

2019



**BRITISH MODEL FLYING ASSOCIATION
CONTEST RULES - SECTION 6**

SCALE

**FREE FLIGHT - CONTROL LINE
RADIO CONTROL – INDOOR - HELICOPTERS**

**To be read in conjunction with the Contest Rules Sections 1 and 2
GENERAL REGULATIONS AND RULES which are available free of charge
from the BMFA**

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Supersedes all earlier Issues

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SECTION 6 - SCALE RULE BOOK 2019

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IMPORTANT NOTES CONCERNING THIS ISSUE

Significant changes from the 2018 issue of this book are marked with a side bar. Minor typographical, grammatical, syntactical and paragraph numbering changes are unmarked.

The significant changes are summarised below, major rule changes are in bold type:

Page 4 - 6.1.1.4 – Competition entry fees exemption for members of clubs hosting competitions.

Pages 6/35 - 6.1.1.10/6.3.1.11 - clarification of scoring system

Page 11 - 6.1.2.3 – Static Judging - clarification of penalties for insufficient evidence of texture

Page 35 - 6.3.2.3 - clarification of eligibility for F4C models being entered in F4H competition

Page 37 - 6.3.3.3 – R/C Flying Only - Introduction of Light Scale Class

Page 47 - 6.3.6.3.1 – R/C manoeuvres - Clarification of description of Figure Eight

Page 48 - 6.3.6.3.2 - R/C manoeuvres - Clarification of description of Descending circle

Page 54 - 6.3.6.4.6 - R/C manoeuvres - Clarification of description of Three Turn Spin

Page 56 - 6.3.6.4.8 - R/C manoeuvres - Clarification of description of Lazy Eight

Page 68 - 6.3.6.4.21 - R/C manoeuvres - Clarification of description of Straight Flight at low speed

Page 69 - 6.3.6.4.23 - R/C manoeuvres - Clarification of description of Dropping bombs

Pages 72/73 - 6.3.6 6.1 - R/C manoeuvres - Clarification of description of Approach and Landing

Page 76 - 6.4.2.3 – FF Rubber - deletion of minimum wingspan requirement

Page 78 - 6.4.3.1 – FF Electric power – clarification of use of 2.4GHz radio

Page 87 - 6.4.11.1 – Indoor Kit Scale – Clarification of Qualification requirement

Pages 88-91 - 6.4.12 – Introduction of Eddie Riding Designs Class rules

Pages 94/95 - ANNEX 6A – Complete revision of Scale Team Selection Process

GENDER

Words of masculine gender should be taken as including the feminine gender unless the context indicates otherwise.

WORD DEFINITIONS

The use of “shall”, “must”, “is” and “are to” indicates that the aspect concerned is mandatory.

The use of “should” implies a non-mandatory recommendation.

The use of “may” implies what is permitted or what might happen and is non-mandatory.

The use of “will” indicates a future happening which may not be mandatory.

FORMS AND DOWNLOADS

The Competitors Declaration forms, score sheets and Judges Guides can be downloaded from the BMFA Website.

Static and Flight score sheets are also available in hard copy on request from the Scale Tech Committee Secretary or the relevant Contest Director.

6.1

GENERAL

6.1.1 GENERAL SCALE RULES

These rules apply to all scale models unless stated otherwise in the class rules

6.1.1.1 System of Rules

All rules in this rule book are Contest Rules as defined in the BMFA Contest Rules Book Part 2, General Rules 2.3 – General Competition Rules.

Any infringement of these rules may result in disqualification from the competition.

N.B Several BMFA Scale Classes are also FAI Scale Classes and in most cases the rules are the same, however for various reasons differences do occur. These differences are closely monitored by the BMFA Scale Technical Committee to ensure that the rules reflect the special needs of UK competition. It must be remembered that whilst the STC can make changes to BMFA rules in a matter of months; it can often take up to three years to change FAI rules. Changes are sometimes made to FAI rules which the STC may decide are inappropriate for the UK. The STC may also make changes to UK rules which are subsequently rejected or amended by the FAI. There are also many FAI class rules, particularly for non-championship classes which are considered to be out of date and the STC may decide to incorporate changes to the BMFA rules in advance of proposing a similar change to FAI rules.

6.1.1.2 Definition of Scale Models

A scale model aircraft shall be a reduced scale reproduction of a full size aircraft.

Published evidence must be available to verify that the full size aircraft which has been modelled has successfully flown.

Scale models of pilotless aircraft, drones and non airworthy replicas are not permitted.

N. B. Throughout these rules the word “subject” is used to refer to the specific full size aircraft that has been modelled.

The aim of scale contests is to accurately recreate the appearance and realism of the subject full-size aircraft both on the ground and in flight.

6.1.1.3 Builder of the Model Rule

Scale models must be constructed and finished solely by the competitor, subject to the exceptions listed below. The Competitor must also prepare the model for flight, although helpers are permitted (para. 6.1.1.14 refers). Team entries are not permitted.

Commercially available components, machined parts, components manufactured using a computer aided process, die or laser cut parts and prefabricated airframe components manufactured by a third party, whether specifically for the model or supplied as part of a kit may be used in the construction of scale models. Details of these items (excluding fixings, i.e. screws, nuts and bolts etc) must be entered on the Competitor’s Declaration and if they affect the visible scale accuracy of the model they will result in a reduction of the marks awarded during static judging.

If the model includes any airframe components or canopies the construction of which required the use of moulds or plugs then any third party involvement in the process must also be entered on the Competitor’s Declaration.

The only exceptions to the Builder of the Model Rule are as follows:

- Models entered in the R/C Stand-Off class (Section 6.3.2. refers)

- Models entered in R/C Flying Only competitions (Para. 6.1.1.11 refers)
- Models entered by Junior's, where parental assistance is permitted. Details must be entered on the Competitor's Declaration.

6.1.1.4 Number of Models, Qualification, Eligibility and Entry Fees

Each competitor shall compete with one model only in each class. Additional restrictions may apply to some classes; see qualification and/or eligibility rules where appropriate.

For outdoor R/C events when there are more than one class, competitors are permitted to enter only one class.

Entry fees are payable for all competitions, except for members of a club which is hosting an STC managed event, who have free entry. The fees for all classes are reviewed each year by the STC and published on the STC website.

6.1.1.5 Name and Scale of Model

The exact name and variant or mark number of the subject aircraft shall be written on the entry form, the score sheets, the Competitors Declaration and in the 'proof of scale' documentation. The scale to which the model is built is optional, but must also be stated on both static and flight score sheets.

6.1.1.6 Competitor's Declaration:

The Competitor must complete and sign a declaration that his model conforms to the current requirements and the appropriate class rules. Because rules may be subject to change on an annual basis the declaration must be made on the current proforma. Declaration forms for Scale classes can be downloaded from the BMFA website or are available from the Scale Competition Secretary or the Contest Director.

Any components of the model including any moulds or plugs used to produce such components and also including components produced using a computer aided process which are NOT entirely manufactured by the competitor must be listed on the Competitors Declaration. The only exceptions are Engines, electrical/electronic equipment and fixings e.g. nuts, bolts, screws etc which need not be declared.

For the C/L Scale, R/C Scale, R/C Stand-Off Scale, Scale Helicopters and Scale R/C Indoor classes, Competitors must also complete a questionnaire on the Declaration. This is used by the Static Judges to assess how much the competitor has contributed to the scale accuracy and additionally for the Stand-off classes, the origin of the model design and its construction.

6.1.1.7 Speed of the model

The maximum and cruising speeds of the subject aircraft must be stated on all flight score sheets before each official flight starts. In the case of early aircraft, where only maximum speeds are likely to be listed, the maximum speed alone may be quoted in the documentation. The competitor must be prepared to substantiate this information if required.

6.1.1.8 Judges and the BMFA Scale Judges Guide

The organiser of an event or a competition shall (subject to availability) appoint at least two flight judges and where appropriate at least two static judges.

NOTE: Other than at the National Championships, if only one flight judge is available, the CD can at his discretion and subject to agreement by the flight judge present, substitute a local volunteer. If the volunteer is a competitor then the flight score recorded for the substitutes' flight will be calculated from the single judge's marks plus or minus the percentage difference between the judges' marks awarded for the other competitors flights.

Flight Judges should have a good general knowledge of the typical performance limitations of different categories of full size aeroplanes. Clearly judges cannot be expected to possess detailed knowledge of the performance and limitations of all aeroplanes likely to be modelled, but judges should be aware of their generic differences.

Static Judges must discount any prior or special knowledge they may have of the subject aircraft and the scale accuracy of the model must be assessed solely on the proof of scale documentation submitted by the competitor.

As soon as practicable after each flight, the flight scores should be calculated and made available to the competitors. Static judges will retain the static score sheets until all models have been static judged and only then will the scores be calculated and released to the competitors. Competitors are not permitted to question their marks with judges or officials during the event, unless submitting a formal protest.

After the results have been announced and subject to the agreement of the judge or judges in question, competitors are free to discuss any aspect of their model and their flight performance.

The BMFA SCALE JUDGES GUIDE is published by the Scale Technical Committee and is available as a free download from the BMFA Website. This document is essential reading for Scale Judges and is also recommended reading for competitors.

6.1.1.9 Protests and Appeals

- (a) It is the right of a competitor to protest against any decision by a Contest Director (CD). Any such protest, however, must be made officially to the CD, and must be made on the day. The protests and appeals procedure to be followed at the contest is also set out in the BMFA General Regulations and Rules, Section 2, and in the event of discrepancies they shall take precedence.
- (b) If not satisfied with the CD's decision the competitor must, on the day, hand the CD the protest in writing, together with a fee of double the standard entry fee. The CD will then immediately empanel three appropriate persons to deal with the protest.
- (c) The panel's decision is final, subject to the right of the competitor who submitted the protest to appeal to the BMFA Council.
- (d) Appeals to Council about a decision made at a contest must be made as follows:
 - (i) Notification that an appeal is pending must be sent to the BMFA Competition Secretary to arrive not later than two weeks from the date of the contest.
 - (ii) The appeal itself, together with any supporting evidence, must be sent to the BMFA Competition Secretary to arrive not later than two months from the date of the contest.
- (e) Protests made to Council after the contest may only be made direct to the BMFA Competition Secretary who, after considering the details of the protest, may bring such protests to the attention of BMFA Technical Council. Notification of an "after the contest" protest must be made to the Competition Secretary within 7 days of the contest and the protest and evidence submitted not later than two months from the date of the contest.
- (f) Protests or appeals arising from a decision made by a Technical Committee on contest related matters may only be made directly to the Competition Secretary and must be accompanied by a £50 fee. The Competition Secretary will then convene a Panel comprising three Technical Committee Chairmen and not including the Chairman of the Technical Committee concerned. This Panel, plus the Competition Secretary, will study the appeal and examine the reasons for the Technical Committee's decision.

- (g) If the protest or appeal is not upheld, then the appellant(s) must be informed of the reasons for the decision. This procedure does not preclude an appellant(s) taking a failed protest or appeal to the BMFA Full Council.
- (h) If the written protest or appeal is upheld, the protest fee will be returned, however if the protest or appeal is unsuccessful the fee will be allocated to the team travel fund of the relevant discipline.

6.1.1.10 Scoring System

The order of merit for scale competitions is decided on a final score which is normally made up from flying and static elements in equal proportions. This is achieved by ensuring that the number of Flight judges is equal to the number of Static Judges, but in the event that this is not possible the CD is responsible to ensure that the scores are suitable factored.

Exceptions to this rule are detailed in the appropriate class rules and certain events identified as 'flying only' which do not have a static element in the final score.

All scoring is to be on the prescribed current score sheets which should be downloaded from the BMFA website. Score sheets are also available from the Scale Technical Committee Secretary, or the Contest Director.

Static and Flight judges shall award **marks** from 0 to 10 inclusive for each item or manoeuvre using increments of 0.1 of a mark

Where a coefficient (K-factor) is noted, the **score** for each item is then calculated by multiplying the marks awarded by the K-factor.

Static Score

The static score shall be the sum of the scores awarded by both Static Judges.

The Static Score can only be used in the calculation for the final competition result when the model aircraft has completed an official flight.

Flight Score

The flight score shall be the sum of the scores awarded by both Flight Judges.

The scores in an official round can only be used in the final competition result if all competitors had an equal opportunity for a flight in that round.

Final Scoring/Competition Results

Unless otherwise stated in the class rules, the final score shall be the sum of the static score and the flight score.

6.1.1.11 Weight, Wing loading and Weighing of Models

The individual class rules provide details of the maximum permitted weight and/or wing loading of the models.

Wing loading is defined as the weight of the model divided by the total flying surface area. The total flying surface area includes the horizontal area of all flying surfaces on the model. The surface area includes the area of the flying surface included in or projected within the fuselage, nacelles etc. Wing loading is measured in grams per square decimetre.

Models may be weighed at any time during a competition at the discretion of the contest Director. Any model which does not conform to the specific weight requirements applicable to the model class will be disqualified.

6.1.1.12 Interruption of the Competition

The competition may be interrupted or the start delayed by the Contest Director if:

- (a) The wind is continuously stronger than 9 m/s (20 mph) measured at two metres above the ground at the flight line for at least one minute, (20 seconds for Free Flight), unless specified otherwise in class rules.
- (b) The visibility prohibits proper observation of the models or due to atmospheric conditions it would be dangerous to continue the competition.
- (c) It is necessary to reposition the Judges line, the flight line or any spectator control measures.
- (d) The prevailing conditions are such that they may lead to unacceptable sporting results.

In the event of an interruption during a flight round, the remainder of the round may be completed as soon as conditions allow.

