have the right to be performed into wind as long as they do not overfly the spectator area. Spectators being anyone else than competitor, helper and officials at the flight line. The flagman will keep a record of these incidents.

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

6.3.9. Flight Score

At World and Continental Championships, or whenever using five flight judges, the highest and lowest judge's score for each manoeuvre will be deleted. The scores of the remaining three judges will then count towards the final score.

The flight score shall be the sum of the points awarded by all three judges in 6.3.6.

6.3.10. Final Scoring:

Add points earned in 6.1.10. to the average score of the two best flights under 6.3.9. If the competitor has achieved only one flight, the points awarded for that flight will be divided by two.

If for any cause beyond the control of the organisers (e.g.. B.11.1.) less than three official rounds can be flown, the scoring shall be completed as follows :-

- If two rounds are flown, the average of the two flights as in 6.3.9. is used.
- If only one round is flown, the single flight score of that one round is recorded.
- The scores in an official round can be recorded only if all competitors had equal opportunity for a flight in that round.

ANNEX 6A
TECHNICAL RULES FOR FLYING SCALE MODEL AIRCRAFT CONTESTS
CLASS F4
JUDGES GUIDE FOR STATIC JUDGING

6A.1 General

Prior to commencement, the judges should review the whole entry at a distance not closer than 3 metres in order that a standard is established for grading of points to be awarded. The entries should be studied in relationship to each other from a superficial aspect before detailed examination commences.

The evaluation is broken down into six items. Judges must discuss each item as a team and attempt to arrive at a unanimously agreed score for each item, although each will retain the right to differ. Any degree of difference should be marginal.

A chief judge shall be appointed as a spokesman. He should discuss the merits and criticisms of each item with the other judges, making suggestions for the scores to be awarded as a basis for further discussion. The use of half points (see 6.1.5.) is important when judging top-class model aircraft. There may be instances where, for example, a 9 would be too low and a 10 too high, and a suitable score might be, say, 9,5.

If model aircraft are flown before being static judged (see 6.1.3.), any damage sustained during flight shall be ignored by the static judges.

6A.1.9. Documentation for Proof of Scale

The minimum documentation required must be provided. Failure to comply shall result in zero marks being awarded under 6.1.10. for items 1, 2, 3, 4 and 6.

Additional documentation is desirable, but a competitor should not be unduly penalised for lack of detail photographic authentication for an aircraft which no longer exists and for which it is impossible to obtain exhaustive authentication, provided that a fully detailed three-view drawing is presented.

6A.1.10. Judging

Items 6.1.10.1. must be judged at a minimum distance of 3 metres in F4B and 5 metres in F4C from the nearest part of the model aircraft. A handler should be prepared to position the model aircraft as directed by the judges. No measurements are to be taken and the judges must not handle the model aircraft.

6A.1.10.1. Scale Accuracy

Firstly, have the model aircraft positioned in a pose similar to that in the best photograph and check for any obvious discrepancies, also assess the "character" and realism of the model aircraft. Repeat this procedure with other suitable photographs. Then, using photographs and drawings, check:

- a) The side view, including the fuselage outline, cabin or canopy shape, cockpit aperture shape, engine cowling and spinner shape, outline of fin and rudder, wing and tailplane sections, wing stagger and struts on biplanes; shape, angle and position of landing gear legs and tail wheel or skid, size of wheels and tyres.
- b) End views, for dihedral, wing thickness and taper, wing struts, bracing and gap on biplanes, thickness of fin, rudder and tailplane, cross-sections of fuselage and engine cowling, cowling shape and cut-outs, dummy propeller size and shape, shape of cockpit canopy or windshields; size, shape, position and angle of landing gear, wheel track, tyre thickness.
- c) Plan views (above and below) for wing outline and fairings, aileron size, flaps; tailplane size and outline; elevator size, shape and cut outs, trim tabs, fuselage shape and taper, cockpit or canopy shape, engine cowling shape.

Notes:

The photographs must take precedence over the drawings if there is any doubt concerning any item of scale accuracy. Caution must be exercised when determining rigging angles using photographs that are taken at an oblique angle, as these might give the wrong impression. The three-view drawing is usually more correct and easy to use in this respect.

If a model aircraft is equipped with a silencer fully or partly protruding from the contours of the model aircraft, or if it is visible well from the outside, then the model aircraft does not correspond to its prototype.

6A.1.10.2. Colour

Correct colour may be established from colour photographs, from accepted published descriptions if accompanied by colour chips certified by competent authority, 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 compared to model aircraft which feature only one or two basic colours.

6A.1.10.3 .Markings

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.

6A.1.10.4. Surface Texture and Realism

The texture and appearance of the surface of the model aircraft 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. Ply covered or wooden monocoque types should be correctly simulated and any sag between the ribs and formers should be apparent if this is present on the prototype.

Metal stressed skin types should show simulation of panels and rivets.

In all instances, the appropriate gloss, eggshell or matt finish should be correctly reproduced.

6A.1.10.5. Craftsmanship

Model aircraft should be checked for quality of workmanship, with particular reference to filling grain; clean, sharp edges, especially trailing edges of wings and tail surfaces; correct gaps at hinge line of control surfaces; close fit where wings are attached to fuselage, and general finesse. Check for any components that have not been made by the competitor (see 6.1.9.4d) and adjust the mark awarded accordingly.

6A.1.10.6. Scale Detail

Check that items such as those listed are present on the model aircraft where applicable, and that they are accurately reproduced and correctly positioned.

Hatches	Brake pipes
Handles	Landing gear springing
Footsteps	Tyre treads
Doors	Wing slots
Armament	Navigation and landing lights
Bomb racks	Pitot head
Control cables	Walkways
Control horns	Tanks
Fairings	Radiators
Bracing	Filler caps
Turnbuckles	Louvres
Struts	Cooling gills
Lacing or stitching	Mass balances
Aerials	Instrument panel
Venturis	Cockpit or cabin interior detail

Notes:

The marks awarded should reflect both the accuracy and the quantity of the scale detail present. A well documented highly detailed model aircraft should score proportionately higher than a model aircraft with little detail, even though the full-size prototype of the latter is similarly sparsely detailed.

Upon the completion of the static judging of each model aircraft, the chief judge must check all score cards for completeness before passing them to the calculators. The panel of the judges has the right to correct scores which are obviously wrong (e.g. first model aircraft deviations, details not proven by documentation, over looked items which were purchased). Only after this procedure has been followed should the scores be made available for publication, having been signed by the chief judge.

ANNEX 6B

TECHNICAL RULES FOR FLYING SCALE MODEL AIRCRAFT CONTESTS

JUDGES' GUIDE

C/L SCALE FLYING SCHEDULE

CLASS F4B

6.B.1 General:

All flying manoeuvres must be judged bearing in mind the performance of the full size subject aircraft. The aim of the scale flight schedule is to recreate the flight characteristics and realism of the full-size aircraft within the limits of the control-lines. Judges must therefore not confuse scale F4B contests with aerobatics F2B contests.

The errors under each manoeuvre cannot be an exhaustive list of all possible faults. They are intended rather to show the sort of mistakes that are likely during the course of 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. How well the pilot is able to suppress the limiting factor of the control-lines yet still achieves scale realism in his flight.

It remains the responsibility of the judges to decide from their own experience on 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". Completion of each manoeuvre must also be announced by the word "FINISHED". Failing to do so, loud and clear will result in loss of marks for that manoeuvre.

The judges will be seated outside the circumference of the contest circle in a position agreed by in concert between the Contest Director and judges. When the wind direction, in the opinion of the CD, continually deviates more than 30° from the first decided direction, the judges' position will be adjusted accordingly.

The pilot is permitted to choose the spots where he wishes to commence his take off run and terminate the roll out after landing. He is also free to choose where he wishes to position each manoeuvre, but must bear in mind that manoeuvres need to be positioned in full view of the judges to achieve a good score.

In the interest of safety, any manoeuvre that is carried out when the Competitor steps outside the 1.5 metre radius "Pilot's Circle" will carry a warning by the Circle Marshall to the Competitor, but no penalty. If the Competitor steps outside the 3.0 metre radius "Penalty Circle" the manoeuvre will score ZERO.

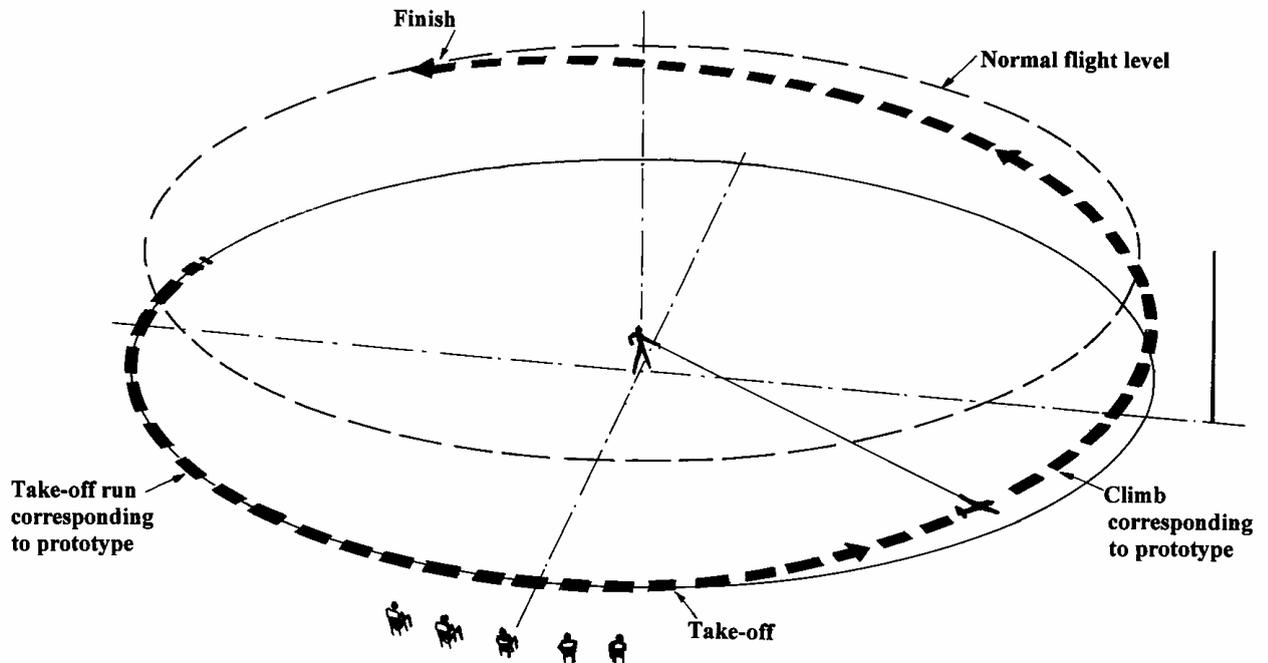
Before the flying part of the contest commences there must be agreement between the chief judge and the respective team manager on the exact nature of manoeuvres M and N if these are to be nominated (flight function(s) performed by the subject aircraft). These agreed manoeuvres must be presented to the judges well before the flying commences, as there can be no discussion at the flight line itself on this matter.

The item 6.2.6.8. "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.

After each flight, the Chief Judge will record any non-standard event that causes downgrading or loss of flight points. As examples: Missed figures, figures flown out of order, out of time, stepping outside the penalty circle, missing dummy pilot or crash landing, etc....

6.B.2.6.1. Take-off:

The model aircraft should stand still on the ground with the engine(s) running without being held. If the model aircraft is touched after the word "NOW" has been called the manoeuvre will score zero. The model aircraft should accelerate to a realistic speed and lift smoothly from the ground, climb at an angle consistent with the subject aircraft and level off at Normal Flight Level. The manoeuvre may, depending of the subject aircraft, take more then one lap to finish.

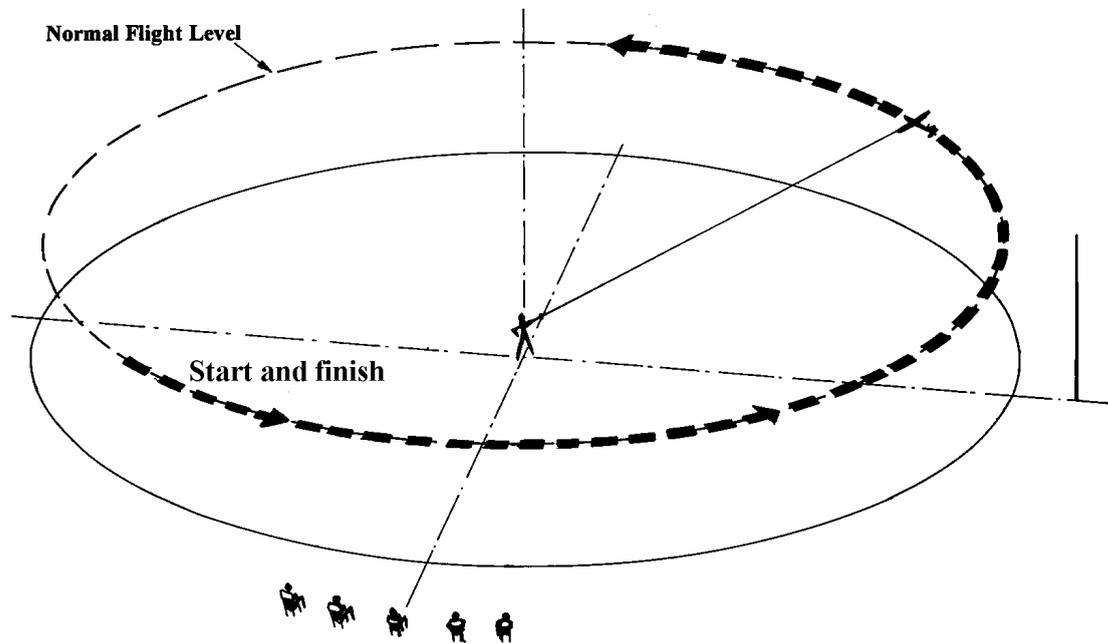


Errors:

1. Model aircraft touched after calling "NOW" (zero marks).
2. Climb erratic.
3. Climb not consistent with subject aircraft.
4. Level-off not smooth.
5. Level-off not at Normal Flight Level.

6.B.2.6.2 Five laps at Normal Flight Level:

This manoeuvre should demonstrate the basic flying qualities of the model aircraft. Five smooth and stable laps should be flown at Normal Flight Level. Height should remain almost constant for optimum marks.



Errors:

1. Not five laps (zero marks). More than five laps is not an error.
2. Flight above or below Normal Flight Level (approx. 6 m) will downgrade the score proportionately.
3. Model aircraft flight path not smooth and steady.

6.B.2.7. Optional Demonstrations – General

The selection of manoeuvres and the order in which they are to be flown 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.

The competitor must also be prepared, if required by the judges, to give evidence that the options selected are within the capabilities of the subject aircraft modelled. (See 6B.1. General)

A Multi-engines:

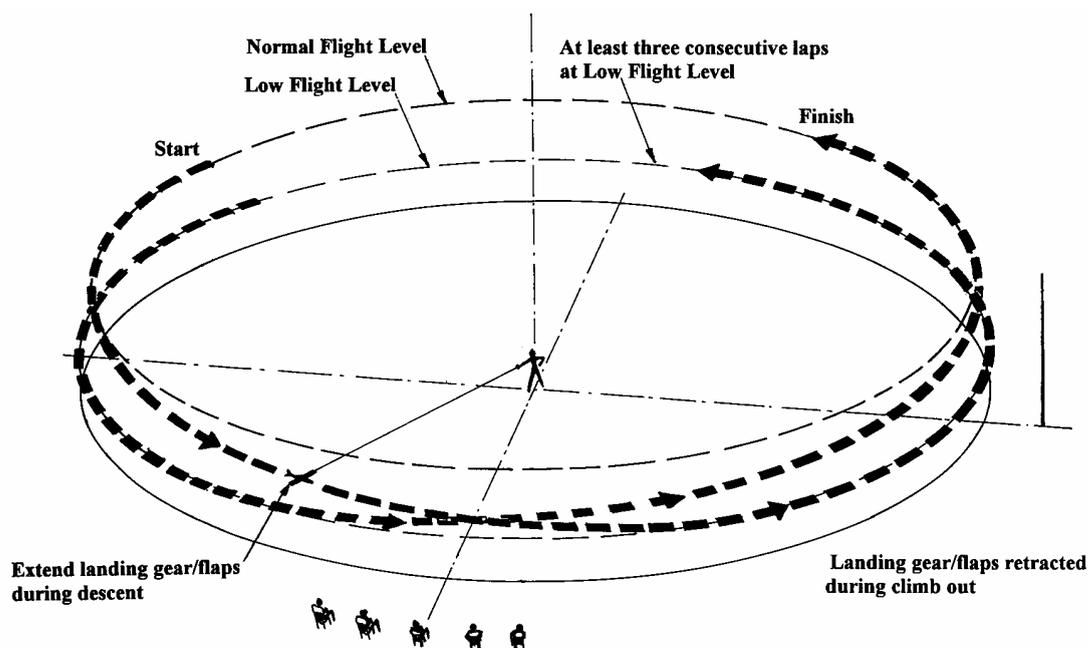
In order to qualify for full multi-engine points, all engines must run for the complete flight. Should any engine cut prematurely, then the mark will be reduced accordingly.

B Retract and Extend Landing Gear:

C Extend and Retract Flaps:

(Diagram and errors applicable to both manoeuvres unless stated)

The manoeuvre should commence from Normal Flight Level and be flown with the gear/flaps fully extended at Low Flight Level (approx. 2m) for at least three consecutive laps. The gear/flaps will then be retracted during a climb out to Normal Flight Level where the manoeuvre is finished.

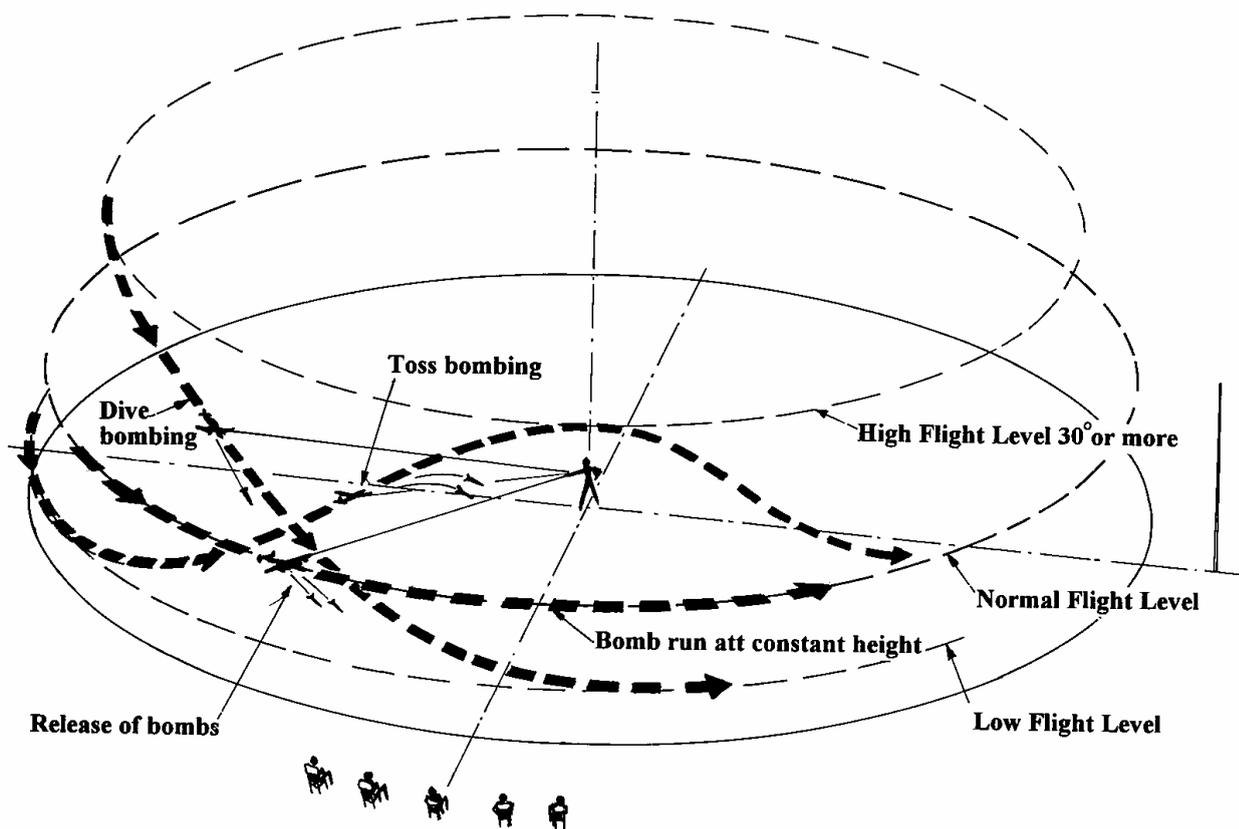


Errors:

1. Not commenced from Normal Flight Level.
2. Extension and or retraction not in full view of the judges.
3. Model aircraft speed too high for landing gear/flap lowering.
4. Model aircraft not flown at Low Flight Level for three consecutive laps with gear or flaps extended.
5. Speed and or sequence of extension and retraction not realistic.
6. No change in attitude with flaps lowered.
7. Manoeuvre not finished at Normal Flight Level.