6.1.1.13 Noise

Where appropriate, I/C engines of all scale models must be effectively silenced. For C/L and R/C fixed wing classes the following noise limits and noise test shall apply to models powered by I/C piston engines.

Advice on noise testing of Helicopters and turbine powered models is detailed in the BMFA Members Handbook.

The decision to measure noise level at a contest rests with the Contest Director.

To measure the noise level the model aircraft must be placed on a concrete or macadam surface or if these surfaces are not available then the measurement may be taken over bare earth or very short grass.

The microphone will be placed on a stand 30 cm above the ground in line with the engine(s) or the rearmost engine if they are not in line. For single engine models, noise measurement will be taken at a point which is 3 meters from the centre line of the model on the side chosen by the competitor; or in the case of a multi-engine model 3 meters from the closest engine to the noise meter. There shall be no noise reflecting objects closer than 3 meters to the model aircraft or the microphone.

The model must be securely restrained and with the engine or engines running at full power, the maximum noise level over concrete or macadam must not be greater than 96 dB(A) or, if over bare earth or grass not greater than 94 dB(A). If the model aircraft features variable pitch propeller(s), the noise test must be carried out over the full range of propeller pitch with the engine at full power, or maximum rpm for the propulsion system if more limiting.

6.1.1.14 Helpers

Each competitor is permitted one helper during a flight. An additional helper may assist with engine starting and pre-flight preparation should the competitor require this. In the case of multi-engine models, one additional helper is permitted to assist in the starting of engines. All but one helper must retire clear of the flying area before the take-off commences.

For radio control events helpers are not permitted to touch the transmitter except for assisting in starting engine(s), or in the event of a flight emergency, e.g. where the competitor is incapacitated. The timekeeper or other nominated official is responsible for watching that helpers do not touch the transmitter during flight. If this occurs the flight is scored zero.

6.1.1.15 Preparation for Flight

Between static judging and flying, no parts of a model are to be removed with the exception of propellers, spinners and droppable ordnance which may be substituted (see 6.1.1.17 and 6.1.1.18 below).

Nothing may be added to the model other than a dummy pilot an external antenna and fuel or flight batteries for electric powered models.

Additional air entries/exits are permitted provided they are covered by movable hatches for static judging. These hatches may be opened manually prior to flight, automatically in flight or by means of radio control.

Necessary repairs due to flight damage are permitted, but the maximum weight limit still applies and the appearance of the model in flight must not be unduly affected.

6.1.1.16 Dummy Pilot

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 should be equally visible during flight in the model. The absence of a dummy pilot during flight may be subject to a penalty depending upon individual class rules.

6.1.1.17 Propellers and Helicopter Rotor Blades

Models of propeller driven aeroplanes may have the scale propeller/s replaced with a flight propeller/s of any shape and form.

If the model is fitted with a spinner/s when static judged, the scale spinner/s may also be replaced with a flight spinner/s but this/these must be of the same size, shape and colour as the scale spinner/s. In this event these flight spinner/s must also be presented with the model for static judging.

If a model of a multi-engine aircraft uses non-powered (windmilling) propellers, these must 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, must likewise not be changed for flying propellers.

For rubber powered aircraft the removable nose block with thrust bearing may be considered as part of the flying propeller. The flight nose block must be similar in appearance to the static nose block and should be presented with the model for static judging

Metal-bladed flying propellers are forbidden.

Helicopter rotors of a different diameter and with a different cross section may be substituted for scale rotors. If the number of blades is changed a penalty will be incurred.

CAP 658 does not currently allow the general use of metal rotor blades.

6.1.1.18 Droppable Stores or Ordnance

Stores that are to be released from the model in flight must be presented for static judging but may be replaced before flying by simpler examples of the same size and colour.

Explosives or incendiary devices must not be carried or released from the model.

6.1.1.19 Take-off aids

All models shall become airborne in the manner of the subject full size aircraft.

Models of seaplanes and floatplanes in all classes, may use wheels or wheeled dollies for take-off in the absence of suitable water surface conditions. A similar consideration also applies to models fitted with skis. Deviation from scale, through inclusion of permanently-attached wheels, skids or similar non scale devices in the model structure shall, in this case, be disregarded during static judging.

Free flight models may be hand launched, in which case the take-off shall score zero.

6.1.1.20 Electronic Motion Stabilising Devices (EMSDs) or Gyros

Scale Helicopters and R/C fixed-wing models are permitted to use devices which provide auto-stabilisation. Devices which provide altitude, heading or speed hold and GPS devices are not permitted. For fixed-wing models using EMSDs a penalty will be applied to the flight score and details of how the penalty is applied will be found in the appropriate class rules.

The use of EMSDs on the model must be declared on the flight score sheet which must be signed and this declaration may not be changed during a competition. i.e. all flight rounds will be scored as if EMSDs are used even if they are disabled during the competition.

N.B. The rapid pace of development of devices which can provide autonomous flight is such that both the FAI and the BMFA rules regarding the use of these devices may require change at short notice.

6.1.1.21 R/C Telemetry

The transmission of information from the model aircraft to the competitor is restricted to Propulsion and Receiver system health monitoring. Any other data stream or telemetry is prohibited.

6.1.2 STATIC JUDGING

Unless stated otherwise in the class rules, this section applies to all classes where the model is judged for scale accuracy (static judging).

6.1.2.1 Proof of Scale

Proof of scale is the responsibility of the competitor.

The documentation provided should be as comprehensive as possible if a high static score is to be achieved. Any feature of the model which is not supported by documented evidence will not be marked.

6.1.2.2 Documentation

(a) Proof of Scale Accuracy (outline)

This must be in the form of photographs or printed reproductions and drawings.

(i) Photographic evidence:

At least three different photographs or printed reproductions of a full size aircraft which must be the same type and mark number as the actual subject aircraft being modelled. Each of these photographs or printed reproductions, which need not be originals, must show the complete aircraft, preferably from different aspects and with a minimum aeroplane image size of 150mm.

At least one photograph or printed reproduction must show the actual subject aircraft modelled.

Photographs of the model are not permitted unless the model is posed alongside the subject aircraft and the photo used as proof of colour.

Additional photographs used as evidence of scale detail, markings or surface texture may be of any size.

Photographs based on digital files may be resized or cropped, but the use of photographs which show evidence of being enhanced or manipulated shall result in disqualification.

(ii) Scale Drawings:

Accurate scale drawing(s) of the full-size aircraft that show at least the 3 main aspects of Side View, Upper Plan View and Front End View. These drawings must be to a common scale giving a minimum wing span of 250 mm (150 mm minimum for Indoor and Free Flight classes), and a maximum wing span of 500 mm. If the fuselage is longer than the wingspan, these measurements will be made on the fuselage drawing.

Unpublished drawings produced by the competitor or other draftsman are not acceptable unless certified accurate in advance of the contest by an authoritative source such as the BMFA Scale Technical Committee, the builder of the original aircraft, or other competent authority.

(b) Proof of Colour:

Correct colour may be established from colour photographs, from published descriptions, from samples of original paint, or from published colour drawings. For the F4 classes written descriptions must be accompanied by colour chips certified by a competent authority.

(c) Proof of Markings

This may be in the form of colour photographs (which may be the same as those supplied for outline), or published colour illustrations from books or magazines. Black and white photos or illustrations are acceptable if accompanied by suitable colour samples. Published descriptions are also acceptable when accompanied by examples of markings used on similar types. Evidence of all the markings including their position on the subject aircraft must be provided to avoid loss of marks.

6.1.2.3 Penalties for inadequate documentation

Failure to provide sufficient or adequate proof of scale documentation will result in a reduction of marks as follows:

- (a) Fewer than three full photos of the full size aircraft type as specified in the class rules:
 - ZERO points for Scale Accuracy (6.1.2.5.1)
 - Likely downmarking of Realism (6.1.2.5.4)
 - Likely downmarking of Craftsmanship (6.1.2.5.5)
 - Likely downmarking of Scale Detail (6.1.2.5.6)
- (b) Missing or unauthorised drawings:
 - ZERO points for Scale Accuracy (6.1.2.5.1)
- (c) No photo of subject aircraft:
 - ZERO points for markings (6.1.2.5.2)
 - Likely downmarking for Realism (6.1.2.5.4)

6.1.2.6 Static Judging Distance

These measurements are taken from the centreline of the model to the judges' chair.

SCALE CLASS	ITEM 1	ITEMS 2 to 6 inc	REMARKS
Control Line (F4B modified)	3 metres	No Restriction	
R/C (F4C modified)	5 metres	No Restriction	
R/C Stand-Off (F4H modified)	n/a	n/a	All at 5 metres
R/C Indoor	n/a	n/a	*
R/C Helicopter	5 Metres	No Restriction	
R/C Stand-Off Helicopter	n/a	n/a	All at 5 metres
Outdoor FF (I/C power)	2 metres	no restriction	
Outdoor FF (Rubber)	2 metres	no restriction	
Outdoor FF (CO ₂ or Electric)	2 metres	no restriction	
Indoor FF (Rubber)	n/a	n/a	*
Indoor FF (CO ₂ or Electric)	n/a	n/a	*
Peanut	n/a	n/a	*
Pistachio	n/a	n/a	*
Indoor Kit Scale	n/a	n/a	*

*It will be necessary for judges to handle the model during static judging

6.1.2.7 Demonstration of Functional Scale Detail during Static Judging

The model should be presented for static judging supported only by its undercarriage or normal aids to take off and landing. If applicable, folding wings may be unfolded and locked for flight in the manner of the full size aircraft. With the exception of undercarriage retraction a demonstration of functional detail of any part of the model is permitted, providing such functionality is normally only operable by the pilot or aircrew of the full size aircraft from their crew position.

6.2

CONTROL LINE CLASSES

6.2.1 SCALE CONTROL LINE (based on FAI Class F4B)

6.2.1.1 General Model Characteristics

Maximum weight of the complete model in flying condition without fuel but including any dummy pilot shall be 6kg except that a model of a multi-engine subject shall be 7 kg.

Models using electric motors for motive power shall be weighed without the batteries used for those motors.

Motive power:

- (a) I/C piston engines
- (b) Gas Turbine – maximum thrust of 10kg
- (c) Electric motors - maximum voltage of power source to be 72 volts

The use of Rocket or pulse jet engines is forbidden.

6.2.1.2 Control Mechanism

All Control Line Flying Scale Model Aircraft must be permanently attached to two or more non-extensible wires or cables during flight.

Primary Flight Control Function: The model aircraft's flight path may only be controlled by manually activated and mechanically linked flight control elements. This must be by a hand-held control handle manipulated by the pilot located on the ground at the centre of the model aircraft's flight circle. No automatic control of the Primary Control Function shall be permitted.

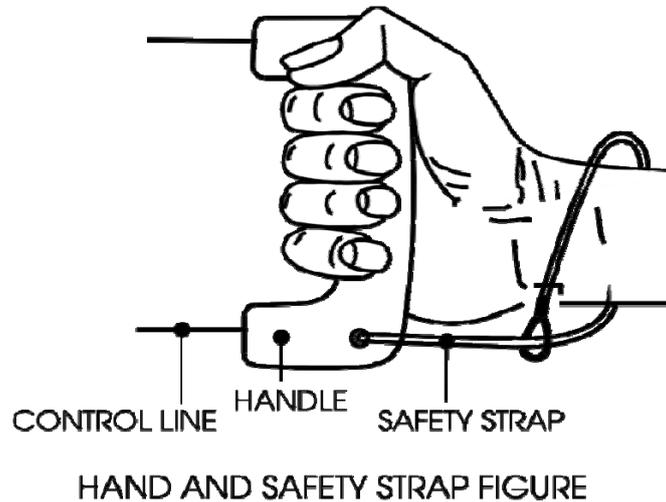
Secondary Control Functions: These may include (but are not limited to) control of engine/s, landing gear, flaps, slats and other lift enhancing devices. Secondary Control Functions may be controlled by the pilot via wires/cables, or may function completely automatically. The frequency of any electro-magnetic pulses sent through wires/cables shall not exceed 30 kHz.

Secondary Control Functions may also be controlled using 2.4GHz radio control equipment. The radio control equipment must conform to BMFA General Regulations and Contest Rules Section 1 paragraph 1.2.5(5). There can be no electrical or mechanical link between the radio control equipment and the Primary Control Function and the Transmitter must be under the sole control of the pilot in the centre of the circle during the flight.

Before each flight the entire mechanism including control lines 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.

The safety strap connecting the competitor's wrist to the control handle must be attached for the whole flight. The circle marshal shall ensure that this requirement is met and any attempt to take off in breach of this will result in disqualification of that flight.



6.2.1.3 Official Flight

Each competitor may be called to fly up to three times, and must execute an official flight within the required time limit (see 6.2.1.4) on each occasion to be eligible for flight points for that flight.

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

An official flight commences at the earliest of the following:

- (a) The competitor signals to the timekeeper that he is commencing to start his motor(s).
- (b) Two minutes after the competitor is instructed to start his flight (see 6.2.1.4.).

An official flight is terminated when the model lands and stops, except during ground contact manoeuvres (Touch and Go Taxi).

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 with the Contest Director. 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 pilot steps outside a circle of 3 metres diameter will score ZERO.

6.2.1.4 Flying Time

Each competitor shall have 9 minutes to complete a flight, plus one minute for each additional motor. Timing will start when the competitor begins to crank the motor or two minutes after entering the starting area, whichever is first. Scoring finishes after expiration of the time limit.

6.2.1.5 Starting Time

Competitors must be called at least 7 minutes before they are required to occupy the starting area.

The model must become airborne within the first 5 minutes (plus one minute for each additional motor in excess of one). If the model 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) stops after the take-off has begun, but before the model is airborne it may be restarted within the 5 minutes starting period.