D Dropping of Bombs or Fuel Tanks:

If bombs are carried internally, bomb-bay doors must be open and be closed after the drop. If bombs or fuel tanks are carried externally, they must be fitted in the correct position and in the correct manner. Dropping should be in the manner of the prototype. Dropping should be within clear view of the Judges and centred on the Judges position. Any special features of the manoeuvre should be declared to the Judges beforehand.



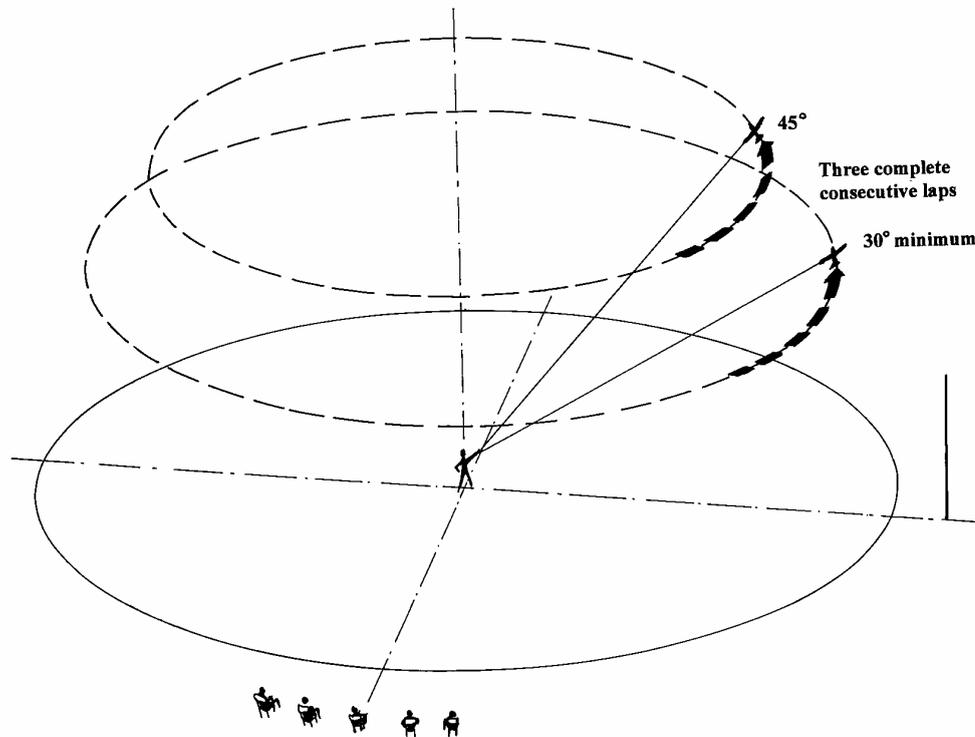
Errors:

1. Not a realistic way of releasing the bomb load.
2. Bomb bay doors did not operate in a realistic way.
3. Bombs do not behave as such on falling to their target zone
4. Bombs not falling on the intended and agreed area.
5. Drop tanks not behaving as drop tanks in the air.

E High Flight At Over 30° Line Angle:

During three complete and consecutive laps the lines must be at a minimum angle of 30° to the ground. The centre of the circles, which the model aircraft describes, must be directly over the flier's head.

Optimum marks will be awarded if the lines do not come below 45° and the flight level must remain almost constant. Lower marks will be awarded to model aircraft that fly below 45° but above 30°, or if the flight level changes considerably during the three laps. Zero marks shall be given if the model aircraft flies below 30° line-angle at any moment during the three laps.

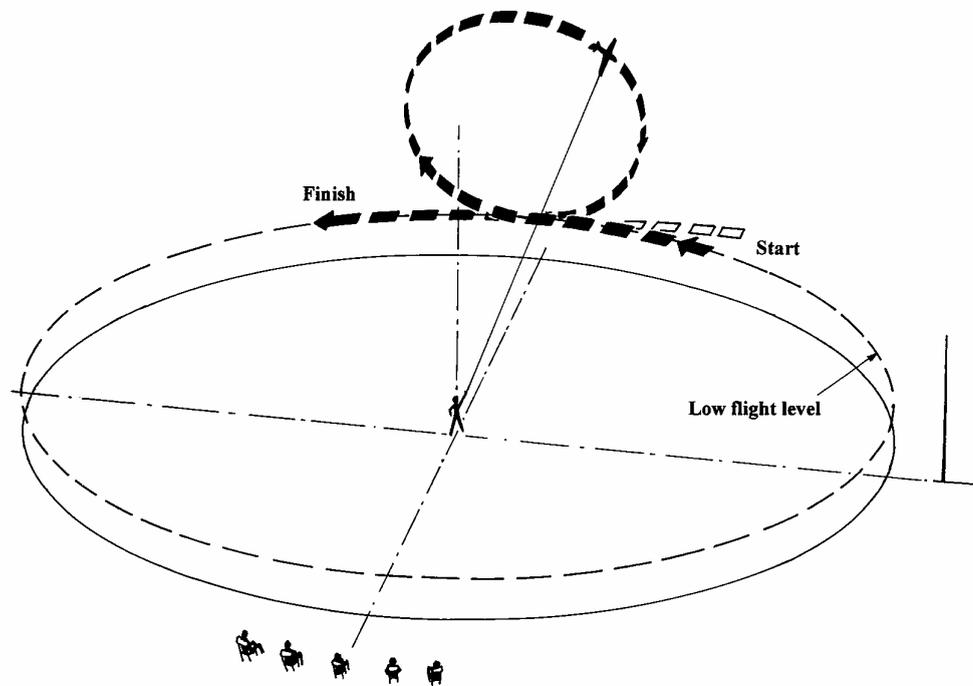


Errors:

1. Not three consecutive laps.
2. Not between 30° and 45° line angle.
3. Great variations of height during the flight.
4. Centring varies during the flight.
5. Below 30° line-angle, at any moment, zero marks.

F One Inside Loop:

From Low Flight Level, the model aircraft pulls up into a circular loop and resumes level flight at the same height as the entry. The throttle may be reduced at the top of the loop, as the subject aircraft would be operated. Low powered aircraft types would be expected to execute a shallow dive at full throttle in order to pick up speed before commencing the loop.

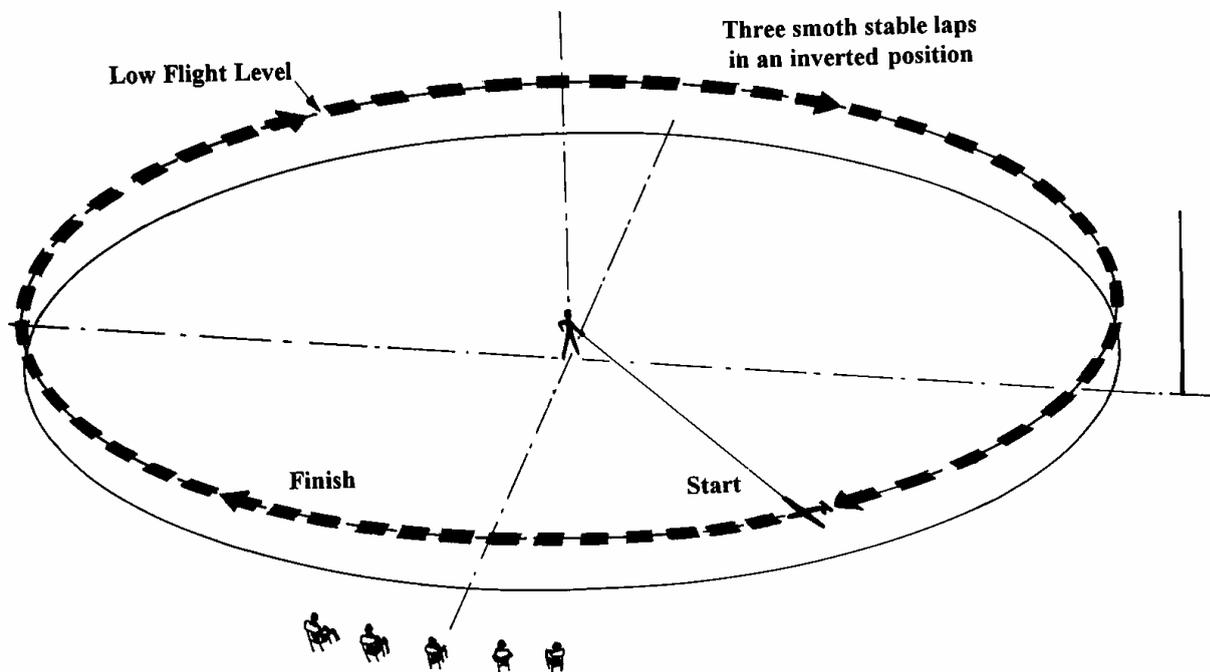


Errors:

1. Loop not commenced at Low Level Flight.
2. Track of loop not vertical.
3. Loop not as per prototype.
4. Inappropriate use of throttle.
5. Loop not finished at Low Flight Level.

G Three Inverted Laps:

The model aircraft should make three smooth and stable consecutive laps in an inverted position at Low Flight Level. Height should remain constant for optimum marks.

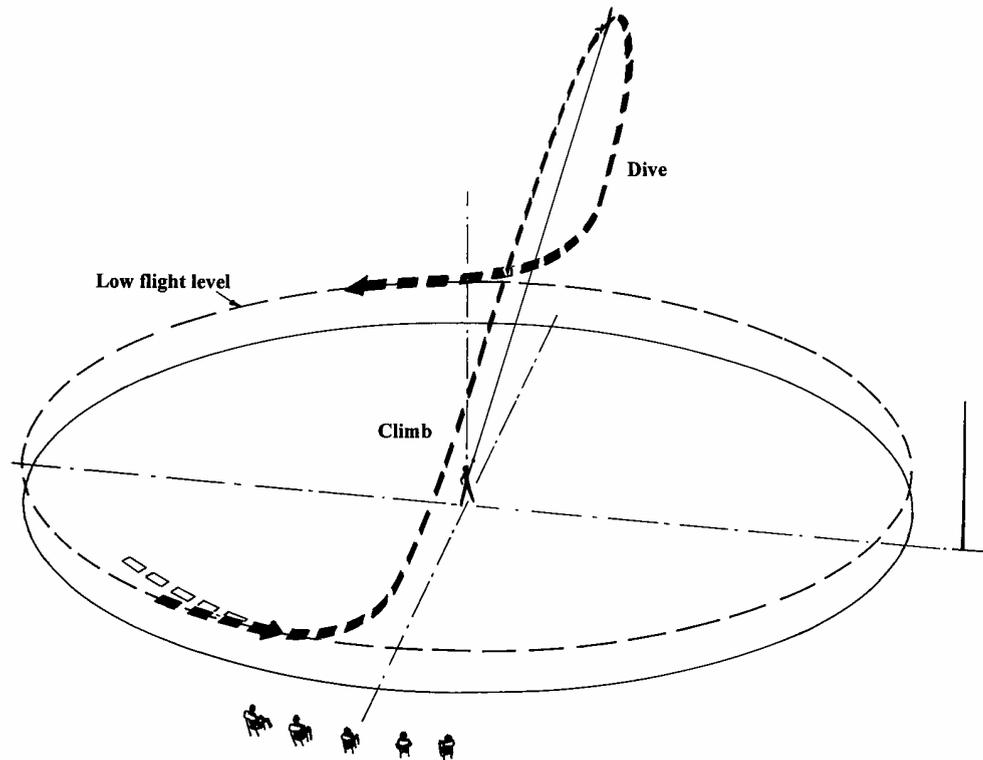


Errors:

1. Less than three laps, zero marks.
2. The height not at Low Flight Level.
3. Not smooth and stable.
4. Variations in height.

H. Wingover:

From Low Level Flight the model aircraft should make a near vertical climb, then perform an equally near vertical dive and finally level out at Low Level Flight. The radius in the pull-up and the pullout should be of equal size for full marks. Low powered aircraft types would be expected to execute a shallow dive at full throttle in order to pick up speed before commencing the manoeuvre.

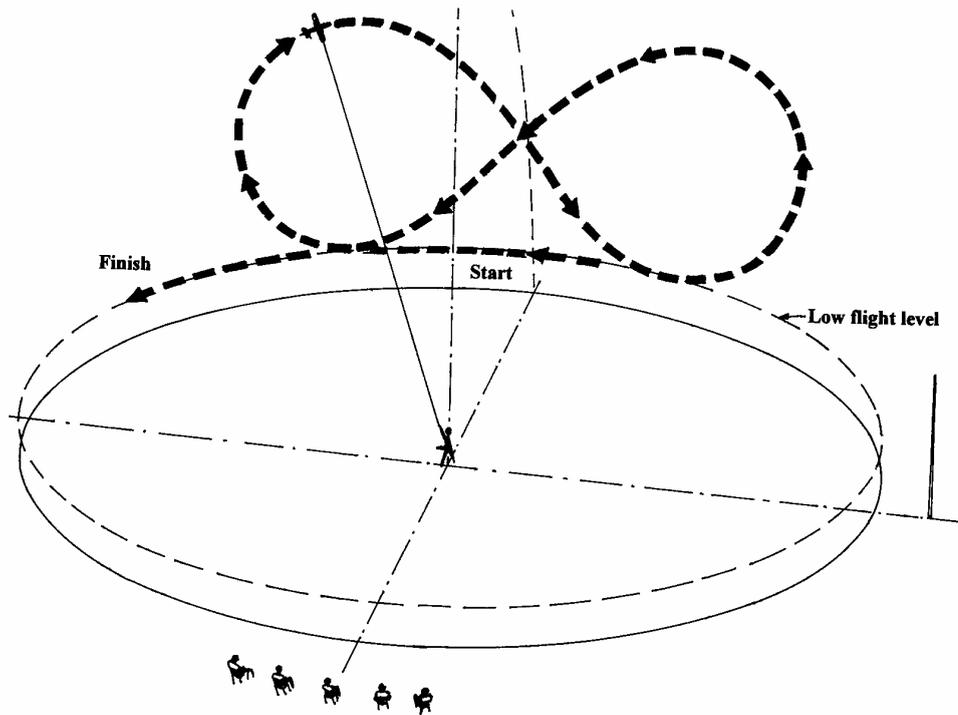


Errors:

1. Not commenced from Low Level Flight.
2. Not sufficiently steep climb. (Less than 60° will score zero).
3. Not sufficiently vertical dive. (Less than 60° will score zero).
4. Not equal shape in the pull-up and the pull-out.
5. The manoeuvre is not finished at Low Level Flight.

I Figure Eight:

From Low Level Flight, the model aircraft pulls up into a near circular loop until 45° nose down. The 45-degree inverted is then held until the entry height is reached when another near circular loop is executed inverted. The manoeuvre is completed with a second 45° nose down and a pullout at Low Level Flight. The 45-degree intersection shall divide the manoeuvre in two equal parts for top marks.

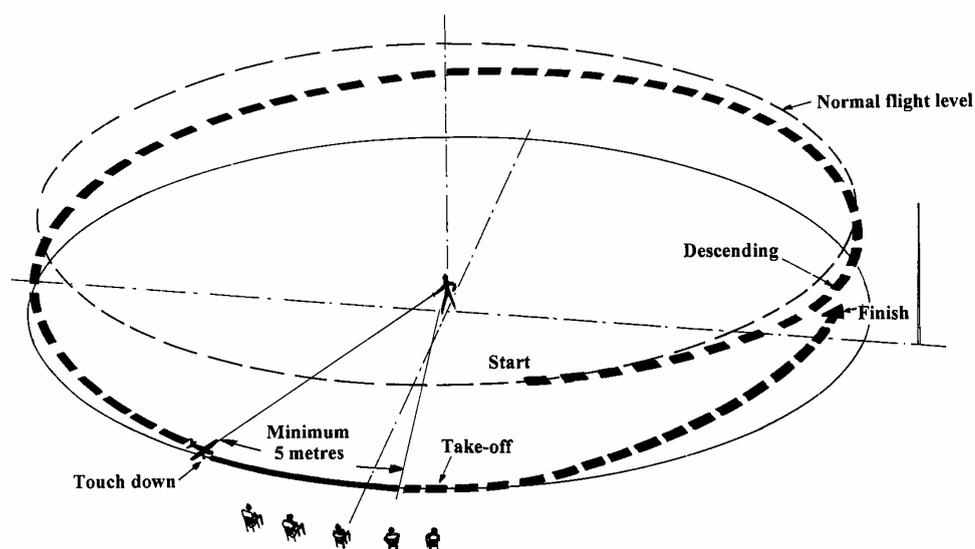


Errors:

1. Manoeuvre not commenced from Low Flight Level.
2. Loops not near circular.
3. Not a 45° intersection.
4. Loops are not the same size.
5. The manoeuvre not finished at Low Flight Level.

J Touch and Go:

From Normal Flight Level, the model aircraft reduces speed and extends landing gear and flaps, as applicable to the subject aircraft, touches down and rolls along the ground without coming to a halt. The main wheels must roll along the ground for a minimum of five lengths of the actual model aircraft. The model aircraft then makes a normal take-off and completes the manoeuvre at Normal Flight Level. The descent, prior to touch down, may take more than one lap to complete.

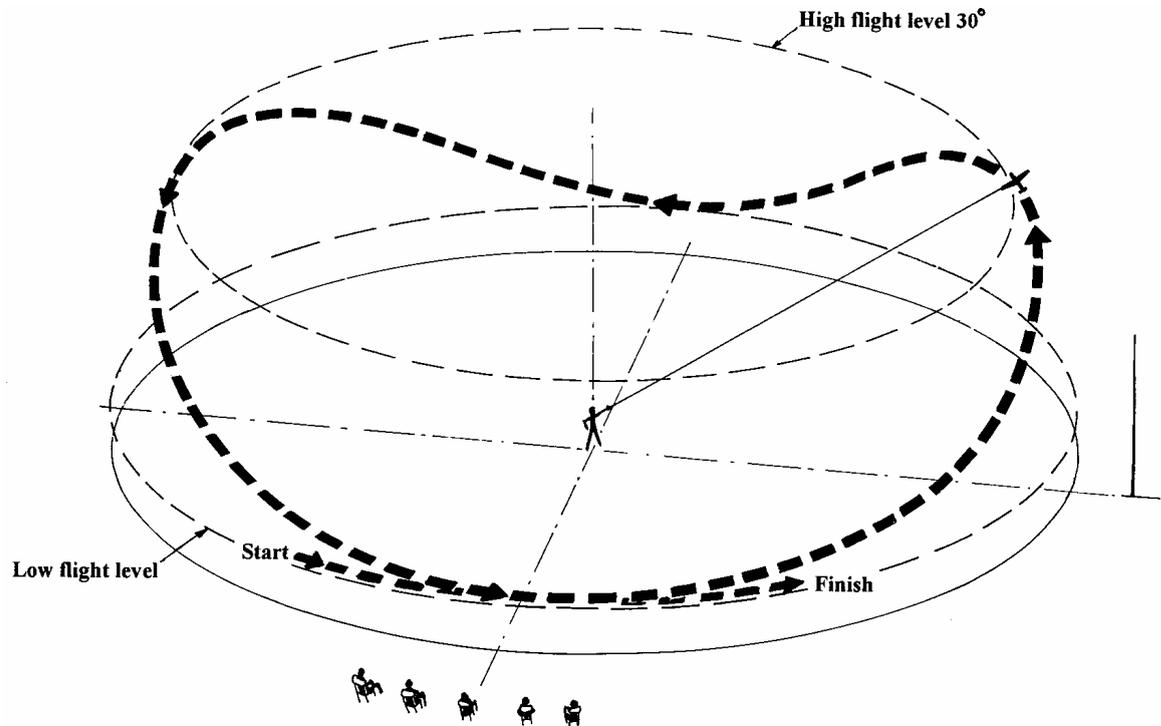


Errors:

1. Descent not commenced from Normal Flight Level.
2. Throttle, gear and flaps not operated smoothly during the descent.
3. The model aircraft bounces on touch down and the continuing roll on the ground.
4. The roll on the ground is less than five lengths of the model aircraft.
5. Not a normal take off and climb out to Normal Flight Level.

K Lazy Eight

From Low Flight Level in front of the judges the model aircraft describes a climbing turn to High Flight Level and down again opposite the judges. The climbing turn is then immediately repeated in the other half of the circle and finished in front of the judges at Low Flight Level. This manoeuvre is for all sorts of aircraft.

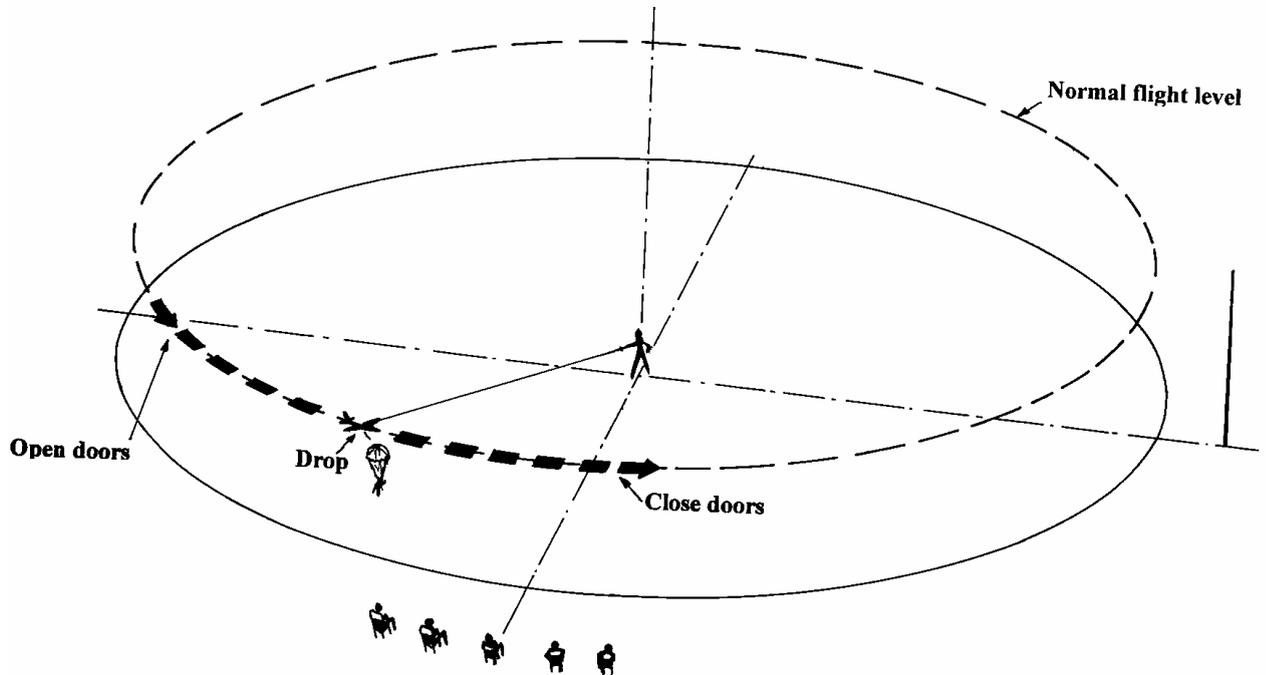


Errors:

1. The manoeuvre not executed from Low Level Flight
2. The climbing turn not to High Flight Level
3. The second climbing tum not a copy of the first
4. The manoeuvre not finished at Low Flight Level
5. The manoeuvre not centred in front of the judges

L Parachute drop:

The drop or ejection should be in the manner of the subject aircraft. Cargo should be dropped from a hatch or from bomb bays. A man should be dropped via doors, a hatch or by inverting the aircraft. If the subject aircraft used a braking parachute when landing, the competitor may demonstrate this aspect for this manoeuvre.



Errors:

1. Not a realistic way of dropping or ejecting the parachute.
2. The parachute not dropped at the agreed spot or area.

M and N Flight Function(s) by the subject aircraft:

The competitor may demonstrate up to two different flight functions of his own choice, in each flying round. These must be agreed prior to the commencement of the flight program.

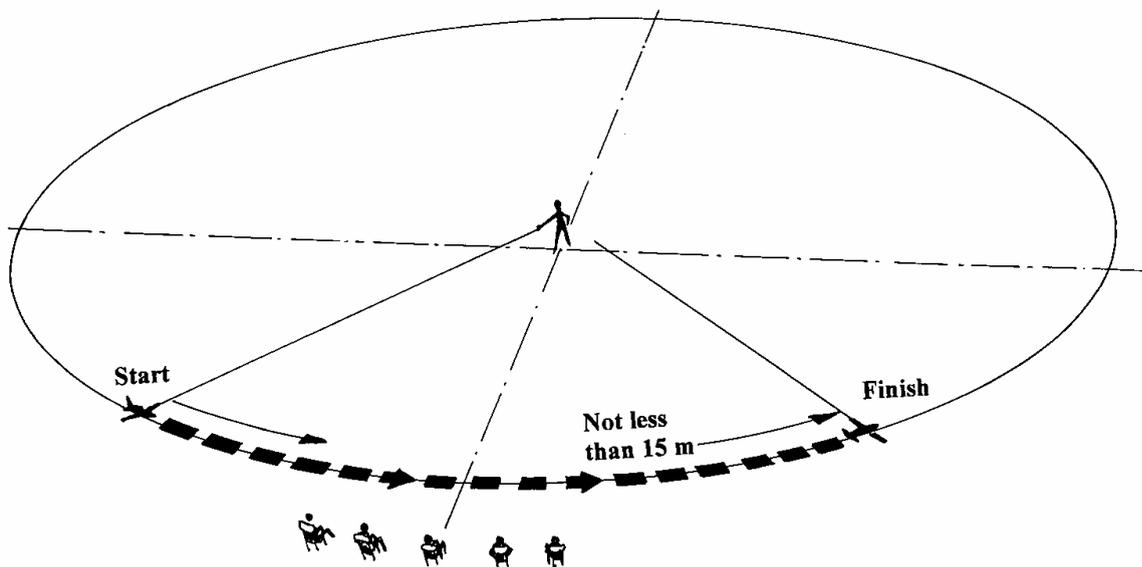
Notes:

Not more than two drop options may be nominated.

Flight functions should be of a nature that is easily understood by the judges. Pure mechanical options, which could equally be performed on the ground, are not allowed.

O Taxi Demonstration

The model aircraft should stand still on the ground with the engine(s) running without being held by anyone. The model aircraft should then taxi a minimum distance of 15 metres in a realistic manner and speed and finally come to a full stop. All engines must be operating for full marks. This manoeuvre may be executed before or after the flight.

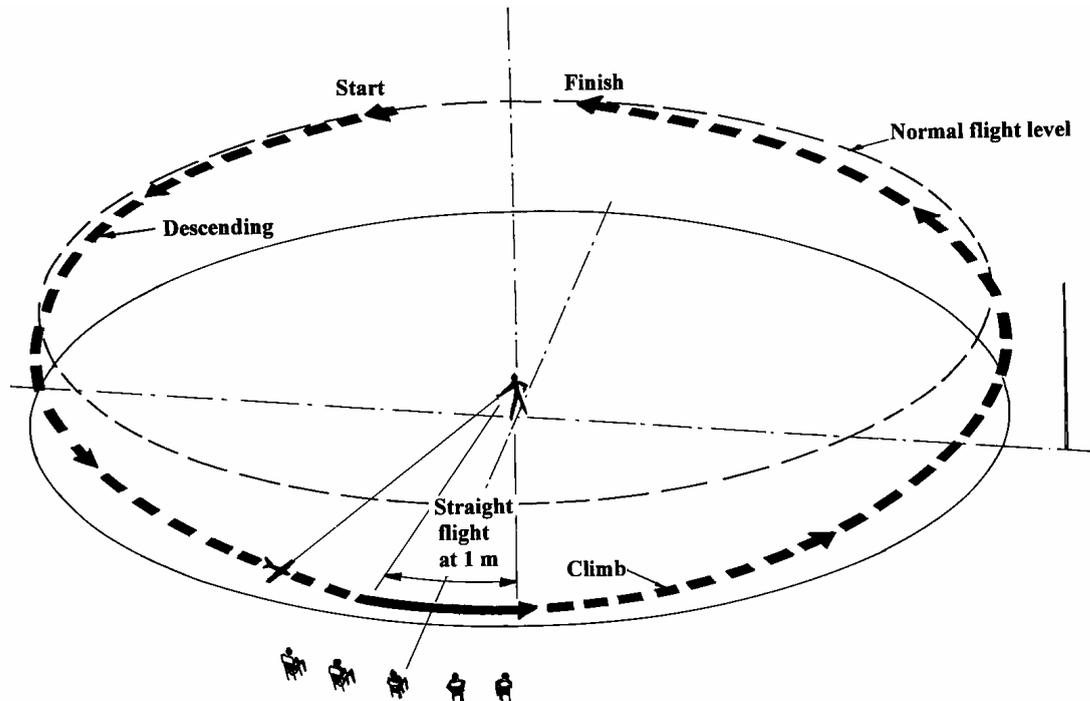


Errors:

1. Not 15 metres.
2. Not a realistic taxi for the subject aircraft.
3. Not all engines operating.
4. If held or touched by anyone during the manoeuvre, the score is zero.

P Overshoot:

From Normal Flight Level, the model aircraft reduces speed and extends landing gear and flaps, as applicable to the subject aircraft. When the model aircraft reaches approximately one metre height it picks up speed before it then makes a normal climb out and completes the manoeuvre at Normal Flight Level. The descending to approximately one metre may take more than one lap to finish.

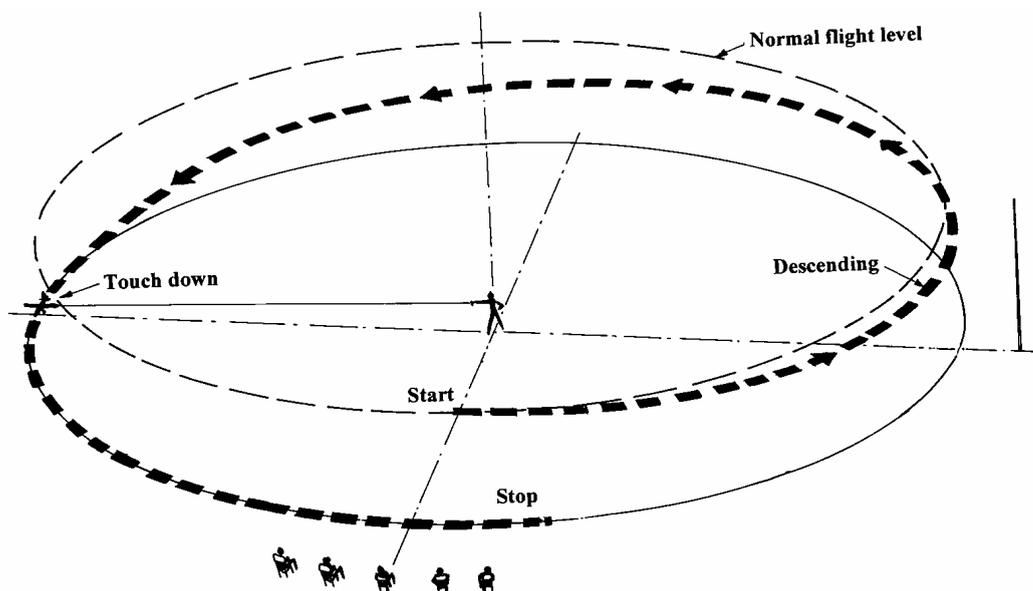


Errors:

1. Descent not commenced from Normal Flight Level
2. Throttle, gear and flaps not operated smoothly during descent.
3. The model aircraft not allowed to accelerate smoothly before climbing out.
4. The manoeuvre not finished at Normal Flight Level.

6B.2.6.7 Landing:

From Normal Flight Level, the model aircraft smoothly descends while throttling back and begins the approach with flaps and gear down, when applicable, the model aircraft then continues to round out, adopting the attitude applicable to the subject aircraft and touches down with no bouncing and rolls to a stop. The landing may take more than one lap to finish.



Errors:

1. Landing manoeuvre not commenced from Normal Flight Level.
2. Not a smooth descent down to the touchdown point.
3. Gear/flaps not lowered in correct positions.
4. Excessive use of throttle on finals.
5. Model aircraft too fast, not correct approach configuration.
6. Model aircraft bounces on touch down.
7. Model aircraft does not come to a gradual and smooth stop after landing.
8. Model aircraft noses over (30 % penalty when nose-down, zero if it overturns).
9. Engine(s) stops before the landing manoeuvre is finished.

6B.2.6.8. Realism of Flight:

All judges should discuss this after completion of the flight and they should attempt to arrive at an agreed score for each item. Realism of Flight covers the entire flight performance including the way the model aircraft flies between the manoeuvres. Judges will allot points for Realism within the following aspects, always keeping in mind the likely characteristics of the subject aircraft.

Engine sound (Tone and Tuning)..... K = 3

”Tone” relates to the character of the sound by comparison with the subject aircraft at all throttle settings.

”Tuning” is the smoothness of operation of the engine at all throttle settings.

The marks for engine sound should therefore be split equally between these two aspects.

Speed of the model aircraft K = 4

This should be an assessment of the scale speed of the model aircraft, calculated from the speed of the full size aircraft (as indicated on the score sheet and documentation) divided by the scale of the model aircraft. Model aircraft invariably fly faster than scale speed and marks should be deducted accordingly. For example, a model aircraft that appears to be flying at twice scale speed should score no more than half marks, a model aircraft flying at three times scale speed, or faster, should score zero.

Smoothness of flight..... K = 4

The model aircraft should be well trimmed and show no signs of instability. Judges should assess the smoothness of control taking into account the prevailing weather conditions. They should also judge the attitude of the model aircraft in flight, i.e. any nose-up or nose-down tendency.

Notes:

A model aircraft, which flies with wheels down, whereas the subject aircraft actually featured retractable landing gear, shall have the total flight score reduced by 25%.

If the pilot of the subject aircraft is visible from the front or from the side during flight, a dummy pilot of scale size and shape shall be equally visible during flight in the model aircraft. If such a pilot is not fitted, the total flight score shall be reduced by 10%.

ANNEX 6C
JUDGES' GUIDE
R/C SCALE FLYING TECHNICAL RULES FOR
FLYING SCALE MODEL AIRCRAFT CONTESTS
SCHEDULE CLASS F4C

6C.1 GENERAL

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 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 wind direction. This axis will be referred to as the "judges' line". The Contest/Flight Line Director will be responsible for the measuring of wind direction. If, in the opinion of the Contest/Flight Line Director, the wind direction continually deviates more than 30° from the judges' line, the judges' line will be adjusted accordingly.

Unless there is a conflict with safety, the pilot should at all times be permitted to choose the direction of take-off and landing to allow for unexpected changes in wind direction. This provision will also apply to manoeuvre 6.3.7.M (Touch-and-Go) since this consists of both a landing and take-off.

Apart from the manoeuvres mentioned above, 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.

In the interests of safety, any manoeuvre that is carried out over the judges, competitors, or anyone else in a designated area behind the judges' line, will also score ZERO.

The height and positioning of individual manoeuvres should be proportional to that expected in a full size display typical to each prototype. Unless specified otherwise, manoeuvres that are carried out in a horizontal plane (e.g. Straight Flight, Figure Eight, Triangular Circuit) should commence on a flight path that is about 60° elevation to the judges. Manoeuvres such as the Descending Circle and Spin should start at a higher elevation. Judges should down mark manoeuvres as too high, too low, too far away, or too close if they consider the positioning to be so.

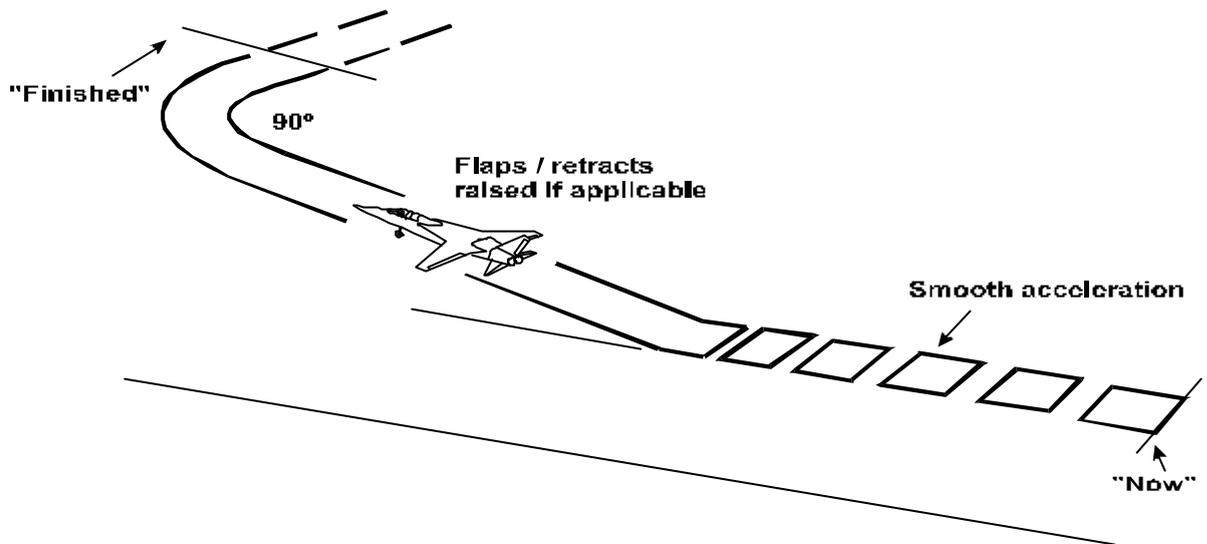
The item 6.3.6.11. "Realism in Flight", should be discussed by all judges after completion of the flight and they should attempt to arrive at an agreed score for this item. At the end of each flight, the chief judge must check all score sheets for completeness.

After each flight, the Chief Judge will record any non-standard event that causes downgrading or loss of flight points. As examples: Missed figures, figures flown out of order, out of flight time, flying behind the "Judges' Line", missing dummy pilot or crash landing.

6C.3.6.1. Take-Off:

The model aircraft should stand still on the ground with the motor running without being held by the pilot or mechanic and then take-off into wind, or as required by the competitor to make best use of the take-off distance available (jet subjects). If the model aircraft is touched after the competitor calls "Now" the take-off will score zero. The take-off should be straight and the model aircraft should smoothly accelerate to a realistic speed, and then lift gently from the ground and climb at an angle consistent with that of the prototype. The take-off is completed after the model aircraft has turned 90 degrees.