Within these time limits, only one attempt is allowed to repeat the take off. In the case of a repeated attempt, the take-off will be marked Zero.

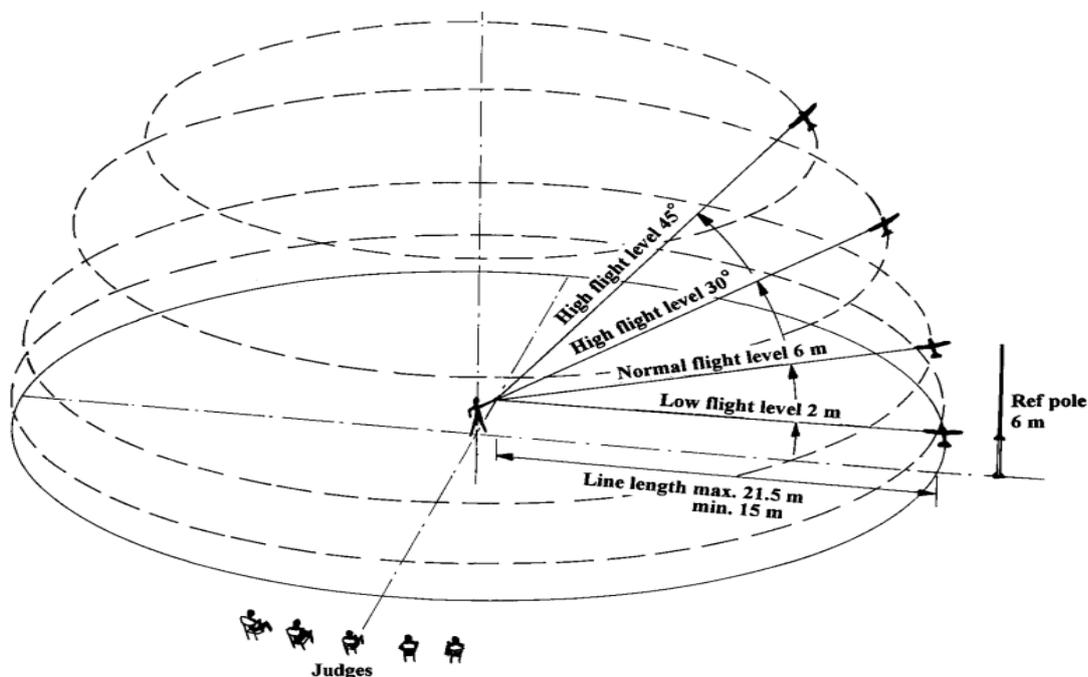
6.2.1.6 Flight Level Definitions:

Three basic levels of flight are defined:

Low Flight Level at approximately 2 m height.

Normal Flight Level at approximately 6 m height.

High Flight Level between 30° and 45° line elevation.



6.2.1.7 Flight Schedule

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

- | | |
|---|--------|
| (1) Take-off | K = 14 |
| (2) 5 laps of straight level flight | K = 8 |
| (3) Optional demonstration | K = 12 |
| (4) Optional demonstration | K = 12 |
| (5) Optional demonstration | K = 12 |
| (6) Optional demonstration | K = 12 |

- (7) Landing..... K = 14
 - (8) Realism in flight
 - (a) Model Sound..... K = 4
 - (b) Speed of the Model..... K = 6
 - (c) Smoothness of flight K = 6
- Total K = 100

6.2.1.8 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.

Any demonstration of cargo doors or bomb doors must be done in conjunction with a cargo or bomb drop, if no cargo or ordnance is dropped, the manoeuvre will score ZERO.

Not more than one drop option may be nominated.

Only one attempt is permitted for each manoeuvre, the only exception is the take-off as described in 6.2.3.5.

FOUR optional demonstrations must be selected from the following list (see 6.2.3. for full descriptions) :

Multiengine 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 12 applies to any multiengine subject. No points are awarded for each individual engine.

Retract and extend landing gear.

Retract and extend flaps.

Droppable ordnance.

High flight over 30° line angle.

One inside loop.

Three inverted laps.

Wingover.

Figure eight.

Touch and go.

Lazy Eight

Parachute drop.

Non-listed manoeuvre or Flight function.

Taxi demonstration.

Overshoot/go around.

6.2.1.9 Realism of Flight:

Realism of Flight covers the entire flight performance including the way the model flies between the manoeuvres. The following aspects are marked always keeping in mind the likely characteristics of the subject aircraft.

If the model lands (or crashes) before the flight schedule is complete, all the realism marks should be reduced from what would have been awarded if the schedule had been completed. The amount of reduction should be in proportion to the percentage of the schedule not flown.

Model sound K = 4

This is an assessment of how the model replicates the characteristic sound of the subject aircraft. Special consideration will be given where the model demonstrates any particular characteristic sounds of the full size aeroplane. Competitors are encouraged to advise judges if such characteristic sounds can be reproduced and where they will occur in the flight. E.g. Excessive propeller noise at high power setting or noise produced by the airframe during high 'g' manoeuvres.

Speed of the model K = 6

This is a subjective assessment of the scale speed of the model.

Smoothness of flight K = 6

This is an assessment of the smoothness of control taking into account the prevailing weather conditions. The model should be well trimmed and show no signs of instability. The attitude of the model in flight, i.e. any nose-up or nose-down tendency will also be assessed.

Notes:

A model, 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 should be equally visible during flight of the model. If such a pilot is not fitted, the total flight score shall be reduced by 10%.

6.2.2 SCALE CONTROL LINE FLYING ONLY

6.2.2.1 Contest Rules

The General Characteristics of the model and the Flying Schedule shall be the same as Scale Control Line - (6.2.1 refers). No static judging will take place, Scoring and Eligibility requirements, are as shown below:

6.2.2.2 Scoring

Normally two rounds will be flown and the final score will be the sum of the two flight scores. If one round is flown the flight score will be doubled, if three rounds are flown the best two flight scores will be used.

6.2.2.3 Eligibility

The requirement for the competitor to have constructed his own model (Builder of the Model rule 6.1.1.3) is not applicable to Scale C/L Flying Only.

Models used in these events must be clearly recognisable as bona fide scale models of full size aircraft. The Contest Director may disallow any entries that he considers not to fit this specification.

6.2.3 SCALE CONTROL LINE FLIGHT MANOEUVRES

6.2.3.1 Description of Manoeuvres

Scale flying is not simply an exercise in precision flying and although it is important to position each manoeuvre correctly it is equally important that the manoeuvre is flown in a manner which, within the constraints imposed by the control lines, replicates how the manoeuvre would be flown by the full size aeroplane.

The following descriptions and diagrams are largely theoretical and indicate the optimum shape of the manoeuvres.

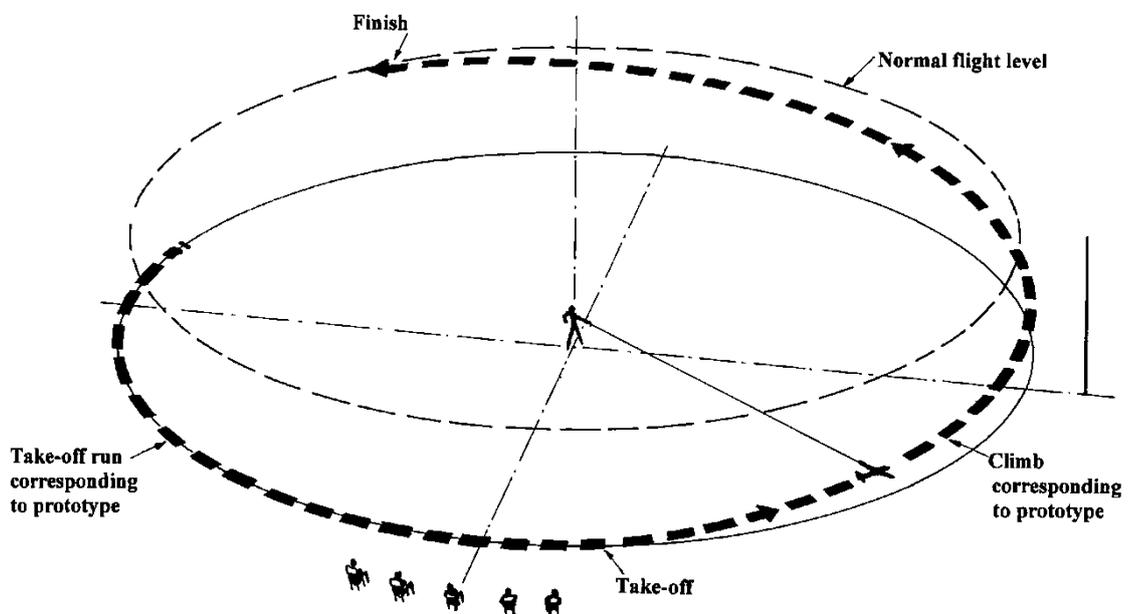
The errors mentioned under each manoeuvre cannot be an exhaustive list of all possible faults. They are intended to show the sort of mistakes that are likely during that manoeuvre.

Flight Judges will assess each manoeuvres with regard to the following 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.

6.2.3.2 Takeoff

The model should stand still on the ground with the engine(s) running without being held. If the model is touched after the word "NOW" has been called the manoeuvre will score zero. The model 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 than one lap to complete.



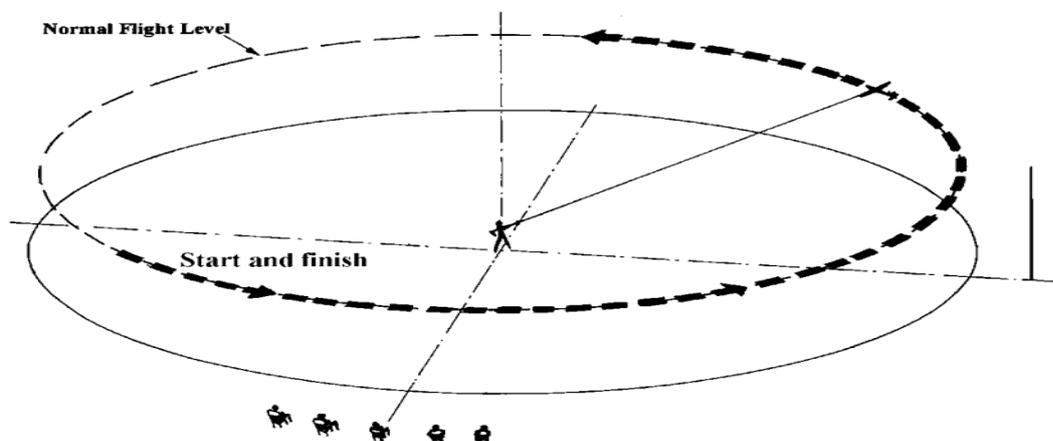
Errors:

- (1) Model touched after calling "NOW" (zero marks).
- (2) Climb erratic.
- (3) Rate of Climb not consistent with subject aircraft.

- (4) Level off not smooth.
- (5) Level off not at Normal Flight Level.

6.2.3.3 Mandatory Manoeuvre - Five laps at Normal Flight Level:

This manoeuvre should demonstrate the basic flying qualities of the model. Five smooth and stable laps should be flown at Normal Flight Level. Height should remain almost constant for full 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 flight path not smooth and steady.

6.2.3.4 OPTIONAL MANOEUVRES

6.2.3.4.1 Multi-engines:

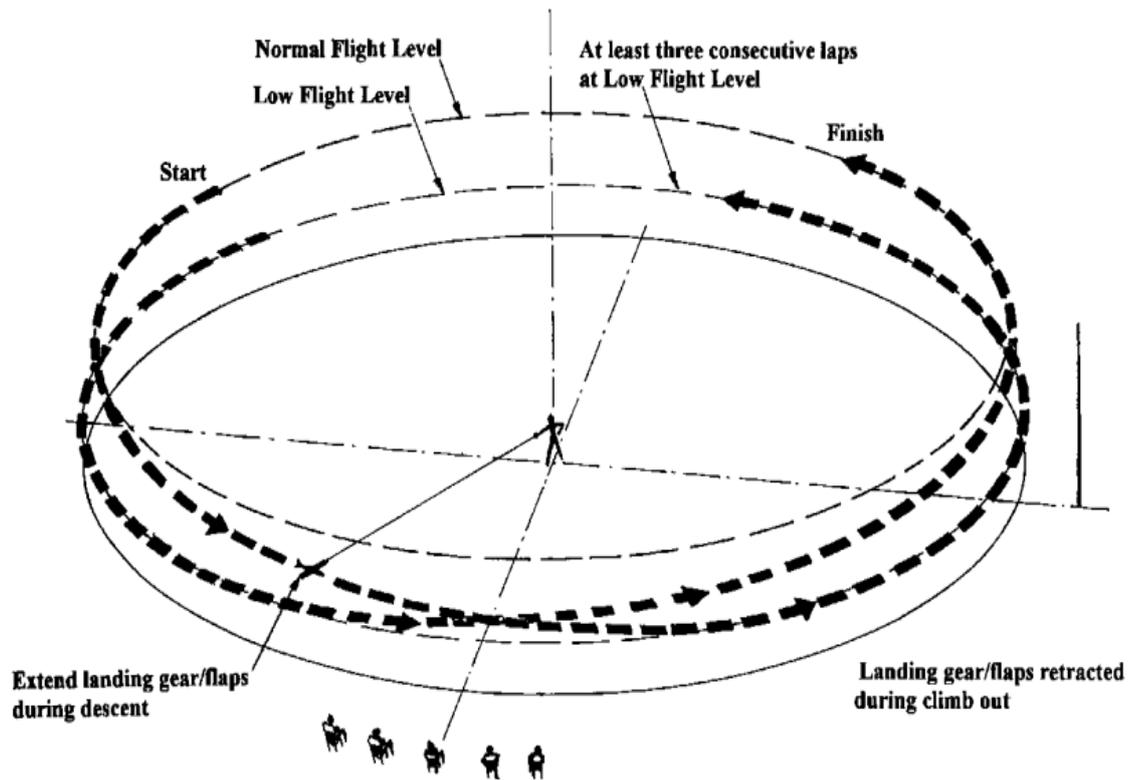
In order to qualify for full multi-engine points, all engines must run for the complete flight. Should any engine cut prematurely, then the mark will be reduced accordingly.