If the prototype used flaps for take-off, then the model aircraft should also, but this may be subject to the competitor's judgement taking into account the wind strength. Any flapless take-off due to wind must be nominated to the judges before take-off. Flaps should be raised during the climb-out after take-off. If applicable, the landing gear should be retracted during the climb-out.

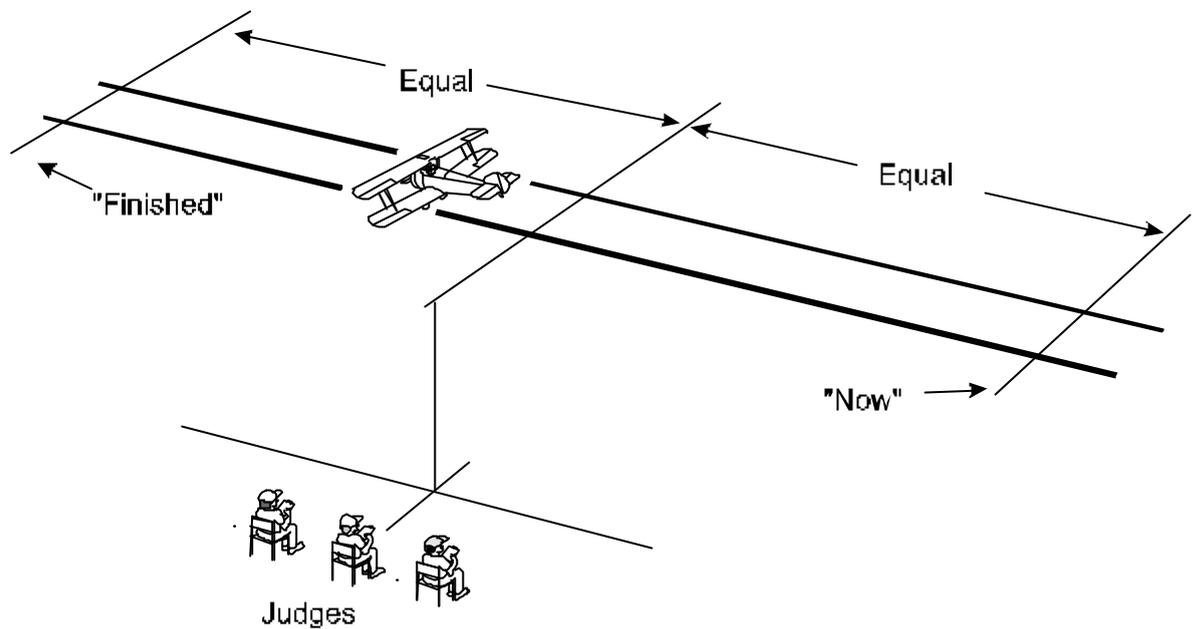


Errors:

1. Model aircraft 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. Flaps not used if applicable.
10. Wheels not raised if applicable.
11. Significant wing drop.
12. Climb-out track not same as take-off run.
13. Unrealistic rate of turn onto crosswind leg.
14. Crosswind track not 90° to climb out track.

6C.3.6.2. Straight Flight:

Model aircraft should make a straight and level flight of at least 100 metres length centred on the judges' position.



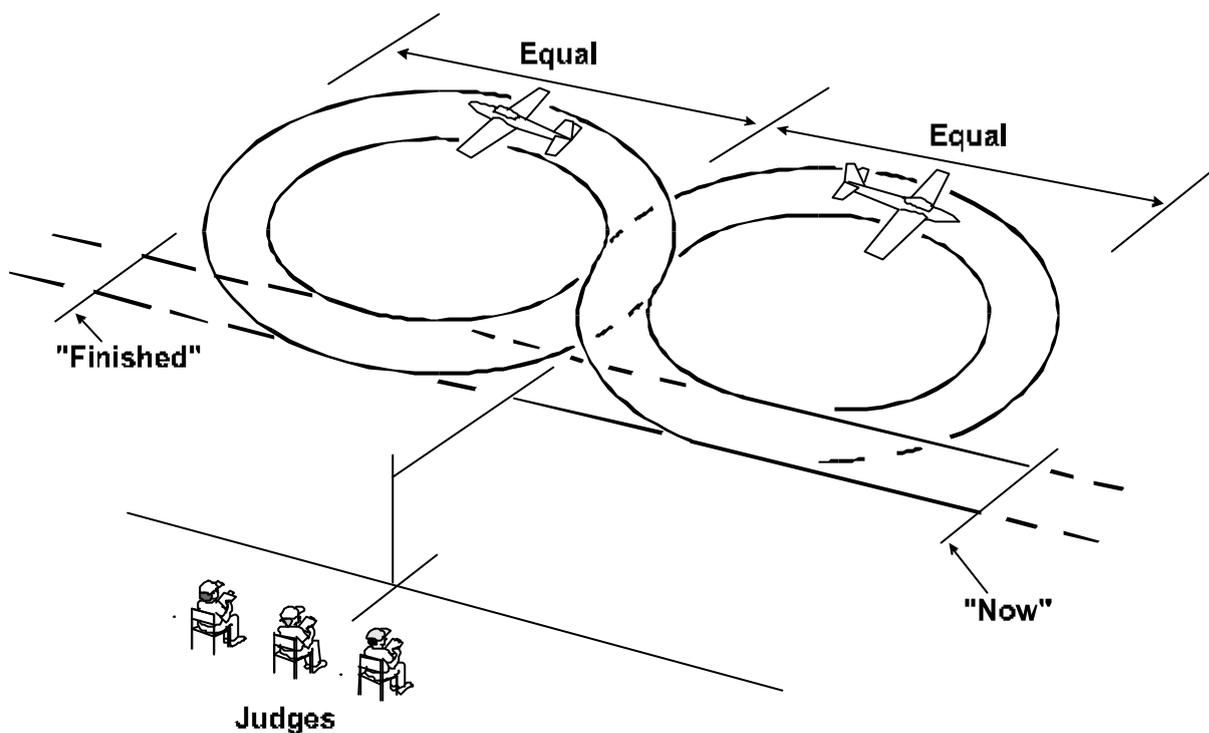
Errors:

1. Not a straight course (slight corrections are acceptable with a light aircraft)
2. Not constant height.
3. Not pass over the landing area.
4. Not centred on judges' position.
5. Not parallel with the judges' line.
6. Too short a distance (too long is not an error).
7. Model aircraft flight path not smooth and steady.
8. Too far away, too close, too high, too low.

6C.3.6.3. 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.

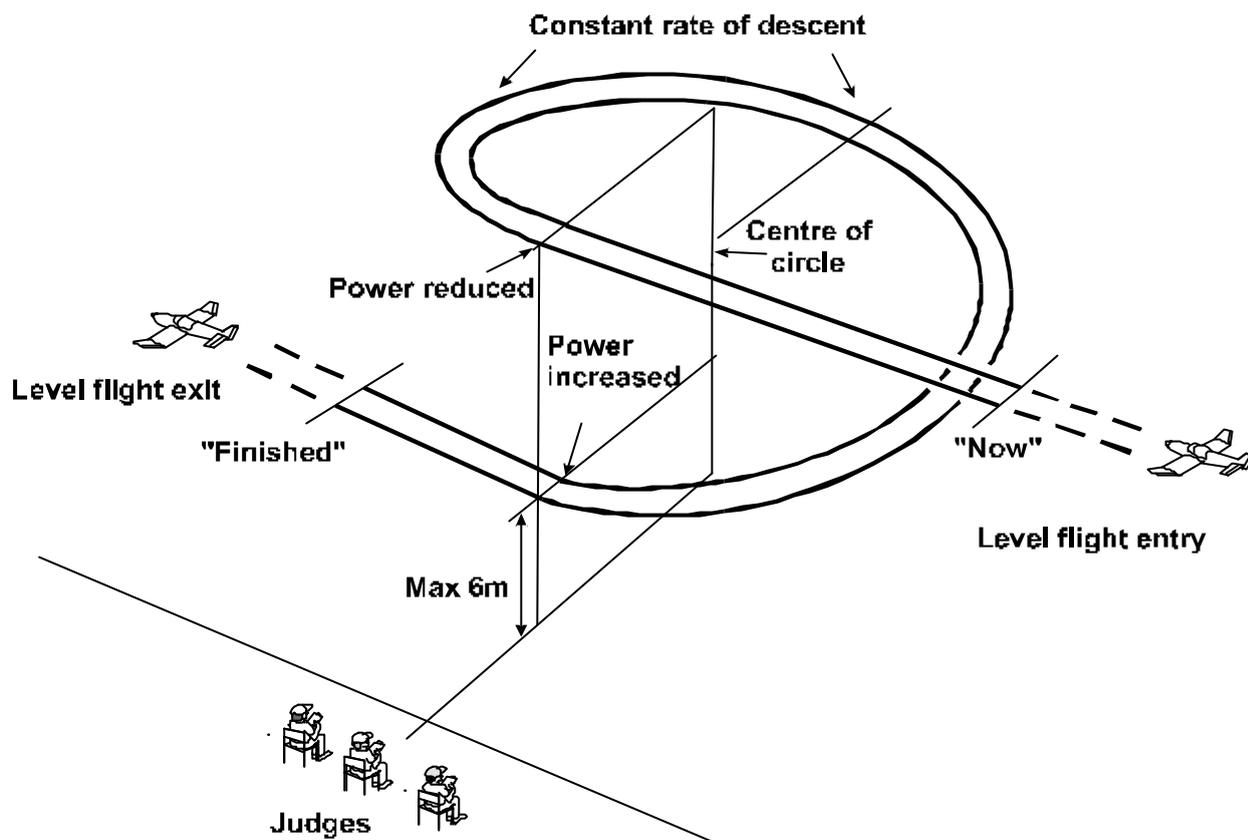


Errors:

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.

6C.3.6.4 360° 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 6 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 6 metres or below.
7. Circle not centred 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.

6C.3.7. Optional Demonstrations:

The selection of optional manoeuvres is dependent upon the capabilities of the aircraft subject type modelled. There are two categories, namely Aerobatics and Non-aerobatics, which are defined as follows:

Aerobatics – Aircraft designed for aerobatic flight, examples of which are military fighters and fighter-bombers, training aircraft, purpose built aerobatic aircraft and some racing aircraft.

Non-aerobatics – Aircraft designed with limited manoeuvrability where the original prototypes of which were restricted by the manufacturer or licensing government agency. Examples are touring aircraft, passenger and cargo aircraft and heavy military transports and bombers.

The selection of manoeuvres and the order in which they are to be flown 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.

The competitor must be prepared, if required by the judges, to give evidence that the options selected are within the normal capabilities of the aircraft subject type modelled.

The following options may only be selected by Non-aerobatic aircraft: -

A -.....Chandelle

N -.....Overshoot

R -.....Flight in triangular circuit

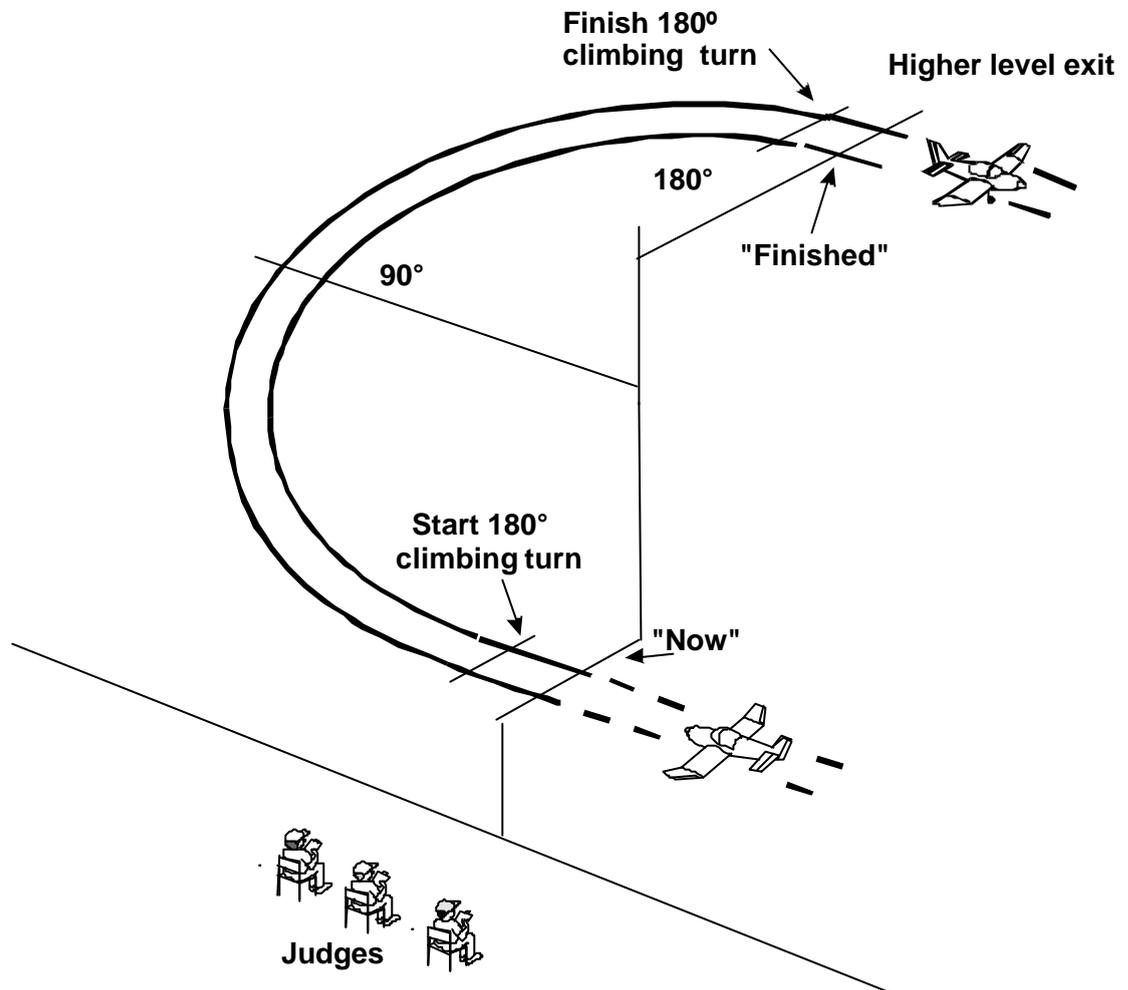
S -.....Flight in rectangular circuit

T -.....Flight in a straight line at constant height

W -.....Wingover 60°

A. Chandelle:

From a straight and level flight the model aircraft passes the judges and then performs a 180° climbing turn in a direction away from the judges, resuming straight and level flight on the opposite heading. The rate of climb should be commensurate with that of the prototype. This manoeuvre is for non-aerobatic prototypes only.



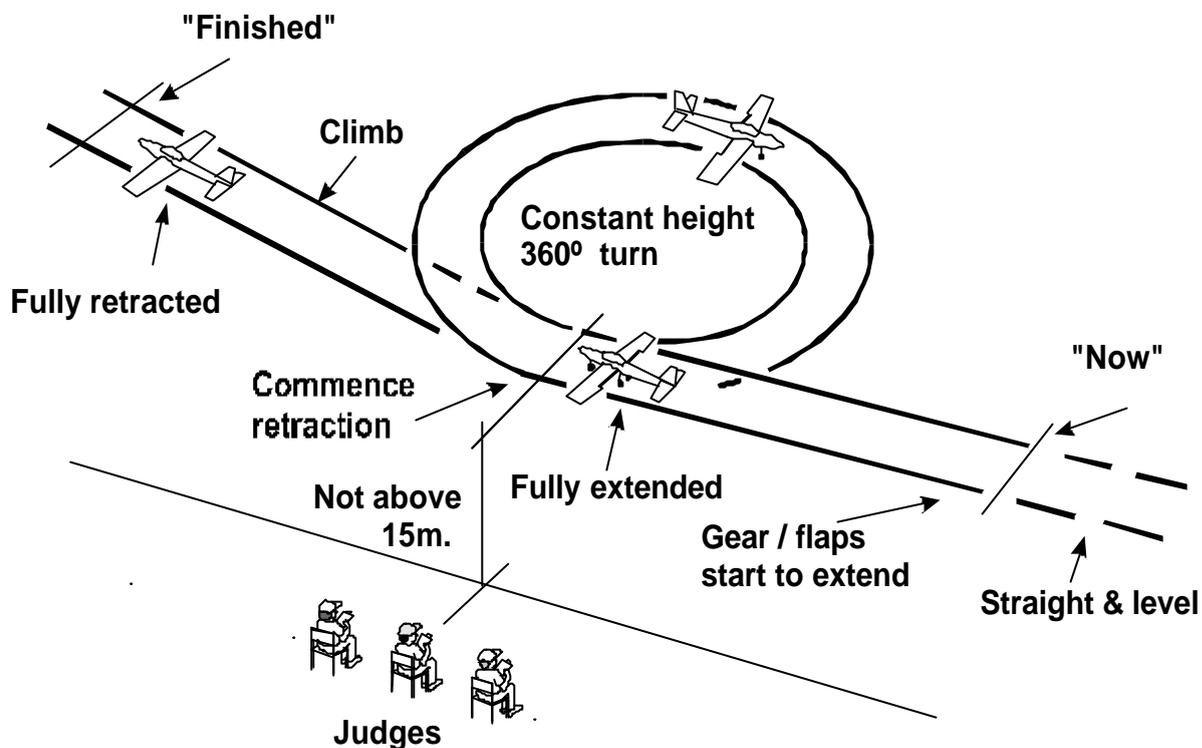
Errors:

1. Turn not smooth and continuous.
2. Climb not smooth and continuous.
3. Half height gain not at 90° position.
4. Excessive/unrealistic engine power used to achieve the climb.
5. Insignificant height gain.
6. Start and finish not centred on judges' position.
7. Entry and exit paths not parallel with the judges' line.
8. Final track not 180 degrees opposite to entry.
9. Entry and exit not in straight and level flight.
10. Too far away or too high.

B. Extend and Retract Landing Gear:

C. Extend and Retract Flaps: (Diagram and errors applicable to both manoeuvres unless stated)

Model aircraft approaches the landing area in straight and level flight at a height not exceeding 15 metres and in full view of the judges, extends the landing gear / flaps. Model aircraft then executes a 360° turn in a direction away from the judges, and when again directly in front of the judges retracts the landing gear / flaps and climbs away in straight flight.



Errors:

1. Model aircraft speed too high for landing gear / flap lowering.
2. Gear / flaps not extended in full view of judges.
3. Speed and sequence of extension and retraction not realistic.
4. Flaps demo only:
 - a) Instability when flaps lowered,
 - b) No change in attitude with flaps.
5. Misshapen circle or not constant height.
6. Circle height exceeds 15 metres.
7. Circle not centred on judges' position.
8. Retraction not commenced abeam judges.
9. Entry and exit paths not parallel with the judges' line.
10. Entry and exit tracks not the same.
11. Un-scale-like climb out.
12. Too far away or too close.

D. Dropping of Bombs or Fuel Tanks:

If bombs are carried internally, bomb-bay doors must be open and be closed after the drop.

If bombs or fuel tanks are carried externally, they must be fitted in the correct positions and in the correct manner. Dropping should be in the manner of the prototype.

Dropping should be within clear view of the judges and centred on the judges' position.