6.2.3.4.2 Retract and Extend Landing Gear:

6.2.3.4.3 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.

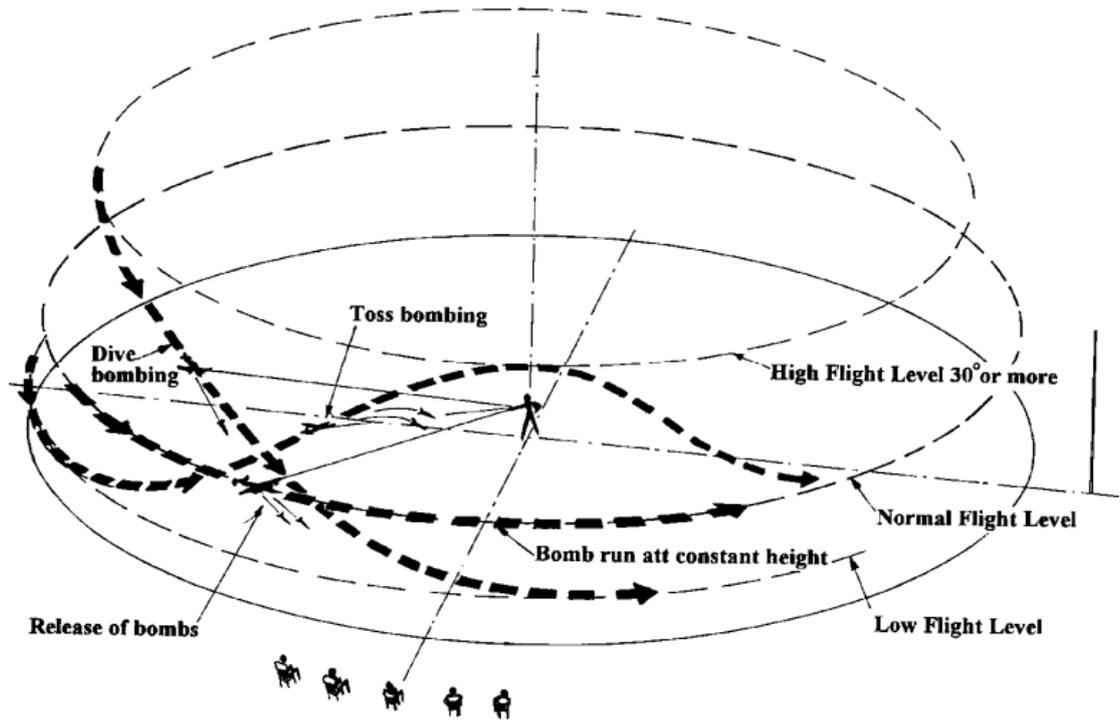


Errors:

- (1) Not commenced from Normal Flight Level.
- (2) Extension and or retraction not in full view of the judges.
- (3) Model speed too high for landing gear/flap lowering.
- (4) Model not flown at Low Flight Level for three consecutive laps with gear/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.

6.2.3.4.4 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 subject aircraft. 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



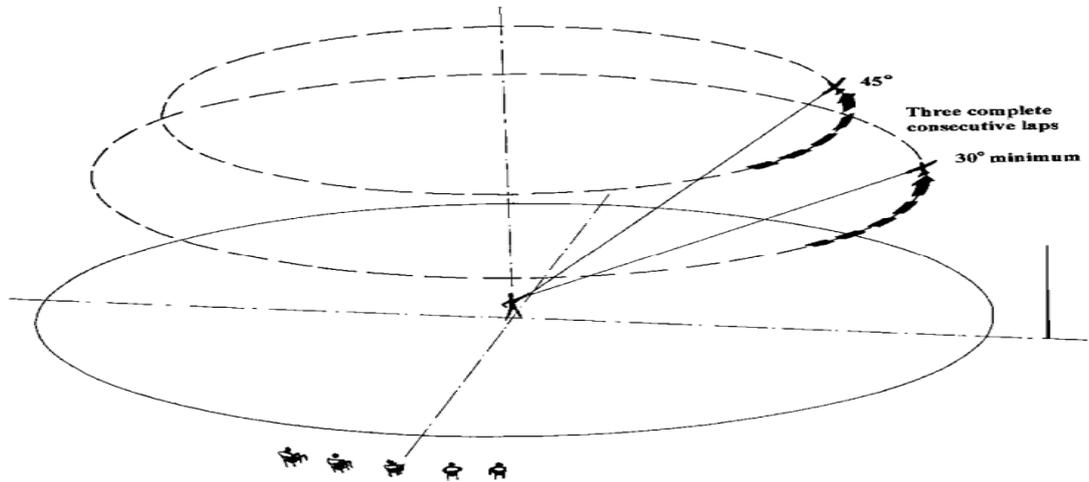
Errors:

- (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.

6.2.3.4.5 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 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 remains almost constant. Lower marks will be awarded to models which 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 flies below 30° line-angle at any moment during the three laps

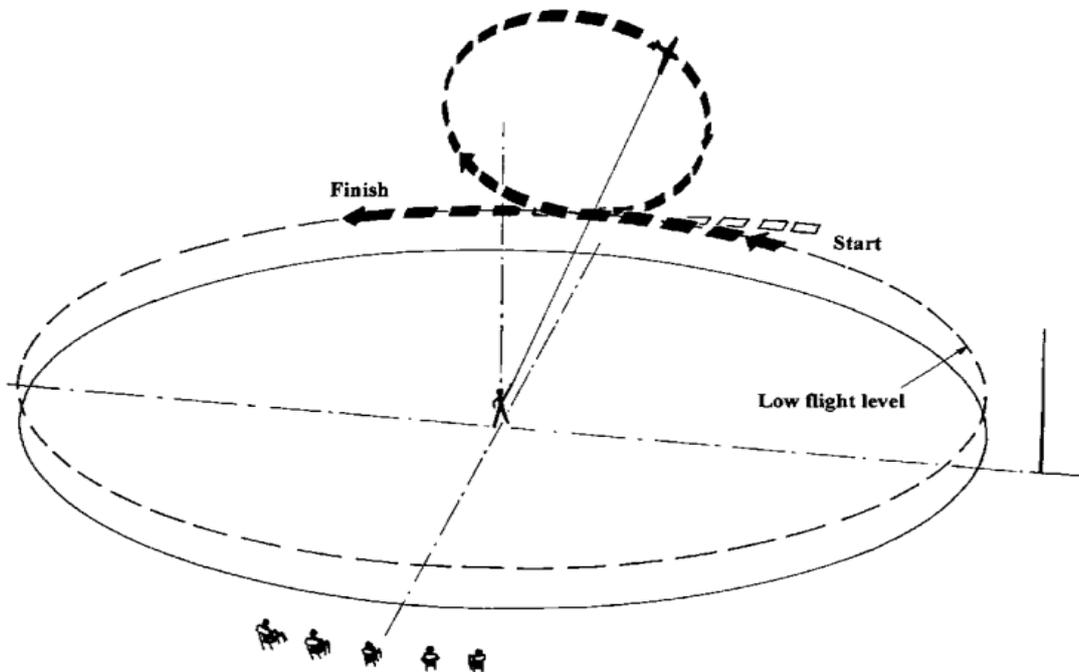


Errors:

- (1) Not three consecutive laps.
- (2) Great variations of height during the flight..
- (3) Centring varies during the flight.
- (4) Line-angle below 30°, at any moment - zero marks.

6.2.3.4.6 One Inside Loop:

From Low Flight Level, the model 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.



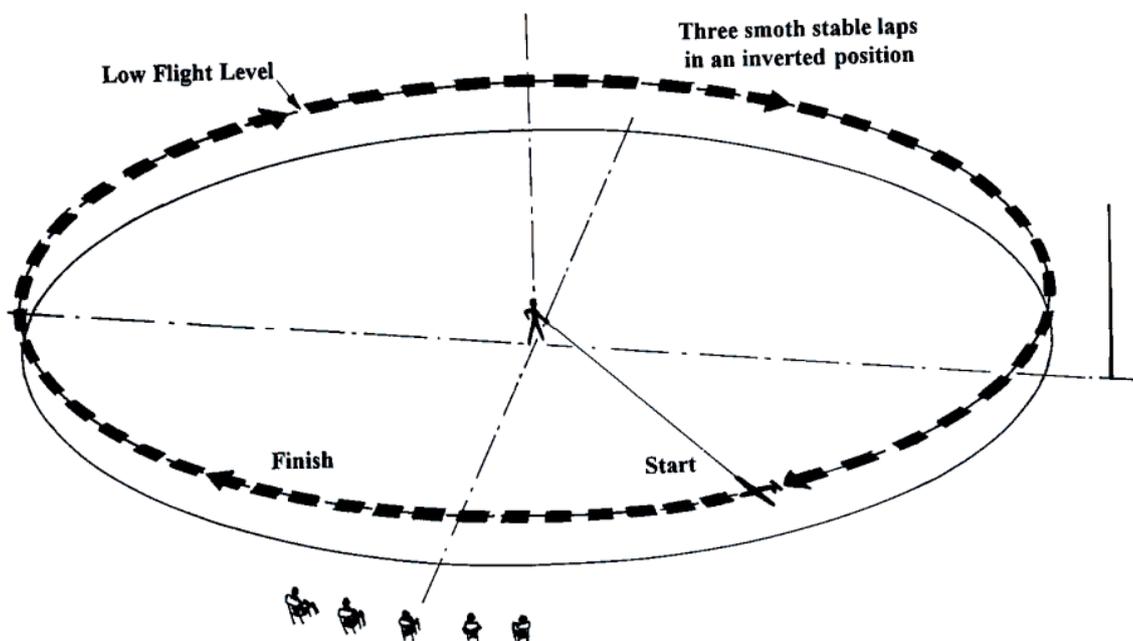
Errors:

- (1) Loop not commenced at Low Level Flight.
- (2) Track of loop not vertical.
- (3) Loop not in the manner of the subject aircraft.

- (4) Inappropriate use of throttle.
- (5) Loop not finished at Low Flight Level.

6.2.3.4.7 Three Inverted Laps:

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

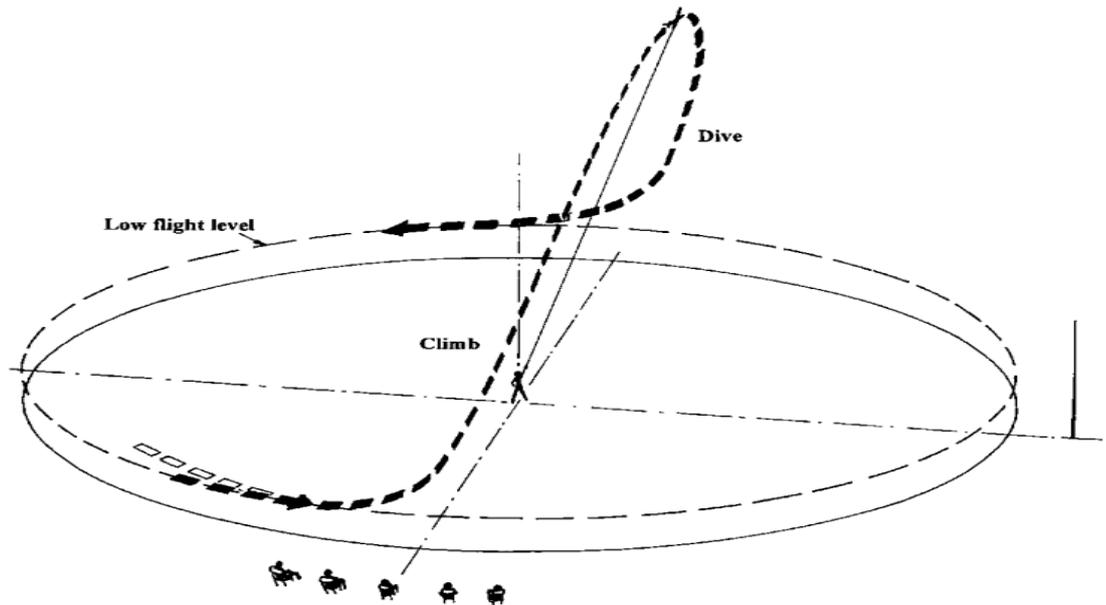


Errors:

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

6.2.3.4.8 Wingover:

From Low Level Flight the model should make a near vertical climb, then perform an equally near vertical dive and finally level out at Low Level Flight. The radii 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.

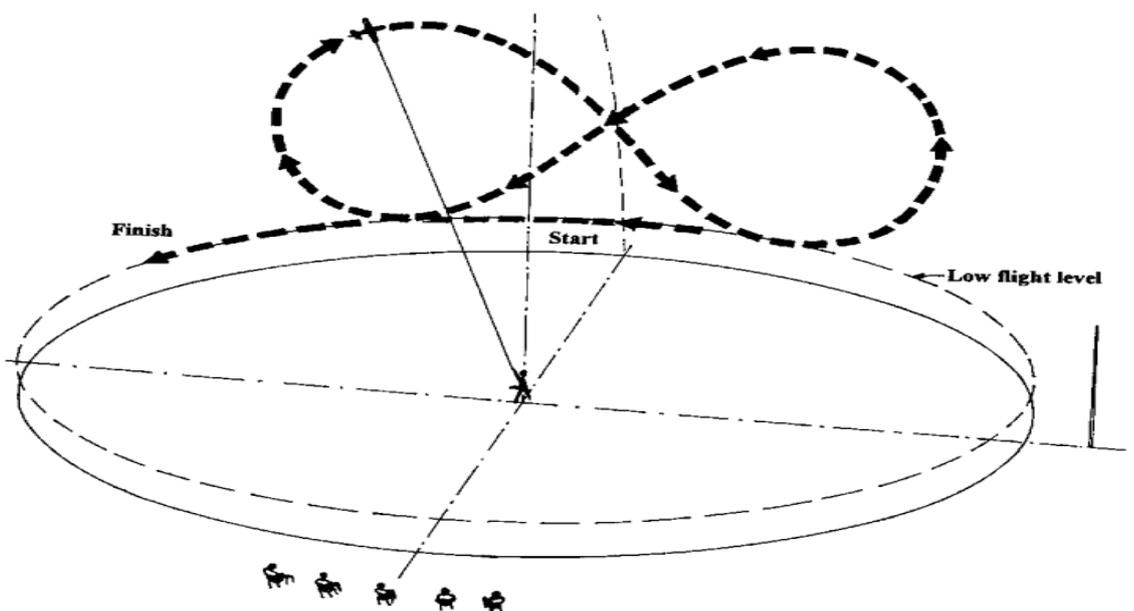


Errors:

- (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.

6.2.3.4.9 Figure Eight:

From Low Level Flight, the model 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.

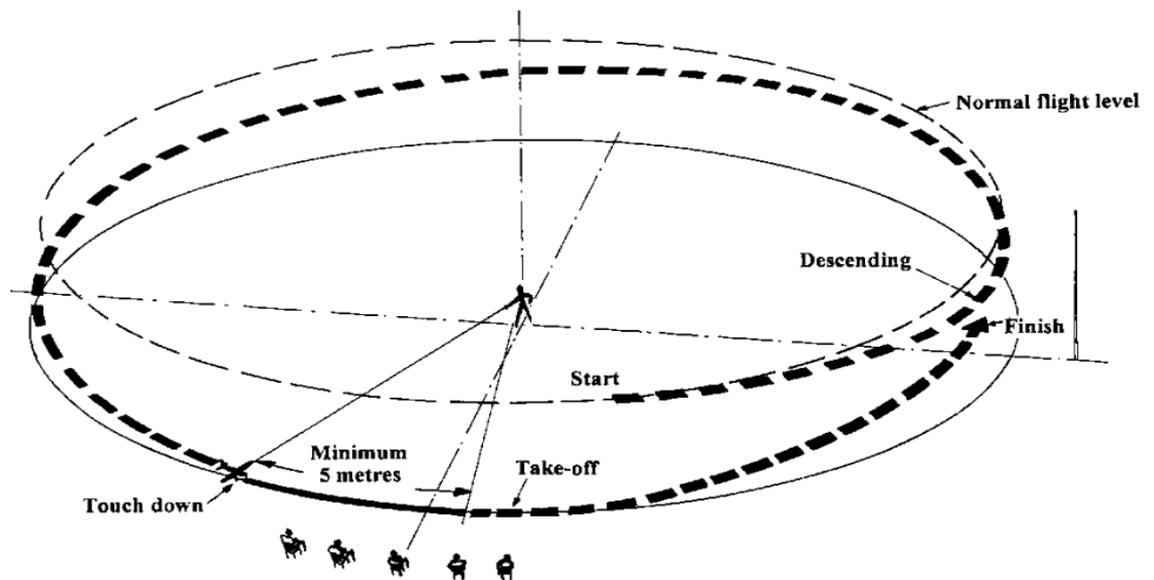


Errors:

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

6.2.3.4.10 Touch and Go:

From Normal Flight Level, the model 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. The model 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.

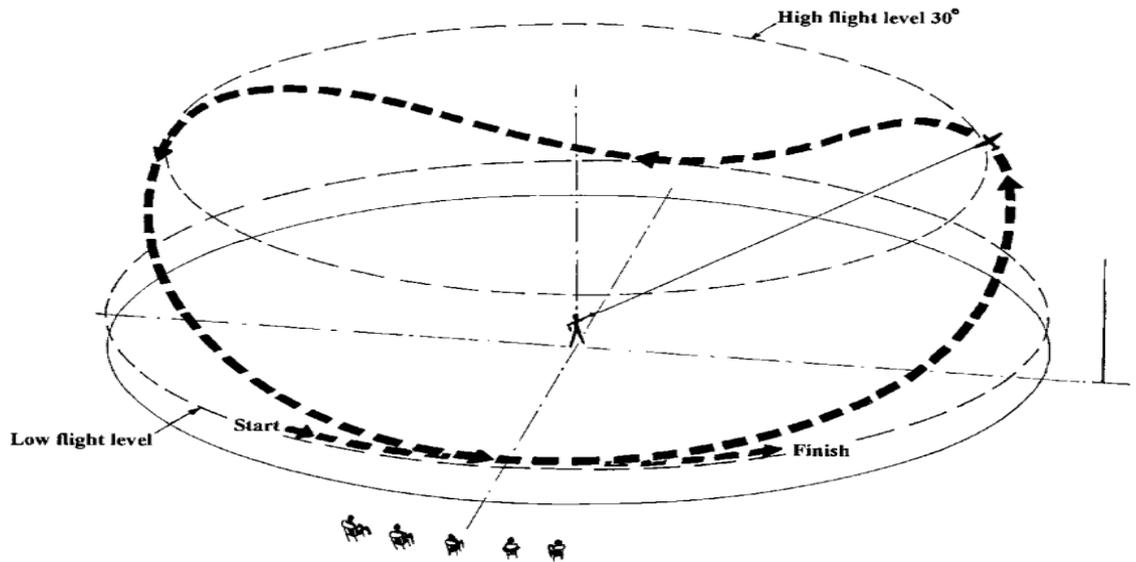


Errors:

- (1) Descent not commenced from Normal Flight Level.
- (2) Throttle, gear and flaps not operated smoothly during the descent.
- (3) The model 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.
- (5) Not a normal take off and climb out to Normal Flight Level.

6.2.3.4.11 Lazy Eight

From Low Flight Level in front of the judges the model 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 types of aircraft.

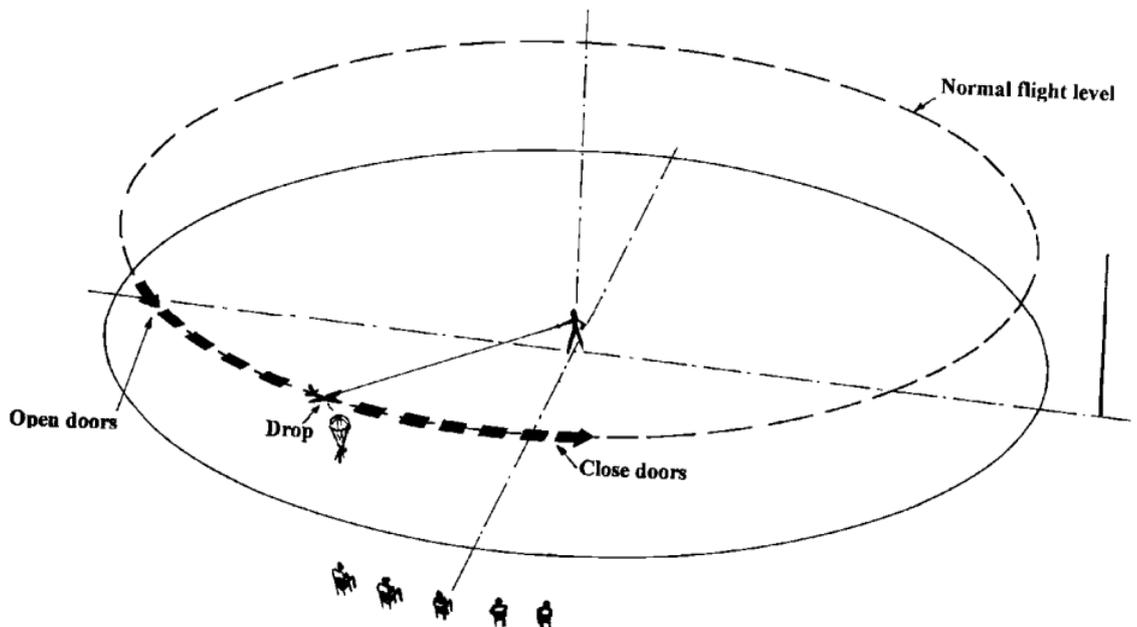


Errors:

- (1) The manoeuvre not executed from Low Level Flight
- (2) The climbing turn not to High Flight Level
- (3) The second climbing turn 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

6.2.3.4.12 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.

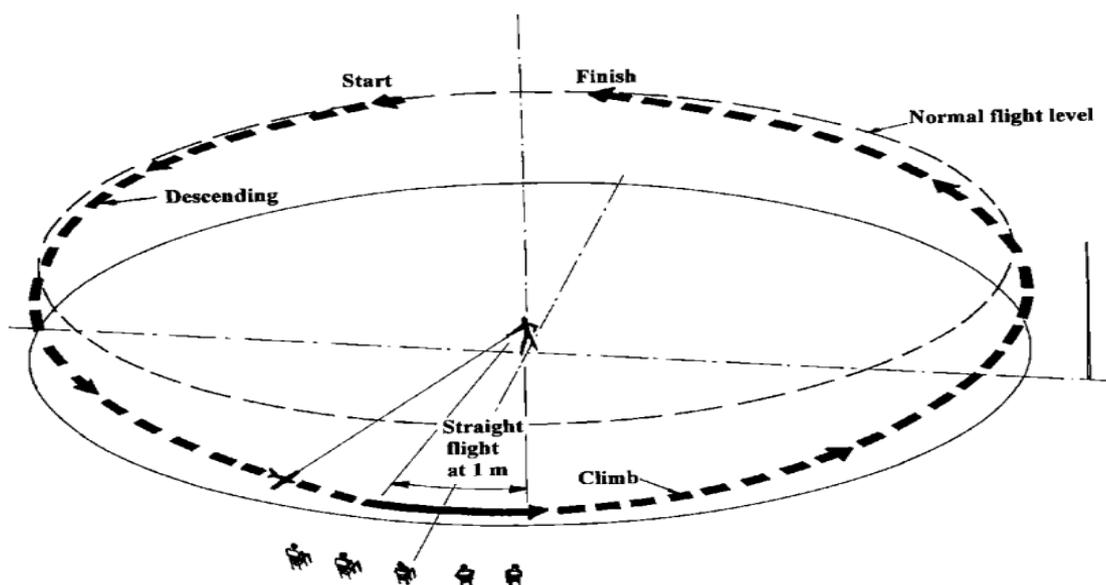


Errors:

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

6.2.3.4.13 Overshoot/Go-around:

From Normal Flight Level, the model reduces speed and extends landing gear and flaps, as applicable to the subject aircraft. When the model reaches not more than one metre height it picks up speed before it then makes a normal climb out and completes the manoeuvre at Normal Flight Level. The descent to approximately one metre 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 descent.
- (3) The model not accelerating smoothly before climbing out.
- (4) The manoeuvre not finished at Normal Flight Level.

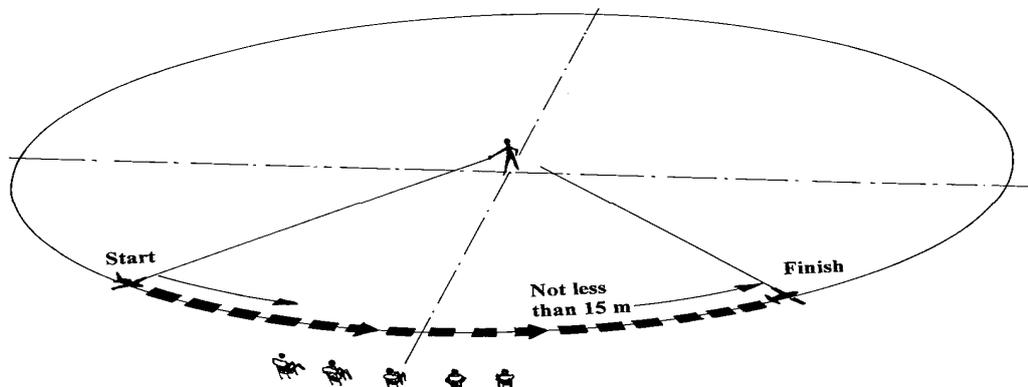
6.2.3.4.14 Non-Listed manoeuvre or Flight Function by the subject aircraft:

A competitor may include in his flight schedule one manoeuvres or flight function which is not described in this section e.g. crop spraying, outside loop etc. Full details of the proposed manoeuvre preferably with a diagram must be presented to the flight judges and agreement reached as to the precise nature of the intended manoeuvre before going to the flight line. The competitor must be prepared to supply evidence that any manoeuvre or function is/was within the performance capability of the aircraft subject type modelled,

Mechanical functions which could equally be performed on the ground and demonstration of functional scale detail, such as dropping auxiliary fuel tanks; sliding canopies and switching on and off lights, are not acceptable as optional flight manoeuvres, but may be included in the schedule to enhance realism.