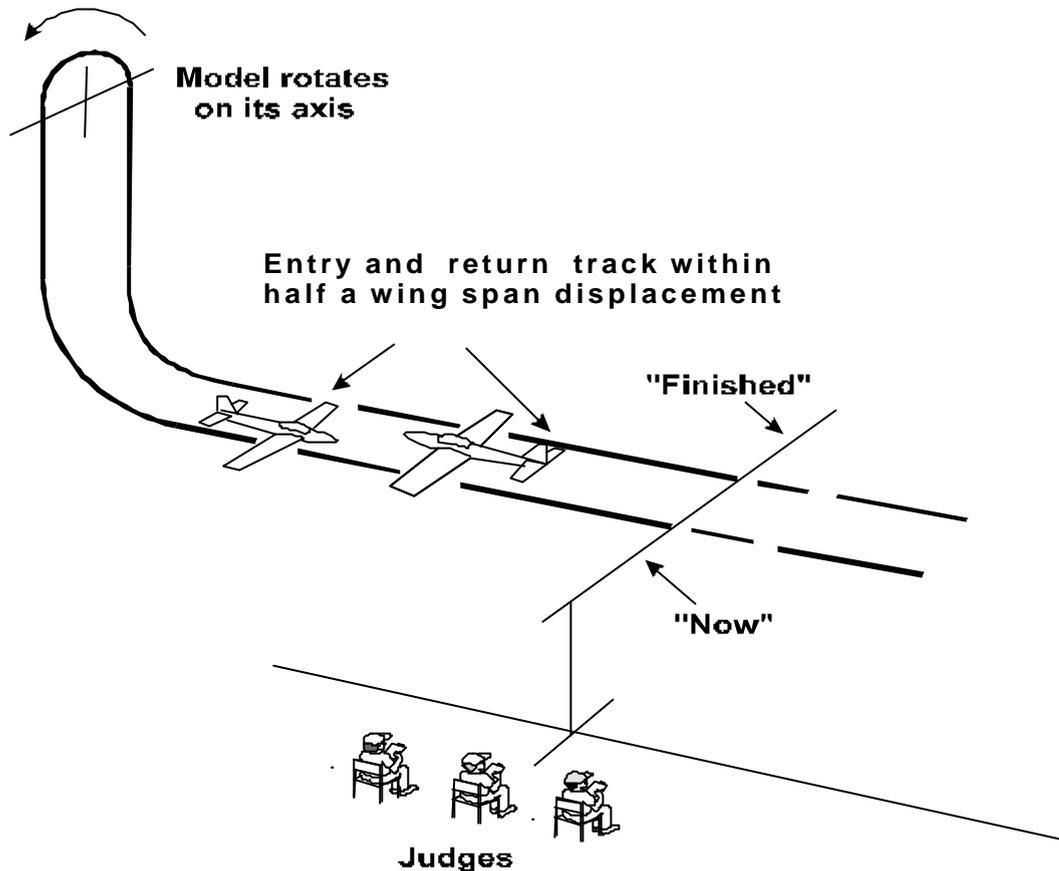
Any special features of the manoeuvre should be declared to the judges beforehand.

Errors:

1. Bombs or tanks do not detach and fall in a realistic manner.
2. Drop is not in front of judges.
3. Overall dropping manoeuvre not presented in a realistic way.
4. Too far away / too close / too high / too low.

E. Stall Turn:

The model aircraft starts in level flight, noses up to a vertical flight path until it comes to a stop. At which point the model aircraft yaws through 180 degrees, then dives and finally recovers straight and level on a flight path in the opposite direction to the entry. Entry and exit should be at the same height. The competitor should specify whether the turn shall be to the left or right. Low powered aircraft types would be expected to execute a shallow dive at full throttle in order to pick up the necessary speed before commencing the manoeuvre.

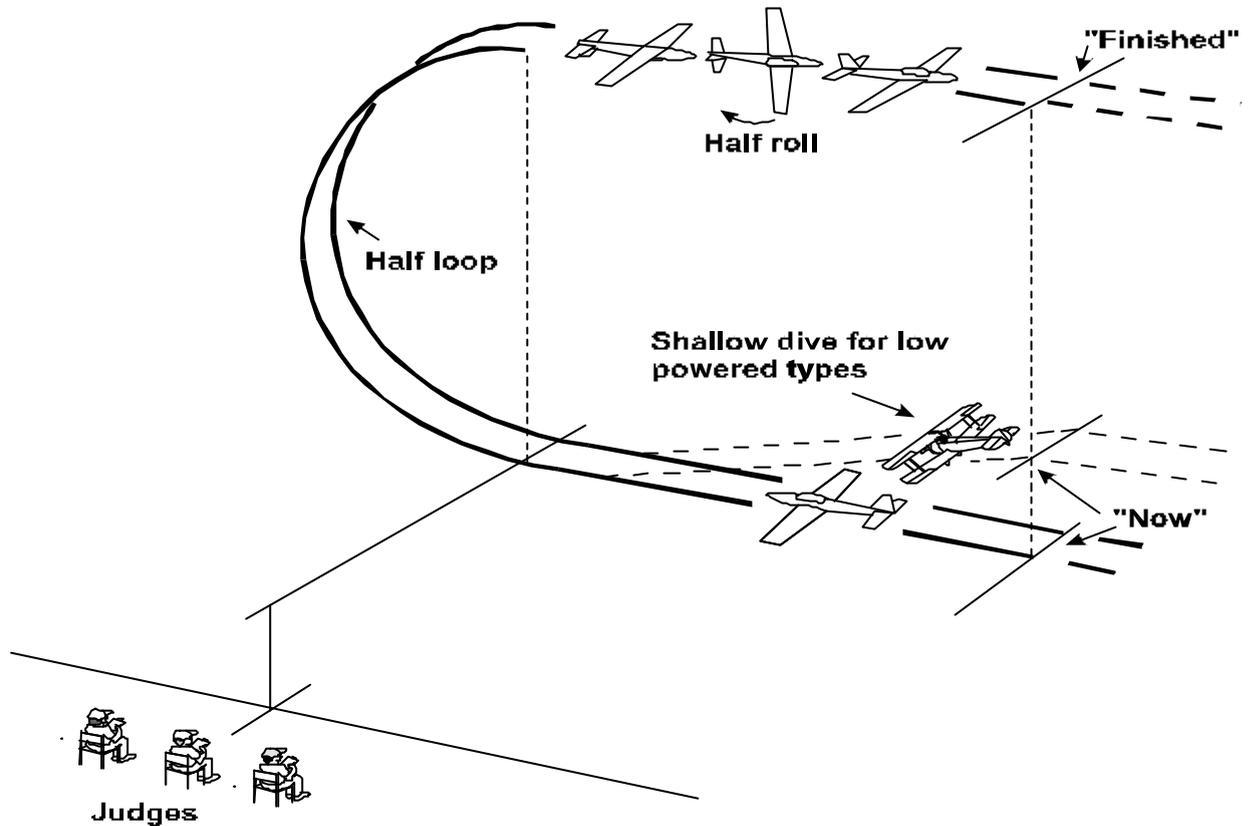


Errors:

1. Start and finish not parallel with judges' line.
2. Pull up not positioned to give best view to judges.
3. Climb and descent not near vertical.
4. Insufficient height gain.
5. Model aircraft does not stop.
6. Competitor does not specify or achieve nominated left / right turn.
7. Entry and exit paths are not at same height.
8. Model aircraft does not exit within half span displacement of entry track.
9. Entry and exit paths not parallel with the judges' line.
10. Too far away / too close / too high / too low.

F. Immelmann Turn:

From a straight and level flight the model aircraft pulls up into the first half of a circular loop (commensurate with the performance of the subject type), and when inverted, performs a half roll before resuming straight and level flight on the opposite track. Low powered aircraft types would be expected to commence the manoeuvre by executing a shallow dive at full throttle in order to pick up the necessary speed.



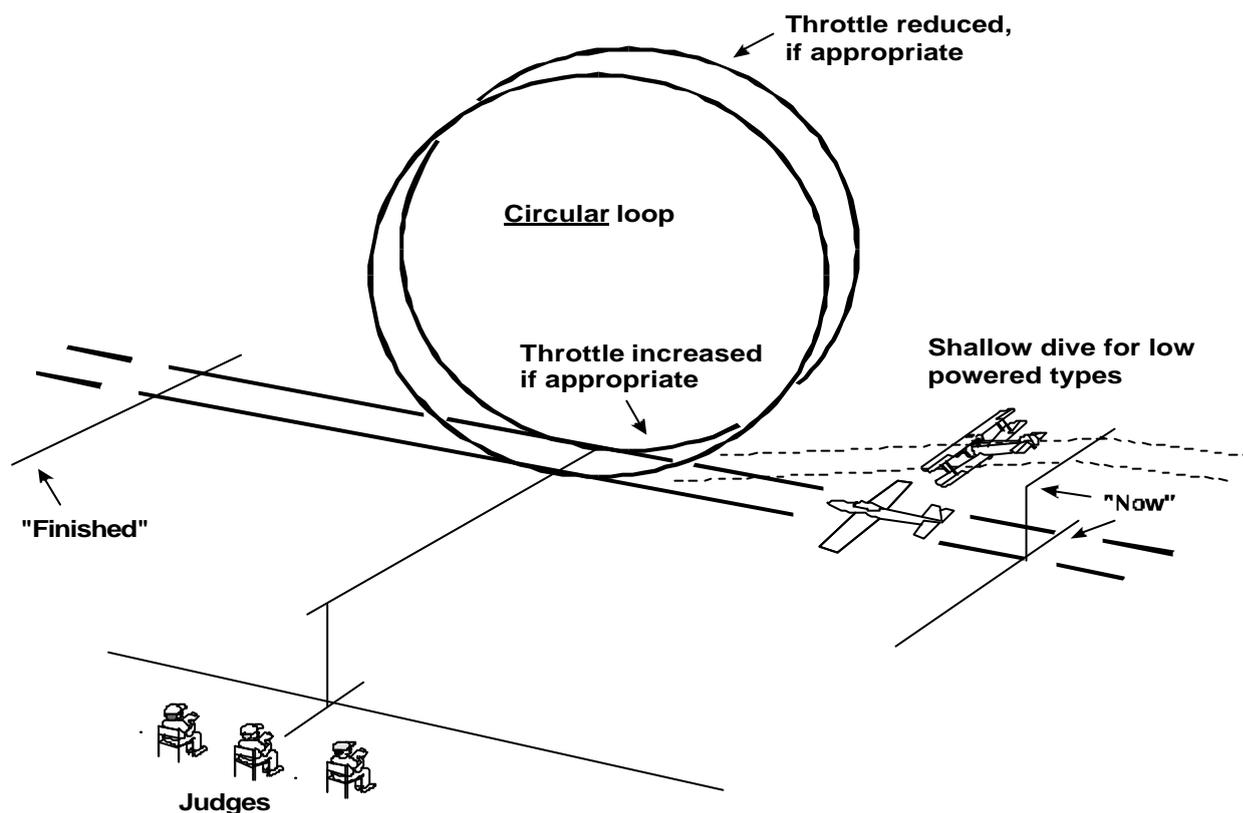
Errors:

1. Track of the half loop not vertical.
2. Half loop not centred on judges' position.
3. Half loop is not sufficiently semicircular.
4. Roll starts too early or too late.
5. Excessive height loss in the roll.
6. Track veers during the roll.
7. Does not resume straight and level flight on the opposite track to entry.
8. Manoeuvre not flown parallel with judges' line.
9. Size of manoeuvre and speed not in manner of the prototype.
10. Too far away / too close / too high / too low.

G. Loop:

From straight flight, the model aircraft pulls up into a circular loop and resumes straight and level flight on the same heading as the entry. The throttle may be reduced at the top of the loop as appropriate to type, and opened if necessary when normal flight is resumed. Low powered aircraft types would be expected to execute a shallow dive at full throttle in order to pick up speed before commencing the loop.

Note: Whilst the loop is intended to be a circular manoeuvre, the ability of a low powered aircraft to achieve a perfect circle will be significantly less than that of a jet or high powered aerobatics machine. A slightly elongated loop by the former would therefore expect to score as well as a perfect circle achieved by the latter, but a grossly misshapen circle would be significantly down marked. This also applies to other options involving looping manoeuvres.

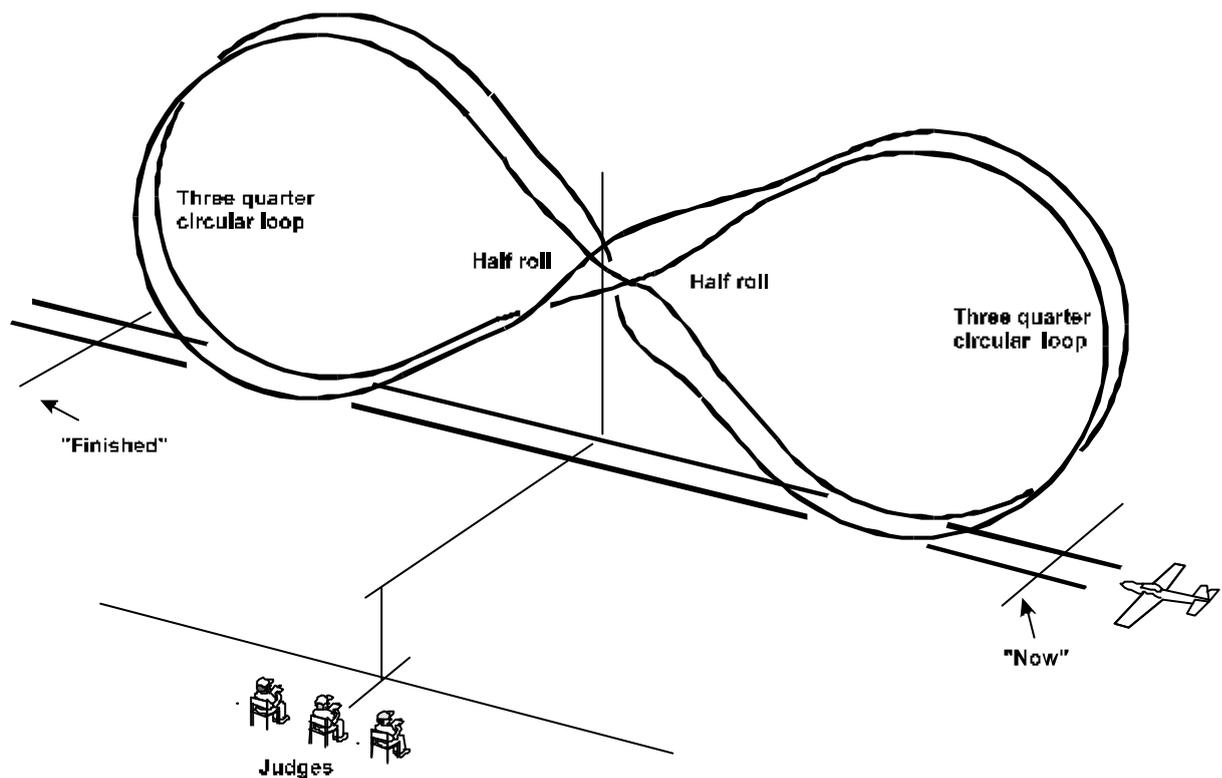


Errors:

1. Track of loop not vertical
2. Loop not sufficiently circular, commensurate with the subject type.
3. Inappropriate use of throttle.
4. Size and speed of Loop not in manner of prototype.
5. Not centred on judges' position.
6. Does not resume straight and level flight on same track and height as entry.
7. Manoeuvre not flown parallel with judges' line.
8. Too far away / too close / too high / too low.

H. Cuban Eight:

Model aircraft pulls up into a circular inside loop until 45° nose down. The 45° inverted flight is held until a half roll when abeam the judges, 45° upright then held until entry height is achieved when a similar circular inside loop is flown to repeat the manoeuvre in the opposite direction. Straight and level recovery is to be at the same height as the original entry. Throttle may be closed at the top of each loop, as appropriate to subject type, and reopened during each descent. A low powered aircraft would be expected to execute a shallow dive at full throttle in order to pick up speed before commencing the manoeuvre.

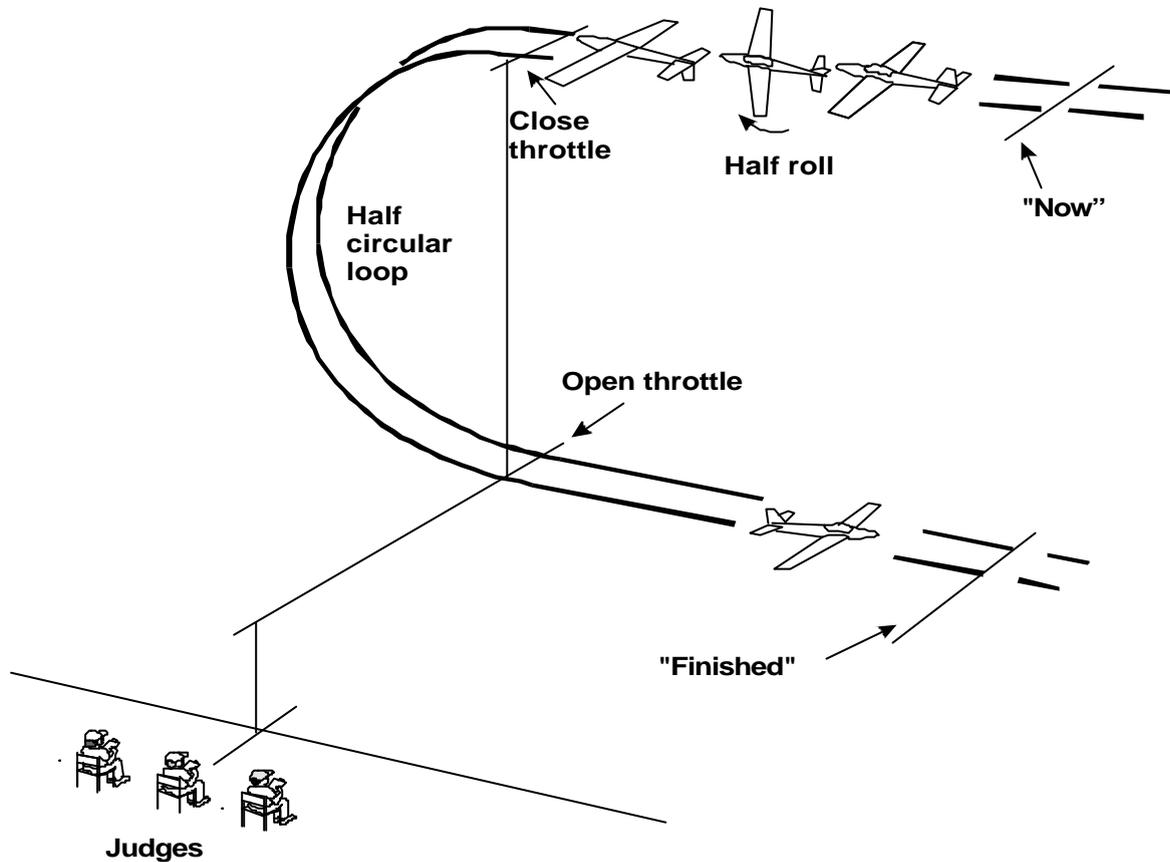


Errors:

1. Manoeuvre not performed in a constant vertical plane that is parallel with the judges' line.
2. Loops are not circular.
3. Loops are not the same size.
4. Half rolls are not centred on the judges' position.
5. 45° descent paths not achieved.
6. Model aircraft does not exit manoeuvre at same height as entry.
7. Model aircraft does not resume straight and level flight on same track as entry.
8. Inappropriate use of throttle.
9. Size and speed of loops not in manner of prototype.
10. Too far away / too close / too high / too low.

I. Split S (Reversal):

From straight flight, the model aircraft performs a half roll and when inverted performs half of a circular inside loop (commensurate with the performance of subject type), and resumes straight and level flight on a flight path opposite to that of the entry. The throttle should be closed at the inverted position, as appropriate to type, and opened when normal flight is resumed.