6.2.3.4.15 Taxi Demonstration

The model should stand still on the ground with the engine(s) running without being held. The model should then taxi a minimum distance of 15 metres in a manner of the subject aircraft 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.

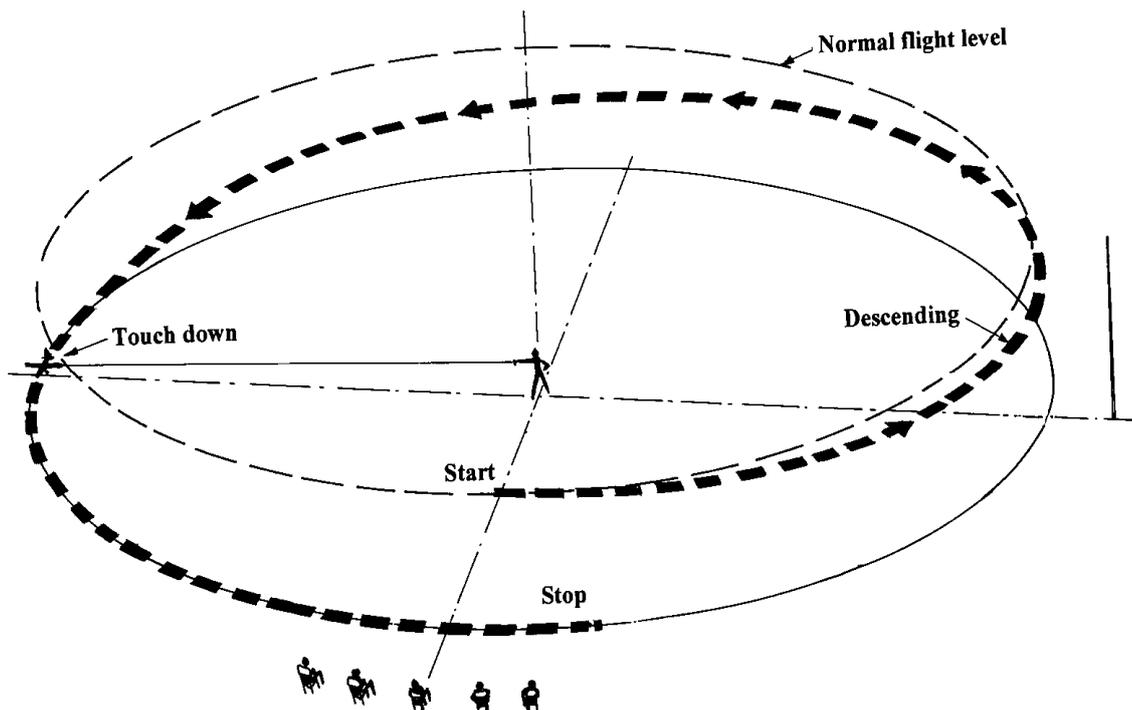


Errors:

- (1) Taxi distance less than 15 metres.
- (2) Not a realistic taxi for the subject aircraft.
- (3) Not all engines operating.
- (4) If held or touched during the manoeuvre, the score is zero.

6.2.3.5 Landing:

From Normal Flight Level, the model smoothly descends while throttling back and begins the approach with flaps and gear down, when applicable, the model 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 too fast, not correct approach configuration.
- (6) Model bounces on touchdown.
- (7) Model does not come to a gradual and smooth stop after landing.
- (8) Model noses over (30 % penalty when nose-down, zero if it overturns).
- (9) Engine(s) stops before the landing manoeuvre is finished.

6.3

RADIO CONTROL CLASSES

6.3.1 SCALE RADIO CONTROLLED MODELS (Based on FAI Class F4C)

6.3.1.1 General Model Characteristics

Maximum weight of the complete model in flying condition without fuel, or motor batteries if electric powered, but including any dummy pilot shall be 15kg.

Motive power:

- (a) I/C piston engines
- (b) Gas Turbine
- (c) Electric motors - Maximum voltage of power source to be 72 volts

The use of Rocket or pulse jet engines is forbidden

6.3.1.2 Organisation of Scale Radio Control Flying Competitions

The Contest/Flight Line Director is responsible for setting up the flight line in accordance with BMFA guidelines and for defining any no-fly areas. N.B. At some competition venues and the UK Nationals there are additional considerations regarding airspace.

The flying order of the competitors will be established by means of a draw before the start of the contest.

The competitor is responsible to ensure that he is aware of his position in the flying order and that his flight schedule has been prepared (see 6.3.1.6) using the current official flight score sheet. He must also ensure that his model is fuelled and prepared for flight in the event that the competitor before him in the flying order fails to start.

Each competitor will normally be given a minimum of five minutes' notice to commence a flight and must execute an official flight within the required time limit (see 6.3.1.5) in order to record a flight score for that flight.

A competition will normally consist of two flight rounds, but in the event that there is a large entry or only limited time available, the Competition Director may decide to reduce the number of optional manoeuvres. N. B. The UK National championships may consist of three rounds depending on weather conditions.

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

6.3.1.3 The Judges' Line

The Flight judges will be seated alongside the take-off and landing area on a line which, subject to any constraints imposed by the flying site is approximately parallel with the wind direction. This axis will be referred to as the judges' line. The Contest/Flight Line Director will be responsible for monitoring the direction of the wind and if it continually deviates more than 30° from the judges' line and it is practical to do so, the judges' line will be adjusted accordingly.

6.3.1.4 Transmitter Control

Transmitter control will be exercised in accordance with the guidelines laid down in the BMFA Members Handbook.

Competitors using 35 MHz Tx's must advise the CD who will ensure that suitable facilities for Tx control are in place and that the flying order is not compromised because of frequency clashes.

Separate rules apply at the UK National Championships where all Transmitters likely to be used during the contest may be subject to testing and/or registration.

Non-2.4GHz transmitters will then be subject to full Tx control during the competition. Transmitters will only be issued to the competitor when his name is called for him to stand by to make his flight and must be returned to the steward at the transmitter compound, as soon as the flight or attempted flight has ended. All unauthorised transmission during the contest will result in automatic disqualification of the offender from the entire contest, and render him liable to further penalties.

6.3.1.5 Flight Timing

An official flight is a flight completed within 17 minutes. If the model has more than one engine, the flight time allowed will be increased by one minute for each additional engine.

When instructed to start his flight, the official flight time will commence after two minutes or when the competitor signals to the timekeeper that he is commencing to start his engine(s), whichever is first.

If the model is not airborne within 7 minutes from when flight timing commences, plus one additional minute for each extra engine, the official flight will be terminated and the total flight score will be zero.

Judging stops at the end of the time allowed and any manoeuvre that is not completed will be marked zero.

If the engine(s) stops after the take-off has commenced, but before the model is airborne, the engine(s) may be restarted, but the take-off will be marked zero.

Only one attempt is allowed to restart an engine and complete the take-off and if the model does not become airborne, the official flight will end and the flight score will be zero.

If the model lands and stops after the take-off has been completed, with the exception of a model which stops during a touch and go manoeuvre, the official flight is terminated.

6.3.1.6 Flight Schedule

The aim of the flight schedule is to demonstrate the flight characteristics of the subject full size aircraft in a realistic fashion..

The flight schedule consists of the take-off, eight manoeuvres and the landing. Two of the manoeuvres are mandatory and six are optional.

The Flight Schedule must be produced by the competitor using the current version of the Flight Score sheet which should be downloaded from the BMFA website in advance. If necessary copies will be available from the Contest Director.

It is the competitor's responsibility to ensure that the Flight Score sheet is correctly filled in and all the intended manoeuvres are identified on the score sheet, numbered in the order they are to be flown and that sufficient copies are passed to the flight judges before timing of the flight commences.

The selection of manoeuvres or the order they are flown in can be changed between flight rounds. If a competitor wishes to make any changes to his flight schedule after the first round he must ensure that copies of the revised schedule are passed to the flight judges before the next flight round commences.

The flight schedule must be adhered to and if during the flight any manoeuvre is omitted for any reason or missed out from the schedule it cannot be re-inserted. Missed manoeuvres and manoeuvres flown not in the sequence identified on the flight schedule will be marked zero.

Only one attempt is permitted for each manoeuvre, the only exception is the procedure of getting a model airborne, as defined in 6.3.1.5.

(a) Mandatory Manoeuvres

The “Figure Eight” and “Descending 360° Circle” are mandatory manoeuvres which can be placed anywhere in the flight schedule. See section 6.3.6 for manoeuvre descriptions.

(b) Optional Manoeuvres

The competitor must nominate six additional manoeuvres which should demonstrate an appropriate range of capabilities of the subject aircraft and which may be selected from the list below. See section 6.3.6 for manoeuvre descriptions

The nominated manoeuvres may include up to two non-listed manoeuvres or flight functions which the competitor feels are appropriate (See 6.3.6.5). If a competitor wishes to demonstrate any non-listed manoeuvre or flight function he must provide written details of the proposed manoeuvre preferably with a diagram, to the flight judges and seek their agreement regarding the exact nature of the proposed manoeuvre before the flying part of the competition commences. There can be no discussion with the judges on this matter at the flightline.

Competitors may submit a description of the subject aircraft’s flight characteristics (originated by a competent authority), which may be used to provide advice to the flight judges. This should be given to the Flight Judges before the flying part of the competition commences.

Only one manoeuvre involving dropping something or the demonstration of a mechanical function may be included in a competitor’s choice of options.

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.

Models of flying replicas will be expected to conform to the performance limitations of the replica, unless the competitor is prepared to provide documentary evidence that the replica is structurally similar to the original.

Models of historic aircraft and restored historic aircraft will be expected to conform to the flight envelope of the aeroplane as it was originally constructed and certified, unless the competitor is prepared to provide documentary evidence to the contrary.

List of Optional Manoeuvres

(See section 6.3.6 for descriptions) -

- One loop
- Roll (including variations)
- Roll off the Top (Immelmann turn)
- Split-S or Reversal
- Stall turn
- Normal spin (three turns)
- Cuban eight (including half cuban, reverse cuban and reverse half cuban)
- Lazy eight
- Derry turn
- Inverted flight
- Wingover
- Chandelle
- Side slip
- Flight in triangular circuit

Flight in rectangular circuit
Extend and retract Landing gear or Flaps
Overshoot or Go-around
Procedure Turn
Touch and go
Straight flight with one engine throttled (multi-engined models only)
Straight Flight at Low Speed
Drop bombs
Parachute Demonstration
Non-listed manoeuvres (max of two)

6.3.1.7 Presentation of Manoeuvres

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

All manoeuvres must be performed parallel with the judges' line (para. 6.3.1.3 refers) and may be flown in either direction i.e. from the left or the right, but if any part of the manoeuvre is performed behind the judges' line it will be marked ZERO.

Exceptions from this rule are the Take-off, Landing, Touch and Go and the Sideslip. These manoeuvres may be performed into wind and the model may fly behind the judges' line without penalty as long as it does not overfly any designated area laid out for the protection of spectators, officials and other competitors or helpers.

The height and positioning of individual manoeuvres should be proportional to that expected in a full size display typical to the subject aircraft. Unless specified otherwise, manoeuvres that are carried out in a horizontal plane (e.g. Figure Eight, Triangular Circuit) should commence on a flight path that is between 30° and 60° elevation to the judges. Manoeuvres such as the Descending Circle and Spin should start at a higher elevation.

Any model which flies with the main undercarriage down when the full size aircraft was equipped with retractable landing gear shall have the total flight score reduced by 10%. Flying with just the tail wheel down when the full size had a retractable tail wheel, will incur a 3% penalty.

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 should be equally visible during flight of the model. If such a pilot is not fitted, the total flight score shall be reduced by 10%.

6.3.1.8 Flight Judging

Flight Judges will examine each manoeuvre with regard to the following aspects:

- (a) The shape, size and technical requirements of the intended manoeuvre.
- (b) The positioning of the manoeuvre relative to the judges position or other datum.
- (c) The scale realism achieved relative to the subject aircraft.

N.B. More detailed information is contained in the Judges Guide published separately.

6.3.1.9 K-Factors

The following K-factors apply:-

(1) Takeoff	K = 11
(2) Mandatory Manoeuvre	K = 7
(3) Mandatory Manoeuvre	K = 7
(4) Optional Manoeuvre	K = 7
(5) Optional Manoeuvre	K = 7
(6) Optional Manoeuvre	K = 7
(7) Optional Manoeuvre	K = 7
(8) Optional Manoeuvre	K = 7
(9) Optional Manoeuvre	K = 7
(10) Approach and Landing	K = 11
(11) Realism of flight:	
(a) Model sound	K = 4
(b) Speed of the model	K = 9
(c) Smoothness of flight	
(i) No electronic motion stabilising devices fitted	K = 9
(i) Electronic motion stabilising devices fitted, but not switched on	K = 9
(ii) Electronic motion stabilising devices fitted and switched on	K = 5

6.3.1.10 Flight Realism

At the end of the flight the judges will confer to assess Realism of Flight, which covers the entire flight performance including the way in which the model flies between manoeuvres. If the flight is terminated before the flight program has been completed, all the realism marks will be reduced in proportion to the part of the program not flown.

The following aspects are assessed, always keeping in mind the likely characteristics of the full size subject:

(a) Model sound - This is an assessment of how the model replicates the characteristic sound of the subject aircraft. Special consideration will be given where the model demonstrates any particular characteristic sounds of the full size aeroplane. Competitors are encouraged to advise judges if such characteristic sounds can be reproduced and where they will occur in the flight. E.g. distinctive propeller noise at high power setting or noise produced by the airframe during high 'g' manoeuvres.

(b) Speed of the model - This is a subjective assessment of the scale speed of the model.