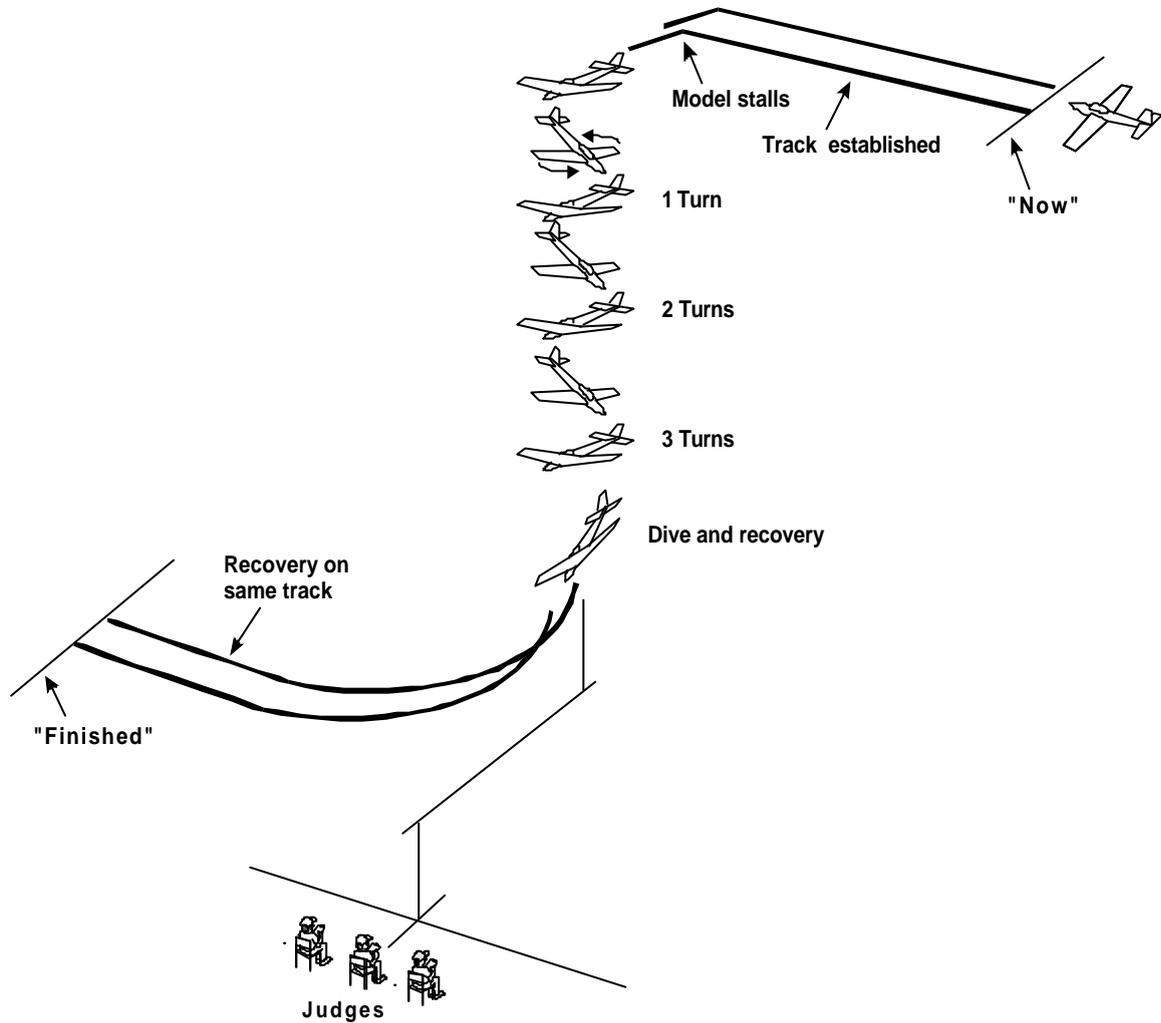


Errors:

1. Model aircraft changes track during half roll.
2. Model aircraft inverted too long or too short.
3. Inappropriate use of throttle.
4. Track of half loop not on line or vertical.
5. Half loop is not sufficiently semicircular.
6. Too fast or too tight a half loop.
7. Does not resume straight and level flight on opposite track to entry.
8. Half loop not centred on judges' position.
9. Manoeuvre not flown parallel with the judges' line.
10. Too far away / too close / too high / too low.

J. Spin Three Turns:

From straight and level flight, the model aircraft decelerates into a stall and commences the spin through three turns and recovers to level flight on the same track as the initial flight direction. During descent the model aircraft may drift with the wind.



Errors:

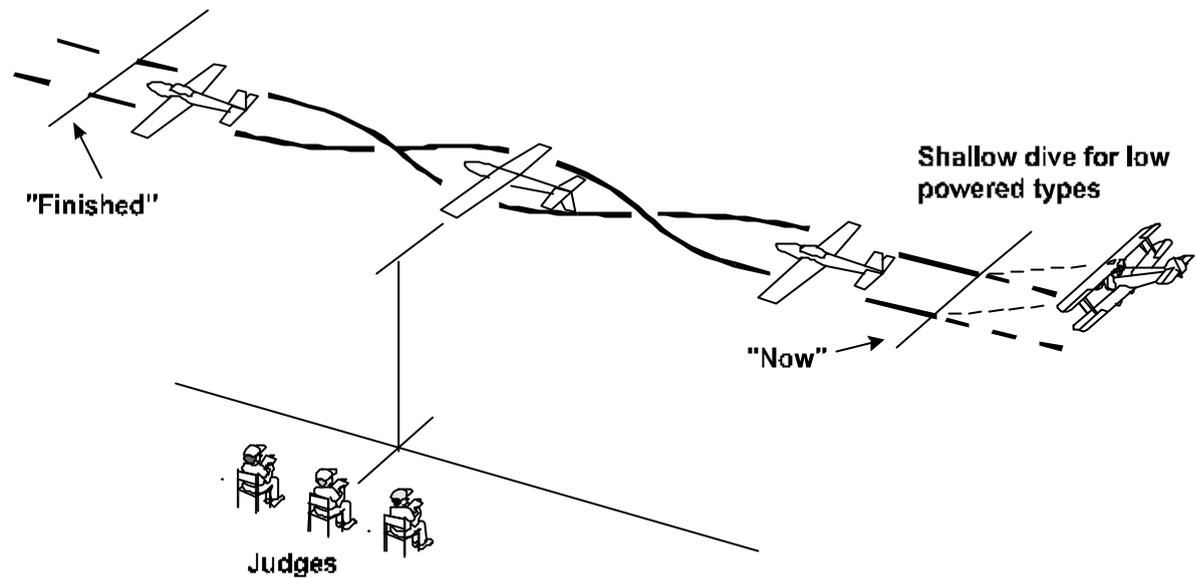
1. Engine not throttled back at point of stall.
2. Entry into spin not clean and positive.
3. Not a true spin but merely a spiral dive (which should score zero).

Note: In a true spin descent path will be close to C of G of model aircraft. A spiral dive is a tight vertical barrel roll.

4. Not three complete turns.
5. Start of spin not centred on judges' position.
6. Model aircraft does not resume straight and level flight on same track as entry.
7. Entry and exit paths not parallel with judges' line.
8. Entry and exit not in level flight
9. Too far away / too close / too high / too low.

K Roll:

From straight and level flight, the model aircraft rolls at a constant rate through one complete rotation and resumes straight and level flight on the same track. Low powered aircraft would be expected to execute a shallow dive at full throttle before the manoeuvre. Competitors should nominate any special type of roll that will be performed, e.g. Slow, Barrel, Snap.



Errors:

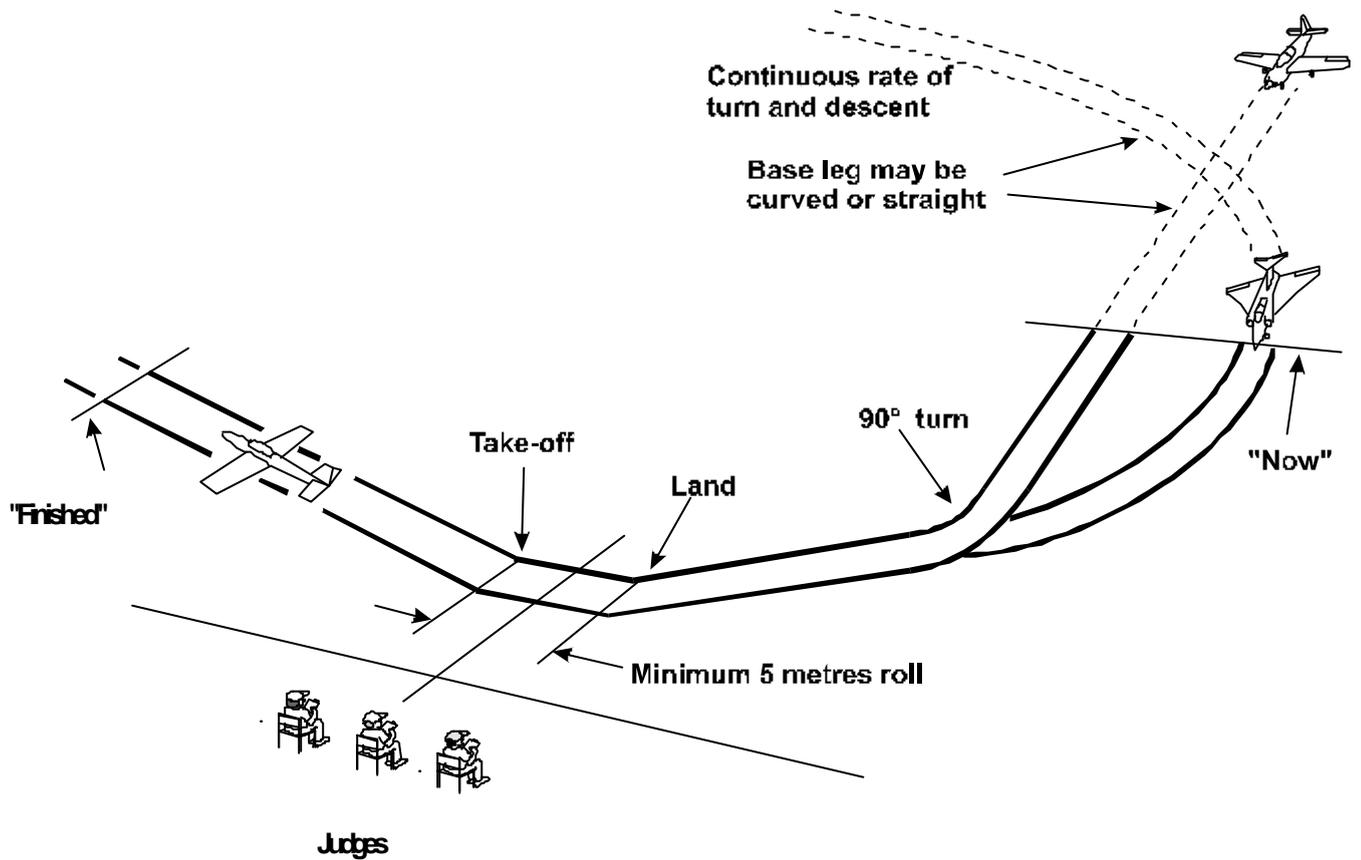
1. Rate of roll is not constant.
2. Style of roll not typical to prototype.
3. Roll not centred on judges' position.
4. Entry and exit at different heights.
5. Entry and exit at different speeds.
6. Entry and exit tracks and line of roll not parallel with judges' line.
7. Does not resume straight and level flight on same track as entry.
8. Style of roll not as nominated.
9. Inappropriate use of throttle.
10. Too far away / too close / too high / too low.

L Parachute:

The drop should be in the manner of the prototype. For example, cargo should be dropped from a hatch or bomb bays. Man via doors, hatch or by inverting the aircraft. The model aircraft should reduce speed before commencing drop, possibly by using flaps and lowering the landing gear. If the prototype used a braking parachute in landing, the competitor may demonstrate this.

M Touch and Go:

The model aircraft commences by descending from base leg, which may be either curved or straight as required by the pilot. The turn is continued through 90 degrees onto final approach. The model aircraft then lands and takes off again into wind without coming to a halt. The main wheels must roll on the ground for a minimum of five metres. Flaps



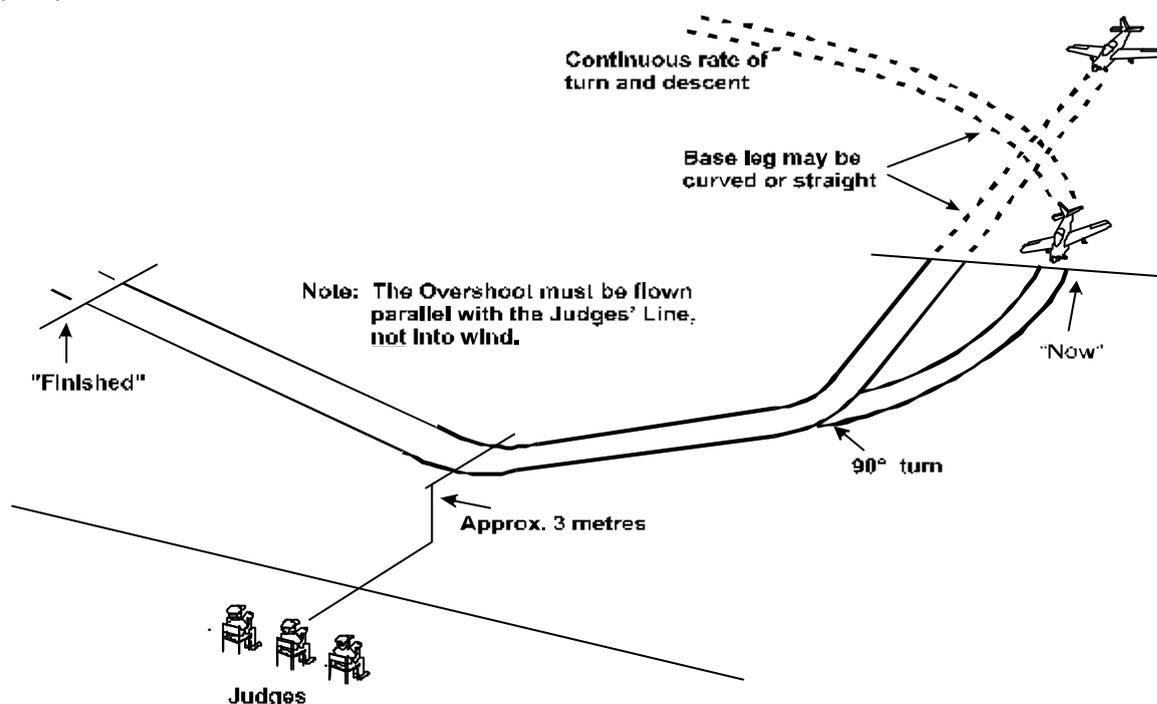
will be used if applicable.

Errors:

1. Manoeuvre does not commence on base leg.
2. Turn onto final approach too tight 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 achieve a minimum ground roll of 5 metres (*note: if prototype has two main wheels then both wheels must roll on ground for minimum 5 metres*).
6. Model aircraft bounces on landing.
7. Inappropriate use of flaps.
8. Climb out not smooth or realistic.
9. Approach and climb out tracks not the same.
10. Does not make best use of landing space available for wind direction.

N **Overshoot:**

The model aircraft commences by descending from base leg, which may be either curved or straight as required by the pilot. The turn is continued through 90 degrees onto a higher than normal landing approach on low throttle, using flaps if applicable. On reaching the centre of the landing area at a height of approximately 3 metres, power is applied to check the descent. After normal flying speed and attitude are attained the model aircraft climbs straight ahead. The aim of the manoeuvre is to simulate an aborted landing due to a higher than normal landing approach. This option may only be nominated for non-aerobatic aircraft.

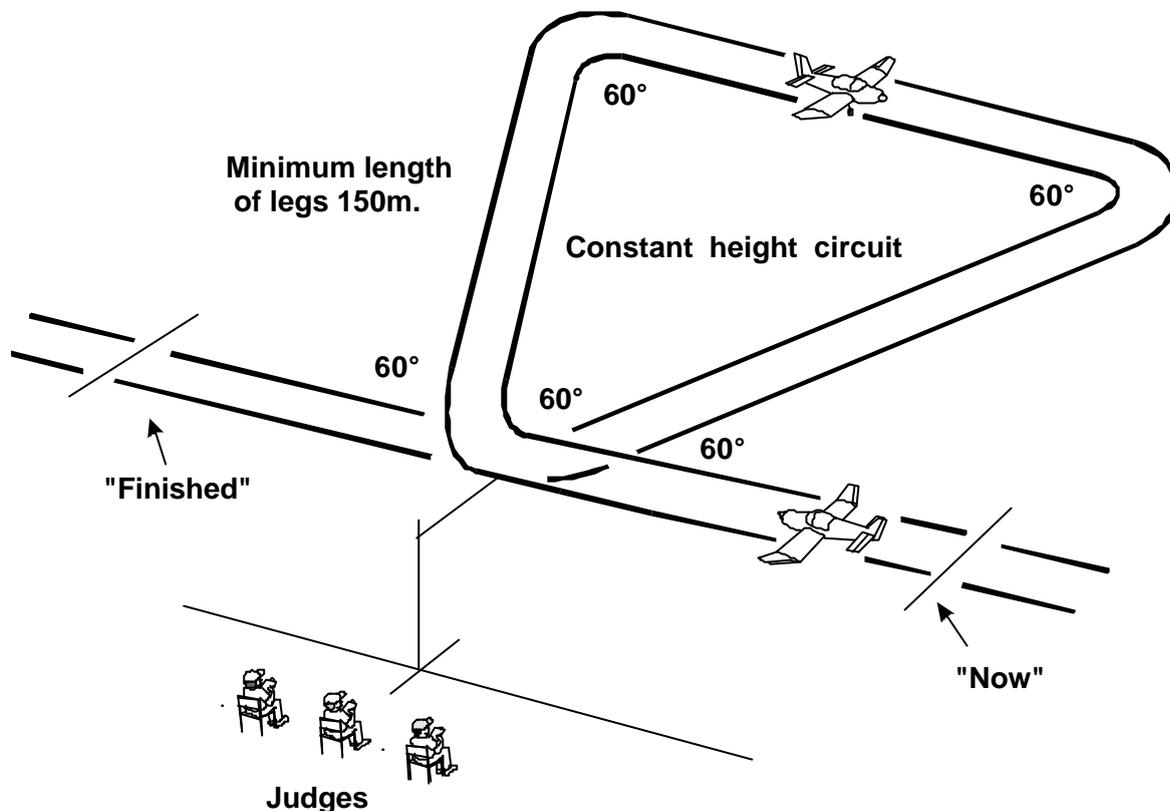


Errors:

1. Manoeuvre does not commence on base leg.
2. Turn onto final approach not smooth and continuous or not 90°.
3. Model aircraft does not achieve correct high landing approach.
4. Model aircraft does not achieve correct landing speed or attitude.
5. Not continually descending until power applied.
6. Model aircraft descends to significantly above or below 3 metres.
7. Lowest point of manoeuvre not achieved in front of judges.
8. Not smooth transition of speed & attitude from approach, through descent check to climb -out.
9. Inappropriate use of flap and/or gear.
10. Model aircraft could have landed from approach.
11. Model aircraft does not climb away smoothly.
12. Approach and climb out tracks not the same.
13. Too close or too far away.

R. Flight in Triangular Circuit:

The model aircraft approaches in a straight and level flight to a point directly in front of the judges. It then turns away to track 60° away from the judges' line. It then flies straight and level for a minimum of 150 metres, turns to track parallel with the judges' line, flies a further minimum of 150 metres, then turns to track towards the judges and flies a further minimum of 150 metres to a position above the centre of the landing area, which completes an equilateral triangle (i.e. a triangle with sides of equal length and angles of 60°), before making a final turn to intercept the original entry track. This option may only be nominated for non-aerobatics aircraft.

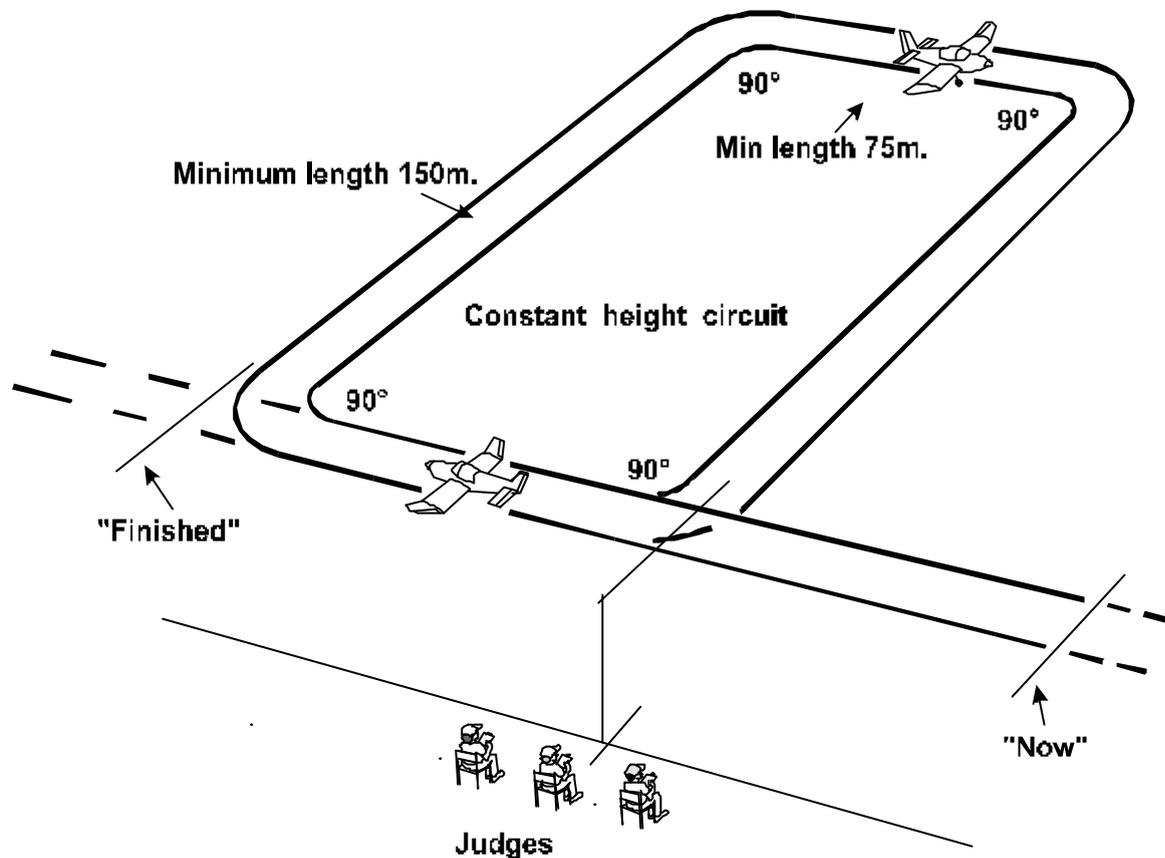


Errors:

1. Not commenced and finished at points equidistant from the judges.
2. Model aircraft changes height.
3. Rate of turn at corners not constant or inside corners of triangle not 60° .
4. Sides of the triangle are not straight.
5. Sides of triangle are not equal lengths.
6. Sides of the triangle are too long or too short.
7. Apex of triangle not centred on judges' position.
8. Correction for drift not properly made.
9. Start and finish tracks not the same.
10. Start and finish tracks not parallel with judges' line.
11. Too far away / too close / too high / too low.

S Flight in Rectangular Circuit:

The model aircraft approaches in straight level flight to a point directly in front of the judges. It then continues for a minimum of 75 metres before it turns away to track 90° from the judges' line and flies straight and level for a minimum of 150 metres before turning to track parallel with the judges' line for a further minimum of 75 metres. It then turns to track directly towards the judges for a minimum of 150 metres, to a point in front of the judges, before completing a final turn to intercept the original entry track. This manoeuvre describes a rectangle over the ground. This option may only be nominated for non-aerobatic aircraft.

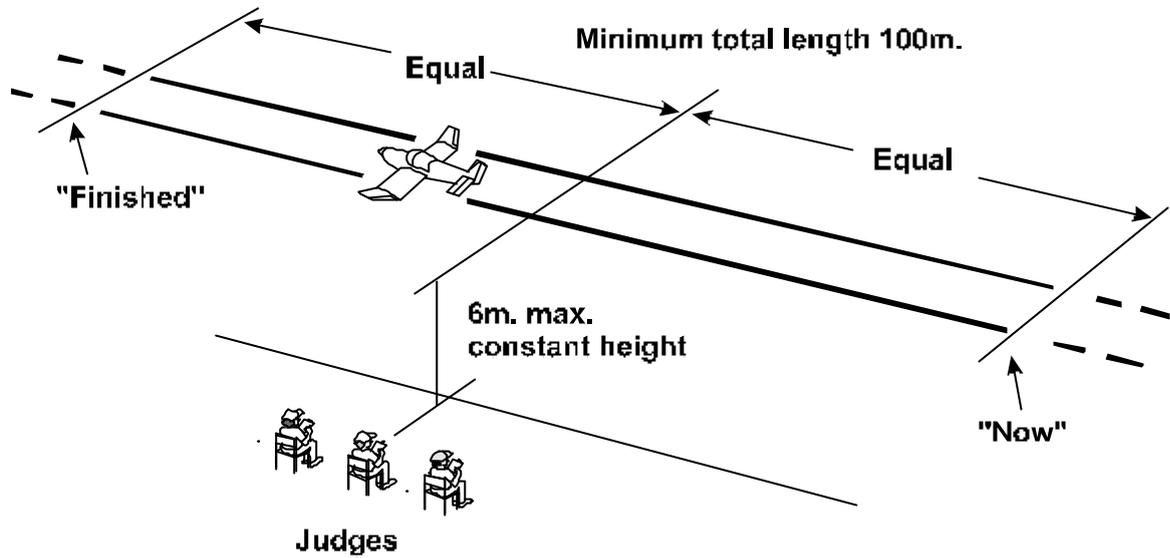


Errors:

1. Not commenced and finished at points equidistant from the judges.
2. Model aircraft changes height.
3. Rate of turn at corners not constant or corners not 90° .
4. Legs are not straight.
5. Legs too long or too short.
6. Opposite sides of rectangle are not of equal length
7. Correction for drift not properly made.
8. Final leg of rectangle not centred on judges' position.
9. Start and finish tracks not the same.
10. Start and finish tracks not parallel with judges' line.
11. Too far away / too close / too high / too low.

T Flight in a Straight Line at Constant Height (Maximum 6 m):

Model aircraft approaches in straight flight at a constant height not exceeding 6 metres for a minimum distance of 100 metres, then climbs away. This is in effect a low flypast and may only be nominated for non-aerobatic prototypes.

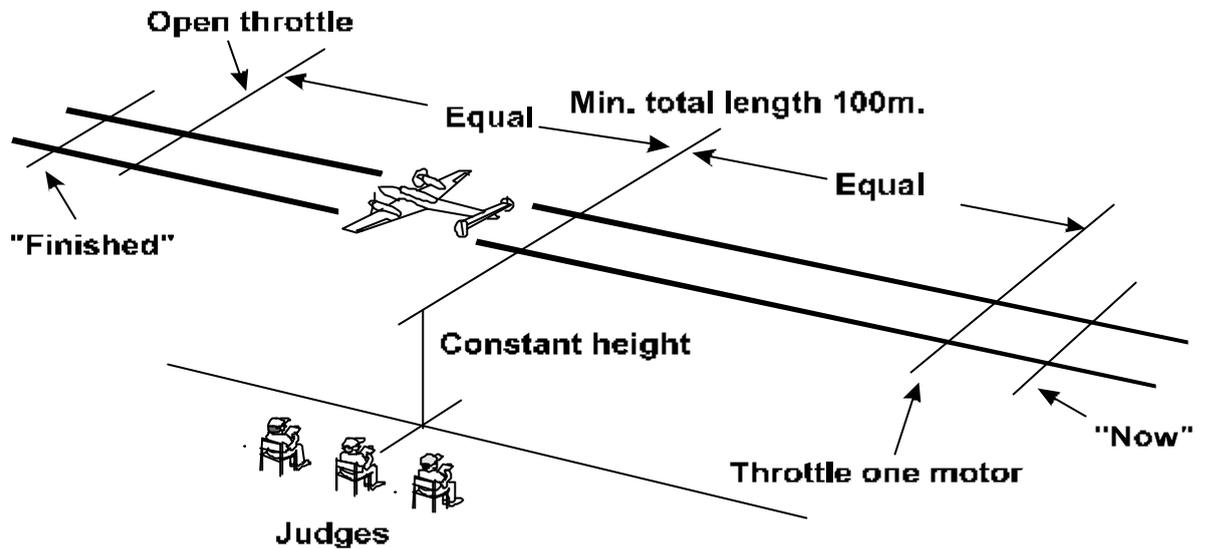


Errors:

1. Not a straight course (slight corrections acceptable with light aircraft).
2. Not constant height.
3. Not 6 metres or below.
4. Not pass over the landing area.
5. Not centred on judges' position.
6. Not parallel with the judges' line.
7. Too short distance (too long is not an error).
8. Model aircraft flight path not steady.
9. Too far away / too close / too high / too low.

U Flight in a Straight Line With One Motor Throttled:

Model aircraft approaches in straight flight at a constant height with one motor throttled, for a minimum of 100 metres, after which the motor is opened up and the model aircraft resumes normal flight. (This option is only for multi-engined subjects.)



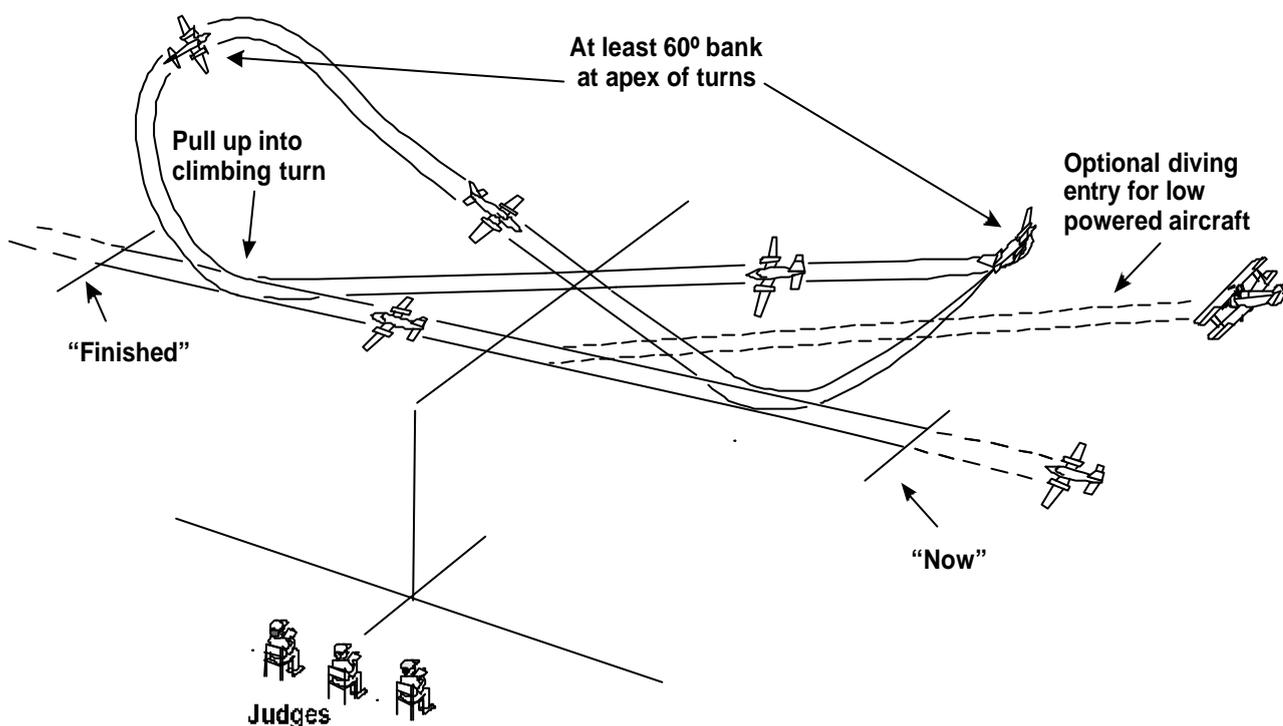
Errors:

1. Flight not straight.
2. Model aircraft is unstable.
3. Undue loss of height.
4. Engine not opened up after demo.
5. Engine not throttled back sufficiently.
6. Insufficient duration.
7. Not centred in front of judges' position.
8. Not flown parallel with the judges' line
9. Too far away / too close / too high / too low.

V Lazy Eight

The model aircraft approaches in straight and level flight on a line parallel with the Judges' line. After passing the judges' position a smooth climbing turn is commenced away from the judges. At the apex of the turn the bank should be at least 60°. The nose of the model aircraft then lowers and the bank comes off at the same rate as it went on. The turn is continued beyond 180° to cross in front of the judges with wings level before intercepting and turning on to the reciprocal of the original approach track. This completes half of the figure, which is then repeated in the opposite sense to give the full manoeuvre. Intercepting the original approach track parallel with the judge's line completes the Lazy Eight. A low powered aircraft would be expected to execute a shallow dive at full throttle in order to pick up speed before commencing the manoeuvre. The figure should be symmetrical each side of the judges' position.

This manoeuvre is essentially two Wingovers in opposite directions, and should be capable of being flown by most aircraft.



Errors:

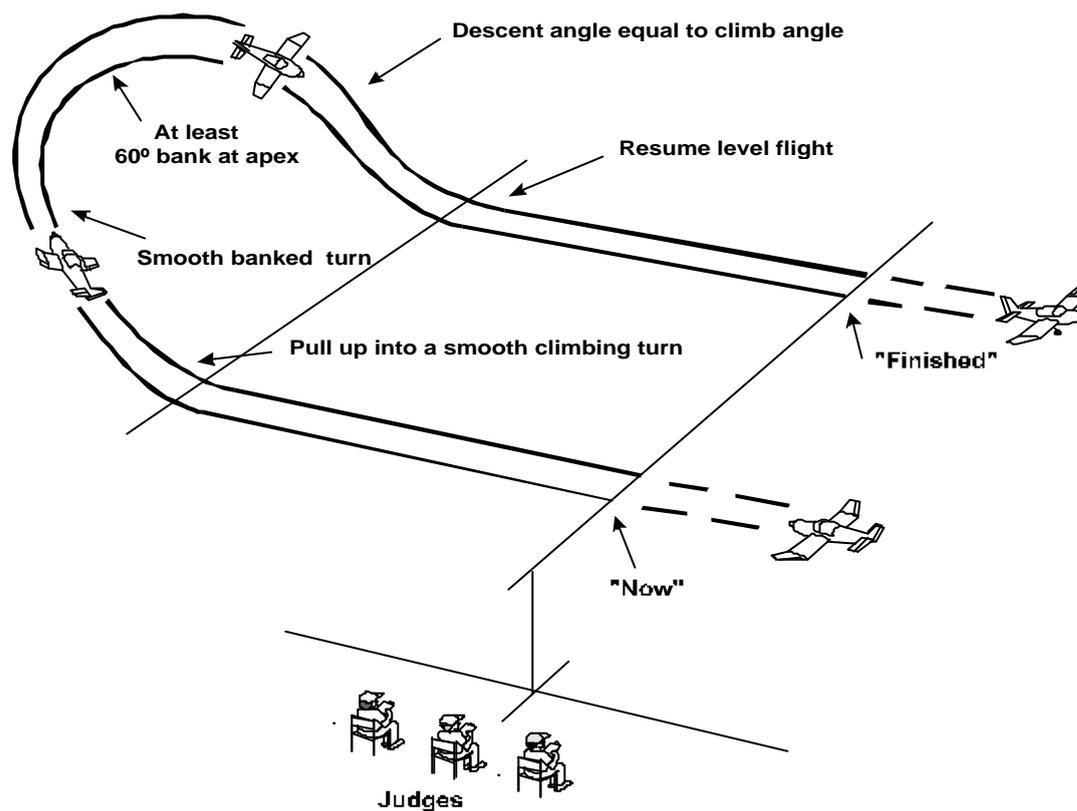
- 1 Entry and exit paths not parallel with judges' line.
2. Insufficient climb achieved.
- 3 Insufficient bank achieved.
- 4 Climb and descent angles not equal throughout manoeuvre.
5. Manoeuvre not symmetrical about judges' position.
6. Arcs misshapen.
7. Start and finish positions not as indicated.
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.

W Wingover.

The model aircraft approaches in straight and level flight on a line parallel with the Judges' line. After passing the judges' position a smooth climbing turn is commenced away from the judges. At the apex of the turn the bank should be at least 60°. The nose of the model aircraft then lowers and the bank comes off at the same rate as it went on. The turn is continued through 180° to recover straight and level flight at the same height and on a heading opposite to that of the entry.

A low powered aircraft would be expected to execute a shallow dive at full throttle in order to pick up speed before commencing the manoeuvre.

This option may only be nominated for non-aerobatic aircraft.

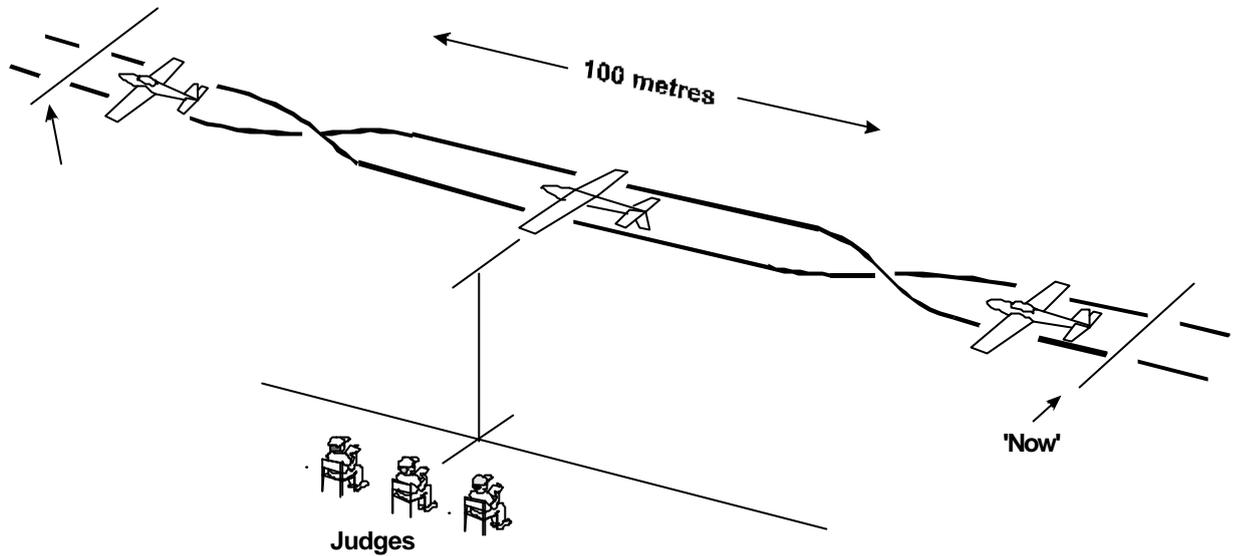


Errors:

1. Start and finish positions not as indicated.
2. Insufficient climb achieved.
3. Insufficient bank achieved
4. Climb and descent angles not equal throughout manoeuvre.
5. Model aircraft does not fly a smooth and symmetrical arc.
6. Entry and exit paths not parallel with judges' line.
7. Overall size of manoeuvre not realistic for prototype.
8. Model aircraft flight path not smooth and steady.
9. Too far away / too close / too high / too low.

X Inverted Flight.

Model aircraft half rolls into inverted attitude and makes a straight inverted flight of 100 metres in length, and then half rolls out of inverted attitude and resumes normal straight flight. A low powered aircraft would be expected to execute a shallow dive at full throttle in order to pick up speed before commencing the manoeuvre.