(c) Smoothness of flight – This is an assessment of the smoothness of control taking into account the prevailing weather conditions. The model should be well trimmed and show no signs of instability. The attitude of the model in flight, i.e. any nose-up or nose-down tendency will also be assessed.

NOTE: The use of electronic motion stabilising devices (gyros) can have a major impact on smoothness of flight. The use of these devices must be declared on the Flight Score Sheet and the maximum points available for "smoothness of flight" for fixed wing models will be reduced from 90 to 50. (Judge's mark multiplied by the K-factor). This declaration cannot be changed or revoked part way through a competition and the calculation of all flight scores in the competition will be based on the initial declaration.

6.3.1.11 Scoring

Normally two rounds will be flown and the final score will be the sum of the best flight score and the static score.

If one round is flown the single flight score will count.

If three rounds are flown, the average of the two best flight scores will count.

6.3.1.12 Flight Safety

If the model flies over any designated no-go area or an area laid out for the protection of spectators, officials and other competitors, or flies behind a specified safety line during any manoeuvre, the competitor will be advised and the manoeuvre will be marked zero.

If in the opinion of the Flight Judges or the Flightline Director, a model aircraft is considered unsafe, or being operated or flown in an unsafe manner, or repeatedly infringes a 'no go' area, the pilot shall be instructed to land immediately and the flight score will be zero.

When the airspace for R/C Scale flying is restricted, a 2-stage warning system will be used to advise competitors and judges when flying close to the boundary and when the boundary is infringed. Infringement during a manoeuvre will be penalised and repeated infringement will result in a zero flight score and the competitor will be required to land.

Pre-flight testing of failsafe systems is recommended (CAP 658 and the BMFA Members Handbook pages 32/33 refer). The Contest Director may at his discretion request a pre-flight demonstration of a competitor's failsafe settings.

6.3.2 SCALE RADIO CONTROL STAND-OFF (Based on FAI Class F4H)

6.3.2.1 Contest Rules

The General Characteristics of the model and the Flying Schedule shall be the same as Scale R/C - (6.3.1 refers).

Scoring, Eligibility, Declaration requirements, Documentation requirements and the Static Judging rules are as shown below:

6.3.2.2 Scoring

Greater emphasis is placed on the flying performance and the ratio of Flight Score to Static Score is 2:1.

Normally two rounds will be flown and the final score will be the sum of the two flight scores and the static score. If one round is flown the flight score will be doubled, if three rounds are flown the best two flight scores will be used.

6.3.2.3 Eligibility

In addition to rule 6.1.1.4 any model, including repaints and rebuilds, which has previously been placed in the top three in a BMFA Scale R/C (F4C) competition, may be entered in a R/C Stand-Off event, but will not be eligible for a podium place or an award certificate.

The minimum requirement is that the surface finish (colour and markings) on the model must have been applied by the competitor. The requirement for the competitor to have constructed his own model (Builder of the Model rule 6.1.1.3) is not applicable to Scale Stand-Off.

6.3.2.4 Declaration

The competitor must complete and sign the Competitors Declaration Form certifying that he has applied the surface finish (colour and markings) to the model. The declaration also includes a questionnaire which is used by the Static Judges to assess how much the competitor contributed to the Scale Accuracy. The competitor may also use photographs or sample material in support of the declaration.

If an incorrect declaration is subsequently revealed, the competitor may be disqualified from the contest.

6.3.2.5 Documentation

The documentation for Stand-Off scale is the minimum necessary to fully assess the model from the following aspects: scale accuracy (outline), colour, markings and realism.

As with all scale model static judging, good photographs and/or drawings are the means of judging scale accuracy. Photographs and reproductions should be of a reasonable size, (aircraft image size 150 mm minimum). Ideally these must show the entire aeroplane and show the three aspects; side view; front view and top plan view (underneath plan view will not be judged). There is no requirement for close up or detail photographs.

The documentation should be presented on separate sheets or as a montage no larger than A2. A book with page markers is not acceptable.

There are no prescribed penalties for missing or inadequate documentation, but judges can only award marks on the basis of the documentation available. Poor documentation will be reflected in reduced scores and any aspect of static judging for which there is no documentation will result in a Zero score for that aspect.

(a) Proof of Scale Accuracy (Outline)

This may be in the form of photographs, printed reproductions or drawings. Photographs or printed reproductions of the full size aircraft are restricted to a maximum of 5 and one or more must show the actual subject aircraft being modelled.

Drawings must conform to the requirements of rule 6.1.2.2(a)(ii).

(b) Proof of colour:

This may be in the form of colour chips or original paint samples, colour photographs (which may be the same photos supplied for outline), or colour illustrations published in books, magazines or on kit boxes. Published descriptions are also acceptable when accompanied by examples of similar colours used on other aircraft types.

(c) Proof of markings:

This may be in the form of colour photographs (which may be the same as those supplied for outline), or published colour illustrations from books or magazines. Black and white photos or illustrations are acceptable if accompanied by suitable colour samples. Published descriptions are also acceptable when accompanied by examples of markings used on similar types.

6.3.2.6 Static Judging

All static judging is carried out at a distance of 5 metres. This is measured from the centre line of the model to the judges seating position.

(a) Scale Accuracy.

This an assessment of the outline accuracy of the model compared with the subject aircraft as seen from three aspects (side, front and top plan), judged by comparison with the documentation presented.

(b) Originality of Model Design & Construction

This is an assessment of the extent to which the scale accuracy of the model is due to the effort of the competitor. Maximum marks will be awarded to a model which is designed and constructed in its entirety by the competitor. A model which is built from a kit will score less, dependent upon the extent of prefabrication and an ARTF model will score zero (unless evidence is presented of extensive modification by the competitor).

(c) Colour and Markings Accuracy

This is an assessment of the accuracy of the colour and markings of the model by comparison with the documentation presented.

(d) Colour and Markings complexity

This is a subjective assessment of the difficulty in reproducing and applying the finish and markings to the model.

(e) Realism

This is a subjective assessment of how well the model captures the character of the subject aircraft by direct comparison with the photograph or illustration of the subject aircraft. The assessment will also take into account the surface finish, weathering and any detail that is noticeable at 5m.

6.3.2.7 K - Factors

Scale Accuracy –

Side View	K = 12
Front View	K = 12
Upper Plan View	K = 12
Originality of model Design & Construction	K = 10
Colour and Markings Accuracy	K = 20
Colour and Markings Complexity	K = 10
Realism	K = 24
Total K = 100	

6.3.3 SCALE RADIO CONTROL - FLYING ONLY

6.3.3.1 Scale R/C - Flying Only comprises two classes, which differ only in respect of the permitted maximum weight of the model, less fuel or motor batteries if electric powered.

6.3.3.2 **Flying Only - 15Kg**

6.3.3.3 **Flying Only - 5Kg (Light Scale)**

6.3.3.4 **Contest Rules**

The General Characteristics of the model (with the exception of the dry weight) and the Flying Schedule shall be the same as Scale R/C (6.3.1 refers). No static judging will take place. Scoring and Eligibility requirements are as shown below.

NOTE: For 2019 it is expected that all flying only events will include the Light Scale Class

6.3.3.5 Scoring

Normally two rounds will be flown and the final score will be the sum of the two flight scores. If one round is flown the flight score will be doubled, if three rounds are flown the best two flight scores will be used.

6.3.3.6 Eligibility

The requirement for the competitor to have constructed his own model (Builder of the Model rule 6.1.1.3) is not applicable to Scale R/C Flying Only or Light Scale.

Models used in these events must be clearly recognisable as bona fide scale models of full size aircraft. The Contest Director may disallow any entries that he considers not to fit this specification.

6.3.3.7 Scale R/ C Flying Only at the UK Nationals

Entry will be subject to qualification and the requirement is that the competitor must have achieved two flight scores of 80% or one over 90% within the last three years at STC/Centralised events including the Nationals. The list of those qualified will be maintained and published on the Scale website.

SCALE RADIO CONTROL INDOOR

6.3.4.1 Contest Rules

The General Rules (Section 6.1.1) will apply where appropriate with the exception of rule 6.1.1.20 concerning electronic motion stabilising devices, see 6.3.4.6 below.

The Static Judging rules are as stated in section 6.1.2

The Flying rules are the same as Scale R/C (FAI Class F4C) (Section 6.3.1) with the exception of the following concerning General Model Characteristics, Event Organisation, Flight Timing and the Flight Program:

6.3.4.2 General Model Characteristics

Maximum weight of the complete model in flying condition including all power packs (i.e. traction batteries, CO₂ and rubber motors) is 300gm.

The maximum wing loading of the complete model in flying condition including all power packs is 15 gm/sq dm

The following motive power is approved:

- (a) Electric motors
- (b) CO₂ Motors
- (c) Rubber motors

The use of any other power system is forbidden.

Use of electronic and/or gyro stabilisation devices is approved for scale indoor RC models, but they must be declared and the flight score will be penalised (See Para. 6.3.4.6 below).

6.3.4.3 Organisation of Scale Indoor Radio Control Flying Events

The flying order of the competitors will be established by the contest director before the start of the contest.

The competitor is responsible to ensure that he is aware of his position in the flying order and his model is prepared for flight in the event that the competitor before him in the flying order fails to start. Each competitor will be given a minimum of five minutes' notice to commence his flight.

Each competitor may be called to fly up to three times and must execute an official flight within five minutes on each occasion to be eligible for flight points for that flight.

The Flight Judges will be seated alongside the take-off and landing area on a line which is parallel with the required flight direction. This axis will be referred to as the "judges' line".

Competitors must stay behind the judge's line during the flight. Failure to do so will result in zero score for that flight.

Transmitter control will be in accordance with paragraph 6.3.1.3

6.3.4.4 Flight Timing

An official flight is a flight completed within 7 minutes.

Any manoeuvre that is not completed within the official flight time will be marked zero.

When instructed to start his flight, the official flight time will commence after two minutes or when the competitor signals to the timekeeper that he is commencing to start his engine(s), whichever is first.

If the model is not airborne within 3 minutes from when flight timing commences the official flight will be terminated and the total flight score will be zero.

If the model lands and stops after the take-off has been completed, with the exception of a model which stops during a touch and go manoeuvre, the official flight is terminated.

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

6.3.4.5 Flight Schedule

The flight schedule which must be completed within the official time, consists of the take-off, five manoeuvres and the landing. Two of the manoeuvres are mandatory and three are optional. Descriptions of manoeuvres are shown in section 6.3.5.

Apart from the Take-off and Landing, the Manoeuvres may be flown in any order. Only one attempt is permitted for each manoeuvre.

The following K-factors apply:

- | | |
|-------------------------------|--------|
| (1) Take-off | K = 15 |
| (2) Figure Eight | K = 10 |
| (3) 360 Deg Descending Circle | K = 10 |
| (4) Optional manoeuvre | K = 10 |
| (5) Optional manoeuvre | K = 10 |

(6) Optional manoeuvre	K = 10
(7) Approach and Landing	K = 15
(8) Flight Performance	K = 20
	Total K = 100

6.3.4.6 Flight Performance

Flight Performance is a subjective assessment of all aspects of the flight not covered by the specific manoeuvres 1 to 7. This includes the overall flight presentation, all the flying between manoeuvres and Flight Realism. (Realism will be assessed in terms of model sound, speed, stability, smoothness of control and flight attitude).

Models with electronic and/or gyro stabilisation devices will have their Take-off and Landing scores reduced by 40%.

Any model which flies with wheels down when the full size aircraft actually featured retractable landing gear shall have the total flight score reduced by 10%.

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

6.3.4.7 Presentation of Manoeuvres

All manoeuvres must be flown in the manner 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".

All manoeuvres must be performed parallel with the judges' line, but the direction of the manoeuvre is at the discretion of the contestant. If any part of the manoeuvre is performed behind the judges' line it will be marked ZERO.

The height and positioning of individual manoeuvres should be proportional to that expected in a full size display. Provided that the ceiling height allows, the figure eight manoeuvre should commence on a flight path that is between 30° and 60° elevation to the judges. The Descending Circle should start at a higher elevation.

The size of manoeuvres should make the optimum use of the available space. However if there are restrictions on the airspace and obstructions projecting from the walls or the ceiling, the size and positioning of manoeuvres may be subject to concession. Any such 'local rules' will be advised before flying commences.

6.3.5 SCALE RADIO CONTROL HELICOPTER

6.3.5.1 Contest Rules

Scale helicopters contests are where possible governed by the same rules as contests for Radio Controlled fixed wing scale models and are divided into similar classes i.e. R/C Scale Helicopter; Stand-Off Scale Helicopter and Flying Only.

The General Rules (Section 6.1.1) will apply where appropriate

6.3.5.2 General Model Characteristics – as 6.3.1.1

6.3.5.3 Static Judging including Declaration and Documentation Requirements

Section 6.1.2 will apply to the R/C Scale Helicopter class and Section 6.3.2 will apply to the Stand-Off Scale Helicopter class

6.3.5.4 Organisation of Events & Judges Line – as 6.3.1.2 and 6.3.1.3 with the addition of the following:

A helipad will be marked out 20 meters in front of the judges and at 90° to the judges line. This will normally be in the form of a circle of 2 meters in diameter.

For Indoor Scale Helicopters the helipad will be 50cm in diameter and positioned an appropriate distance in front of the judges.

6.3.5.5 Transmitter Control – as 6.3.1.4

6.3.5.6 Flight Timing - As 6.3.1.5

6.3.5.7 Flight Schedule

The aim of the flight schedule is to recreate the flight characteristics of the subject full-size helicopter, from when the rotors start to turn until the rotors are stopped.

All the manoeuvres must be identified on the Flight Score Sheet which must be given to the judges before timing of the flight commences.