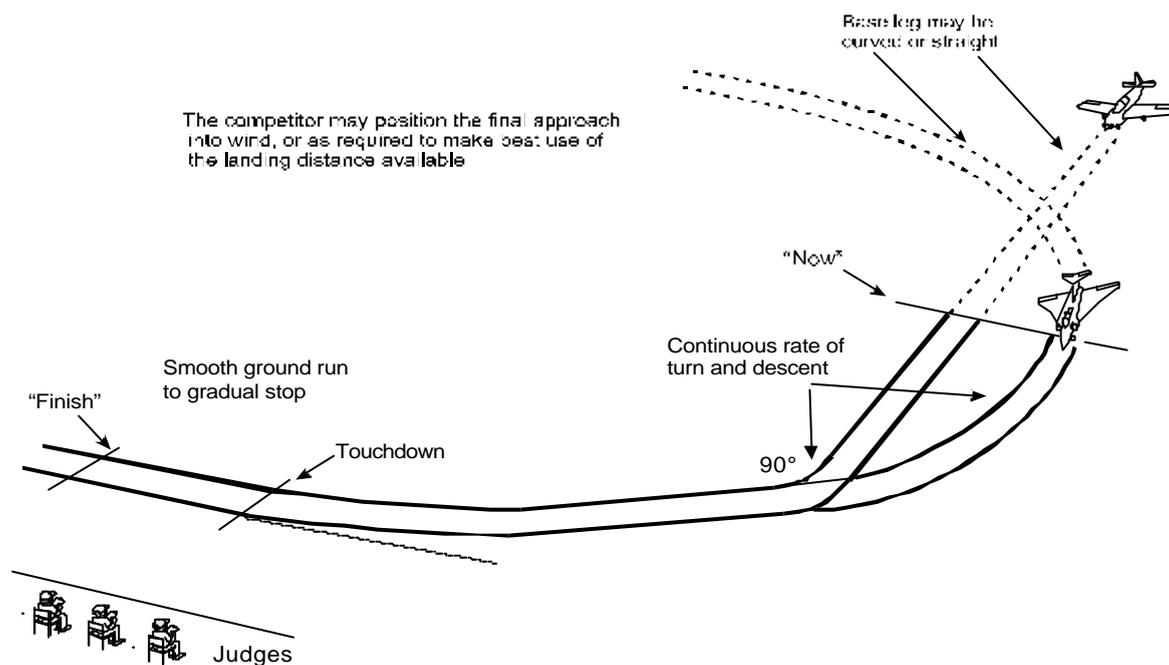
Errors:

1. Half rolls not performed on same track as inverted flight.
2. Model aircraft does not fly a straight course.
3. Model aircraft gains or loses height.
4. Model aircraft does not remain inverted for the prescribed duration.
5. Manoeuvre not centred on judges' position.
6. Manoeuvre not flown parallel with judges' line.
7. Too far away / too close / too high / too low.

6C.3.6.10 Approach and Landing

The manoeuvre commences by descending from base leg (in the same way as the Touch and Go). Prior to this point the model aircraft may complete any form of appropriate circuit to achieve a landing configuration. This may be a full rectangular or oval pattern, or a join directly onto the downwind or base legs. The Approach and Landing may be orientated into wind, or as required by the competitor to make best use of the landing distance available (e.g. jet subjects).

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, the prevailing wind conditions, or the surface of the landing area. 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 model aircraft running off the prepared area, because this is too short for the particular wind direction, 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.

6C.3.6.11. Realism in Flight

Realism in Flight covers the entire flight performance including the way in which the model aircraft flies between manoeuvres.

Judges will allot points for Realism within the following aspects, always keeping in mind the likely characteristics of the full size subject:

Engine sound (realistic tone & tuning) K = 2

“Tone” relates to the character of the sound by comparison with the full size at all throttle settings.

“Tuning” is the smoothness of operation of the engine at all throttle settings.

The marks for engine sound should therefore be split equally between these two aspects.

Speed of the model aircraft K = 4

This should be an assessment of the scale speed of the model aircraft, calculated from the speed of the full size aircraft (as indicated on the score sheet and documentation) divided by the scale of the model aircraft. Model aircraft invariably fly faster than scale speed and marks should be deducted accordingly. For example, a model aircraft that appears to be flying at twice scale speed should score no more than half marks, a model aircraft flying at three times scale speed, or faster, should score zero.

Smoothness of flight..... K = 4

The model aircraft should be well trimmed and show no signs of instability. Judges should assess the smoothness of control taking into account the prevailing weather conditions. They should also judge the attitude of the model aircraft in flight, i.e. any nose-up or nose-down tendency.

Size of manoeuvres..... K = 3

Unless otherwise specified, the size of manoeuvres should be in proportion to the scale of the model aircraft and the nature of the prototype. Judges must use their own experience to score this aspect based upon the amount of airspace that they would expect the prototype to use if it were performing a full size flying display.

Notes:

1. Any model aircraft that flies with wheels down, whereas the prototype actually featured retractable landing gear the total flight score shall be reduced by 10%.
2. If the pilot of the prototype is visible from the front or from the side during flight, a dummy pilot of scale size and shape shall be equally visible during flight in the model aircraft. If such a pilot is not fitted, the total flight score shall be reduced by 10%.

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ANNEX 6D

JUDGES' GUIDE FOR SCALE FREE FLIGHT FLYING SCHEDULE

SCALE OUTDOOR F/F POWER CLASS

6.D.1 Models should at all times fly in the same manner as the prototype. The following notes describe an average aeroplane; judges should use their own personal judgement to decide on an appropriate flight style for the prototype submitted and mark the flight accordingly. Competitors may submit a description of the prototype flight characteristics (originated by a competent authority), which should be used to judge the flight.

6.D.2. Take Off

The model should slowly accelerate from rest, leaving the ground after an appropriate ground run. The take-off run should be straight, and transition to flight should be smooth.

Errors

The take-off should be penalised if: the ground run is too short, too long or assisted, the tail or nose wheel does not leave the ground before the main wheels, the wing drops or the run is curved. Note that a swing may occur as the tailwheel leaves the ground; this is normal and should not be penalised unless it is excessive.

6.D.3. Initial Climb

The model should smoothly rotate to a climbing attitude, and commence a gentle straight or curved climb. The climb should be smooth and appropriate to the prototype.

Errors

The climb should be penalised if: too steep, too shallow, too highly banked, wing drop or wing rock occurs or nose attitude is too high or too low. Note that a high bank steep spiral climb is normal for a Pitts but that a Bleriot should hardly leave ground effect.

6.D.4. Realism in Flight

The model should mirror the flight characteristics of the prototype in speed, flight attitude, stability and balance. The model may fly in a straight line or turn in either or both directions. Turns should display an appropriate amount of bank. The flight should be smooth and continuous, especially the transitions between take-off, climb, cruise, descent and landing approach. Due allowance must be made for the prevailing wind conditions.

Errors

Realism in flight should be penalised if: the model flies too slowly or too fast, the nose attitude is too high or too low, the model stalls, or shows fugoïdal flight path, has persistent wing drop or wing rock, flies an out of balance turn or pitches harshly on engine failure. A stall or wing drop may occur if the model hits turbulence or its own slipstream. If the recovery to stable flight is smooth, this should not be penalised. A grossly out of balance turn, left turn with right bank for instance, or a flat turn should be penalised.

6.D.5. Transition to Descent

The model's flight path should smoothly change between cruise and descent. The change may be abrupt, after an engine failure, or prolonged as the power slowly reduces. The direction of flight may or may not change.

Errors

The transition should be penalised if: the model stalls as the engine fails, wing drop or wing rock occurs or an excessive pitch change is apparent.

6.D.6. Descent and Landing Approach

The descent should be smooth, continuous and stable. It may be straight or curved. The angle of descent should be consistent with that of the prototype either engine on or engine off. As the model nears the ground, it should adopt a landing attitude consistent with that of the prototype. Allowance must be made for prevailing wind conditions.

Errors

The descent and landing approach should be penalised if: the model stalls, drops or rocks the wings, shows too steep a glide or does not change to a landing attitude. Note that the glide angle may change significantly with engine on or off.

CLASS F4A – SCALE OUTDOOR FREE FLIGHT (ENGINE POWERED)
(provisional)

6.4. SCALE OUTDOOR FREE FLIGHT

6.4.1. General Characteristics

Maximum surface area 150 m²

Maximum weight of complete model without fuel 5 kg

Maximum loading 50gdm²

Motive Power:

(a) Piston engines, total..... 10 cm³ max

(b) Electric Motorsno limitations

(c) Solid fuel reaction motors (Jetex)allowed

6.4.2 Definition of an Official Flight

An official flight shall be recorded when the model has been airborne for 30 seconds except when the wind velocity exceeds 4 m/s when the qualifying time shall be reduced to 20 seconds.

6.4.3 Number of Flights

Each competitor shall have the opportunity to make a minimum of four flights.

6.4.4 Flying Time

Competitors must be called at least five minutes before they are required to occupy the starting area. Each competitor shall have a flying time of five minutes (plus one minute for each additional engine of multi-engined models) to complete each flight programme, the flying time commencing when the competitor begins to start the engine(s) or two minutes after entering the starting area, whichever is first. No points may be scored after the end of the flying time.

6.4.5 Flight

(a) Take-Off (Optional, see 6.1.6 (a)).....K=13

(b) Initial ClimbK= 10

(c) Realism in FlightK= 23

(d) Transition to descent.....K= 6

(e) Descent and landing approach.....K= 13

Total K=65

6.4.6 Complexity Bonus

The flight score shall be subject to a complexity bonus as listed in the following schedule. All bonuses are additive. The best flight score shall be factored by the appropriate total bonus, to become the scoring flight.

Engines (on different thrust lines).....Bonus

Single0

Twin10%

Three10%

Four20%

N.B. To qualify for the multi engine bonus each propeller must be driven by a separate engine unless this was not the case with the prototype modelled. The engines must deliver similar levels of power.

Undercarriage

Fixed (any configuration).....0

Retractable (remains up for landing).....5%

Retractable (lowers again for landing)..... 10%

6.4.7 Marking (Flight Points)

Each part of the flight₃ as defined in 6.4.5. will be awarded marks between 0 and 10 by each judge during the flight. These marks are then each multiplied by the appropriate K factor and aggregated before the bonuses are applied as described in 6.4.6.

6.4.8 Flight Score

The flight score shall be the aggregate sum of points awarded by the judges as described in 6.4.7.

6.4.9 Total Score

Add the points earned in 6.1.11 to the best flight score as defined in 6.4.8.

Note Static judging is to take place at a minimum distance of 2 metres for items 1 to 5 in 6.1.11.and 0.5 metre for items 6to8 in 6.1.11.

**CLASS F4E - INDOOR FREE FLIGHT SCALE MODELS POWERED BY CO₂ OR ELECTRIC MOTORS
(Provisional)**

- 6.5 **General rules and standards for static judging** as under 6.1. apply with the following amendment.
- a) 6.1.1. Minimum judging distances to read 1,5 m and 0,5 m instead of 3 m and 1 m . (Note: 6.1.6a shall also apply).
- 6.5.1. **General Characteristics**
- Maximum flying weight: 150 g
- Maximum wing loading: 15 g/dm²
- Motive power:**
- a) Commercially produced reciprocating motors driven by carbon dioxide gas with the gas storage tank carried on the model, or
- b) Electric motors with the batteries carried in the model.
- 6.5.2. **Definition of an Official Flight:** An official flight shall be recorded when the model has been airborne for 15 seconds.
- 6.5.3. **Number of Flights:** Each competitor shall have the opportunity to make a minimum of four flights.
- 6.5.4. **Flying Time:** A minimum period of 15 minutes shall be allocated for trimming before the competition begins, and the competitor must be called 5 minutes before he/she is required to occupy the starting area. Failure to comply will result in loss of the flight. The model will be released upon instruction from the flight judges within a period of 3 minutes, plus 1 minute for each additional motor. Only one release is permitted during the allocated time.
- 6.5.5. **Judging for Flight Realism**
- 6.5.5.1 Take-off (optional see Section 4c, 6.1.6a).....K = 10
- 6.5.5.2. Initial climbK = 8
- 6.5.5.3 Descent and landing approach.....K = 12
- 6.5.5.4 Quality of landingK = 11
- 6.5.5.5. Realism in flight.....K = 24
- TOTAL.K = 65
- 6.5.6. **Complexity Bonus:** The flight shall be subject to a complexity bonus as listed in the following schedule. All bonuses are additive. The best flight score shall be factored by the appropriate total bonus to become the scoring flight.
- a) Engines (on different thrust lines.....% bonus
- Single 0
- Two10
- Three.....10
- Four20
- Note: To qualify for the multi-engine bonus, each propeller must be driven by a separate engine unless this was not the case with the prototype modelled. The engines must deliver similar levels of power.
- b) Landing% bonus
- Fixed (any configuration 0
- Retractable (remains up for landing)...10
- Retractable (lowers again for landing).....20
- 6.5.7. **Marking (Flight Points):** Each part of the flight, as defined in 6.5.5. will be awarded marks between 0 and 10 by each judge during the flight. These marks are then each multiplied by the appropriate K-factor and aggregated before the bonuses are applied as described in 6.5.6.
- 6.5.8. **Flight Score:** The flight score shall be the aggregate sum of points awarded by the judges as described in 6.5.6. and

6.5.9. **Total Score:** Add the points earned in 6.1.12. to the best flight score as defined in 6. 5.8.

**CLASS F4D - INDOOR FREE FLIGHT SCALE MODELS POWERED BY EXTENSIBLE MOTORS
(PROVISIONAL)**

6. 6. General rules and standards for static judging as under Section 4c, 6.1. apply with the following amendment.
- 6.1.10. Minimum judging distances to read 1,5 m and 0,5 m instead of 3 m and 1 m. (Note 6.1.6a. shall also apply).
- 6.6.1. **General Characteristics**
- Maximum flying weight: 150 g
- Maximum wing loading: 15 g/dm²
- Motive power: Extensible motor(s) only
- 6.6.2. **Definition of an Official Flight:** An official flight shall be recorded when the model has been airborne for 15 seconds.
6. 6.3. **Number of Flights:** Each competitor shall have the opportunity to make a minimum of four flights.
6. 6.4. **Flying Time:** A minimum period of 15 minutes shall be allocated for trimming before the competition begins, and the competitor must be called 5 minutes before she/he is required to occupy the starting area. Failure to comply will result in loss of the flight. The model will be released upon instruction from the flight judges within a period of 3 minutes, plus 1 minute for each additional motor. Only one release is permitted during the allocated time.
- 6.6.5. **Judging for Flight Realism**
- 6.6.5.1. Take-off (optional, see Section 4c, 6.1.6a).....K = 10
- 6.6.5.2. Initial climb.....K = 8
- 6.6.5.3. Descent and landing approach.....K = 12
- 6.6.5.4. ...Quality of landing.....K = 11
- 6.6.5.5. Realism of flight.....K = 24
- Total..K = 65
6. 6.6. **Complexity Bonus:** The flight shall be subject to a complexity bonus as listed in the following schedule. All bonuses are additive. The best flight score shall be factored by the appropriate total bonus to become the scoring flight.
- a) Engines (on different thrust lines) % bonus
- Single 0
- Twin 10
- Three 10
- Four 20
- Note: To qualify for the multi-engine bonus, each propeller must be driven by a separate engine unless this was not the case with the prototype modelled. The engines must deliver similar levels of power.
- b) Landing gear % bonus
- Fixed (any configuration)..... 0
- Retractable (remains up for landing).... 10
- Retractable (lowers again for landing)... 20
- 6.6.7. **Marking (Flight Points):** Each part of the flight, as defined in 6.6.5. will be awarded marks between 0 and 10 by each judge during the flight. These marks are then each multiplied by the appropriate K-factor and aggregated before the bonuses are applied as described in 6.6.6.
- 6.6.8. **Flight Score:** The flight score shall be the aggregate sum of points awarded by the judges as described in 6.6.6. and 6.6.7.

6. 6.9. TOTAL SCORE: ADD THE POINTS EARNED IN 6.1.12. TO THE BEST FLIGHT SCORE AS DEFINED IN 6.6.8.

CLASS F4F - PEANUT FORMULA INDOOR FREE FLIGHT SCALE MODELS (Provisional)

6.7. **General Rules:** General rules and standards for static judging as under Section 4c, 6.1 shall *not* apply except for the following:

- a) 6.1.7. Number of models
- b) 6.1.9.2. Name of entry

6.7.1. **Definition of Peanut Formula Scale Models:** A Peanut Formula scale model shall be a reproduction of a heavier-than-air man carrying aircraft.

6. 7.2. **General Characteristics:**

Maximum dimensions:

33 cm span or

23 cm overall length excluding the propeller.

Motive power:

Extensible motor(s) only.

6.7.3. **Documentation:** The minimum documentation is to be one of the following::

- a) A general arrangement drawing of at least two inches (5 cm) wingspan, plus one photograph or printed reproduction of the prototype. If the photograph or printed reproduction is not in colour, then an authentic written colour description must be included; or
- b) a coloured three-view (e.g. "Profile" publication) to a minimum of 1/144 scale. The competitor must also state in the documentation, the type of covering material used.

6.7.4. **Flying Section:** Each competitor is allowed a minimum of 4 official flights, with two attempts per flight (an attempt is less than 10 seconds duration). The times of the longest two flights will be aggregated to form the competitor's flight score. Flights may be hand launched or from take-off. If take-off is successfully achieved, without pushing or similar assistance, then 10 seconds will be added to that flight time recorded.

6.7.5. **Appearance Score:** Models will be judged visually, in comparison with the documentation provided, by one or more judges. No measurements will be taken. Marks will be awarded as follows:

- a) Workmanship 0 - 15
- b) Complexity and accuracy of colour and markings 0 - 10
- c) Authentic details :.....0 - 5
- d) Flying surfaces:
 - All double covered 4
 - Double covered wing but single covered tail. 2
 - Foam..... 2
 - Single surface..... 0

Note: If however the prototype itself was single covered, then the model should be likewise single covered and be awarded the full 4 points.

e) Surface Finish:

- Painted colour.....5 - 9
- Unpainted colour tissue..... 4
- Unpainted condenser paper..... 3
- Microfilm..... 0

f) Landing gear:	
Scale length	3
Slightly enlarged	2
Greatly enlarged or no documentation	1
None or retracted	0
g) Dihedral:	
Scale	3
Slightly exaggerated	1
Grossly exaggerated or no documentation.	0
h) Stabiliser outline:	
Correct size and shape	3
Correct size, wrong outline	2
Enlarged	1
Grossly enlarged	0
i) Bonus Points for complexity:	
Low wing	9
Biplane	9
Triplane	15
Autogyro.....	21
Helicopter.....	27
Flying boat or floatplane	2 per wing
Scale number of tailplane ribs	1
Scale number of rudder ribs..	1/2
Separate ailerons.....	1
Separate rudder.....	1/2
Separate elevator or all-moving tailplane	1/2
Other than square fuselage.....	1
Wheel spats or pants	1
Three dimensional pilot.....	1
Exposed engine	0-5
Flying wing	8
Other than rectangular fuselage	5
More than one functional motor on different thrust lines	5
j) Negative points for deviation from scale to assist flying performance:	
Lengthening of nose or tail moment	2 each
Moving wing back	2
Simplifying fuselage cross-section	2
Enlarging rudder	2

All other non-scale performance aids2 each

The competitor's Appearance score will be the sum of the marks awarded in 6.7.4.(a) through 6.7.4.(j).

- 6.7.6. Scoring: The order of marking in 6.7.3. and 6.7.4. will produce a "place" in the Flying and Appearance sections respectively. Each competitor's numerical "places" in the two sections are added. The lowest overall totals then determine the final overall placings in the competition. A fly-off in which the realism of flight is the determining factor (marked to section 6.4.5.) will be held, if necessary, to break ties in the final placing of the leaders. In the event of a tie, places shall be decided by referring to the Appearance score, followed if necessary by reference to the flight scores, comparing first flights, then the second flights. If there is still a tie, then places will be decided by a duration fly-off.

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