Manoeuvres (2) to (9) may be flown in any order but the sequence must be marked on the score sheet and any manoeuvre flown out of sequence will be marked zero.

(a) Mandatory Manoeuvres

The “Figure Eight” and “Descending 360 degree Circle” are mandatory manoeuvres to be included in each flight, to be positioned within the flight schedule at the competitor’s discretion. Descriptions of these manoeuvres are shown under section 6.3..

(b) Optional Manoeuvres

The competitor must nominate six additional manoeuvres which should demonstrate an appropriate range of capabilities of the subject helicopter and may be selected from the list below. Descriptions of all listed manoeuvres are shown under section 6.3.6. The nominated manoeuvres may also include up to two non-listed manoeuvres or flight functions which the competitor feels are appropriate. If a competitor wishes to demonstrate any non-listed manoeuvre or flight function not included in section 6.3.6 he must provide written details preferably with a diagram to the flight judges and seek their

agreement regarding the exact nature of the proposed manoeuvre before the flying part of the competition commences. There can be no discussion with the judges on this matter at the flightline.

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. (Evidence of validity for any manoeuvre or aircraft performance can be any published document or statement of performance, flight test report, pilots notes, aircraft sales brochure or similar).

Only one manoeuvre involving dropping something or the demonstration of a mechanical function may be included in a competitor's choice of options. Mechanical functions which could be equally demonstrated on the ground, (e.g. switching on and off lights or opening & closing doors), are not acceptable as optional manoeuvres.

To assist the judges, competitors may submit a description of the full size subject helicopter's flight characteristics and performance, (originated by the manufacturer, licensing authority or established publisher). This should be given to the Flight Judges before the flying part of the competition commences.

List of optional manoeuvres -

- Loop
- Roll
- Roll off the Top
- Stall turn
- Lazy eight
- Wingover
- Chandelle
- Flight in triangular circuit
- Flight in rectangular circuit
- Extend and retract Undercarriage
- Procedure Turn
- Fixed Heading square
- Quick Stop
- Autorotation
- Confined area take-off

6.3.5.8 Presentation of Manoeuvres

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

All manoeuvres must be performed parallel with the judges' line (para. 6.3.1.2 refers) and may be flown in either direction i.e. from the left or the right, but if any part of the manoeuvre is performed behind the judges' line it will be marked ZERO.

The height and positioning of individual manoeuvres should be proportional to that expected in a full size display appropriate to the subject helicopter. Unless specified otherwise, manoeuvres that are carried out in a horizontal plane (e.g. Figure Eight, Triangular Circuit) should commence on a flight path that is between 30° and 60°

elevation to the judges. Manoeuvres such as the Descending Circle should start at a higher elevation.

Any model which flies with wheels down whereas the full size actually featured retractable landing gear shall have the total flight score reduced by 10%.

Any model which flies without the correct number of main rotor blades shall have the total flight score reduced by 10%

6.3.5.9 Flight Judging

Flight Judges will examine each manoeuvre with regard to the following aspects:

- (a) The shape, size and technical requirements of the intended manoeuvre.
- (b) The positioning of the manoeuvre relative to the judges' position or other datum.
- (c) The scale realism achieved relative to the subject aircraft, taking into account the following:
 - (i) Model sound - This is an assessment of how the model replicates the characteristic sound of the subject helicopter. Special consideration will be given where the model demonstrates any particular characteristic sounds of the full size helicopter. Competitors are encouraged to advise judges if such characteristic sounds can be reproduced and where they will occur in the flight. E.g. distinctive rotor noise at high speed or noise produced during high 'g' manoeuvres.
 - (ii) Speed of the model - This is a subjective assessment of the scale speed of the model.
 - (iii) Smoothness of flight – This is an assessment of the smoothness of control taking into account the prevailing weather conditions. The model should be well trimmed and show no signs of instability.

6.3.5.10 K- Factors

- | | |
|------------------------------|--------|
| (1) Take-off | K = 10 |
| (2) Mandatory Manoeuvre..... | K = 8 |
| (3) Mandatory Manoeuvre..... | K = 8 |
| (4) Optional Manoeuvre..... | K = 8 |
| (5) Optional Manoeuvre..... | K = 8 |
| (6) Optional Manoeuvre..... | K = 8 |
| (7) Optional Manoeuvre..... | K = 8 |
| (8) Optional Manoeuvre..... | K = 8 |
| (9) Optional Manoeuvre..... | K = 8 |
| (10) Approach & Landing..... | K = 10 |
| (11) Flight Impression..... | K = 16 |

Total K = 100

6.3.5.11 Flight Impression

At the end of the flight the judges will confer to decide the marks for Flight Impression, which is a subjective assessment of all aspects of the flight not covered by the specific manoeuvres 1 to 10. This includes the realism of all the flying between scheduled

manoeuvres; the appropriateness or otherwise of the scheduled manoeuvres in an air display or an operational scenario and the overall flight presentation including the sequence of manoeuvres.

If the flight is terminated before the flight program has been completed, the Flight Impression marks will be reduced in proportion to the part of the program not flown.

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

6.3.5.12 Flight Safety

The rotor blades of a model helicopter must not be driven unless the Helicopter is in an area designated as safe for helicopter flight. This would normally be in front of the Judges line.

If the model flies over any designated no-go area or an area laid out for the protection of spectators, officials and other competitors, or flies behind a specified safety line during any manoeuvre, the competitor will be advised and the manoeuvre will be marked zero.

If in the opinion of the Flight Judges or the Flightline Director, a model helicopter is considered unsafe, or being operated or flown in an unsafe manner, or repeatedly infringes a 'no go' area, the pilot shall be instructed to land immediately and the flight score will be zero.

6.3.6 SCALE RADIO CONTROL FLIGHT MANOEUVRES

6.3.6.1 Description of Manoeuvres

Scale flying is not simply an exercise in precision flying and although it is important to position each manoeuvre correctly it is equally important that the manoeuvre is flown in a manner which replicates how the manoeuvre would be flown by the subject full size aeroplane.

The following descriptions and diagrams indicate the shape of the manoeuvres, illustrate the positioning of the manoeuvres in relation to the judges and where the start and finish of the manoeuvres should be called. The shape of each manoeuvre is largely theoretical and in reality would only be achievable by a model of a fully aerobatic aeroplane.

The errors listed 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.

For indoor events manoeuvres should be flown in order to make optimal use of the available space, however where there are severe restrictions on the airspace and obstructions projecting from the walls or the ceiling, the size and positioning of manoeuvres may be subject to concession. Any such 'local rules' will be advised before flying commences.

NOTES:

Manoeuvres that are fixed wing or rotary wing specific are suffixed 'FW' or 'HELI' as appropriate.

Manoeuvres which may be oriented into the wind and which may result in the model crossing the judges' line without penalty are additionally identified.

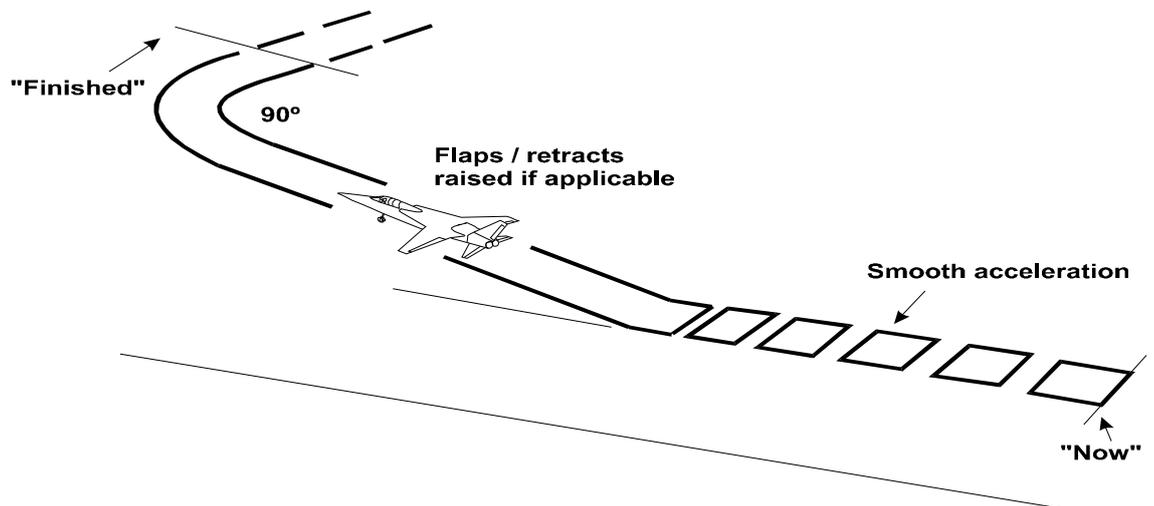
6.3.6.2. TAKE-OFF

6.3.6.2.1 TAKE-OFF – FW

This manoeuvre may be flown into the wind and the model may cross the judges' line without penalty

The model should be positioned on the take-off area and stand still on the ground with the motor/s running without being held by the pilot or helper. After the take-off is 'called', the model then commences the take-off, either into wind, or as required by the competitor to make best use of the available take-off area. If the model is touched after the competitor or his helper calls "Now" the take-off will score zero. The model should smoothly accelerate to a realistic speed in a straight line and then lift gently from the ground and climb at an angle consistent with that of the subject aircraft. The take-off is completed after the model has turned through 90 degrees at an appropriate altitude

If the subject aircraft used flaps or other lift enhancing devices for take-off, then their function must be demonstrated before take-off and these devices including the landing gear if applicable must be retracted in the correct sequence during the climb out after take-off. In the event of a strong or gusty wind, the competitor may choose to retract these devices before the take-off run commences, providing the judges are advised. However this may result in a reduction of the marks awarded.



Errors:

- (1) Model touched after calling "Now" (zero marks). (Not applicable to rubber or CO₂ powered indoor models).
- (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) Rate of climb inappropriate for subject aircraft
- (8) Inappropriate attitude during climb (nose too high or too low).
- (9) Flaps/lift enhancing devices not used if applicable.
- (10) Undercarriage 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.

6.3.6.2.2 TAKE-OFF - HELI

The model helicopter should stand still on the helipad on a heading parallel with the judge's line and with the rotor/s stationary. The rotor/s are then run up to speed and the model lifted off vertically to hover above the helipad at an altitude of 0.5 to 2 metres. The hover is sustained for 5 seconds followed by a 90° observance turn in a direction appropriate to the full size (i.e. opposite to the full size pilot's seating position – not required if pilot is seated on centre-line). After returning to the original heading, the model should then smoothly accelerate forwards and climb away at a speed and rate of climb appropriate to the full size. The take-off is completed after the model has turned 90° away from the judges' line.

Diagram TBA

Errors:

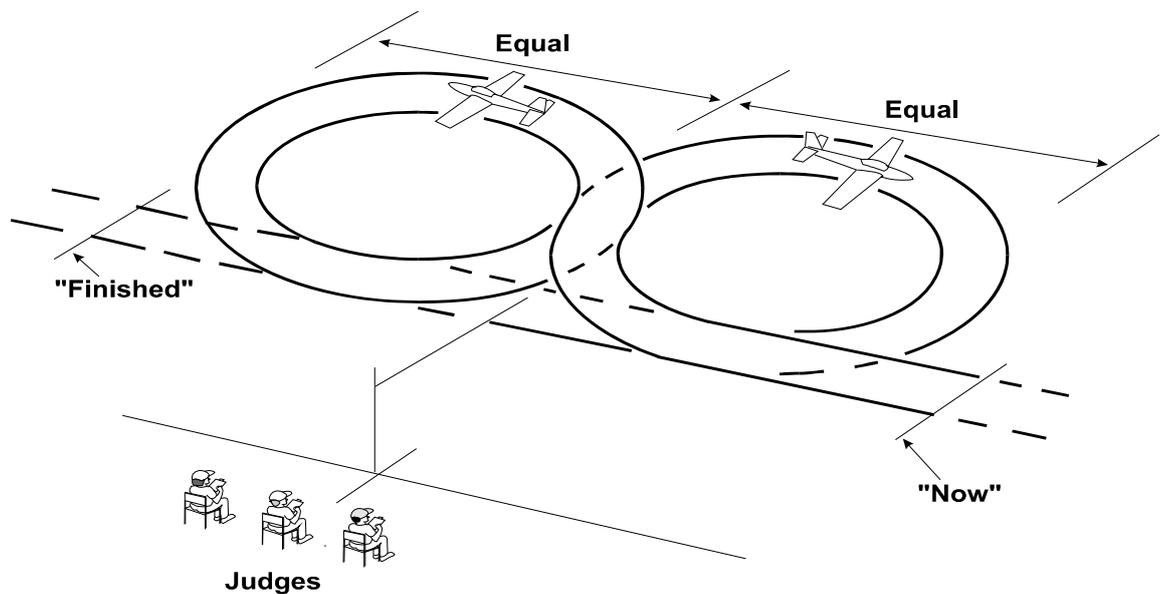
- (1) Model touched after calling "Now" (zero marks)
- (2) Yaws excessively on lift off
- (3) Hover not sustained for 5 sec.
- (4) Observance turn inappropriate/ not 90° .
- (5) Unrealistic speed / too rapid acceleration
- (6) Rate of climb inappropriate for subject aircraft
- (7) Undercarriage not raised if applicable.
- (8) Change of heading during climb
- (9) Unrealistic rate of turn onto crosswind leg
- (10) Model does not turn through 90° after climb out.

6.3.6.3 MANDATORY MANOEUVRES

6.3.6.3.1 FIGURE EIGHT

The model approaches in straight and level flight on a line parallel with the judges' line, and then a 90° 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 radius of the turns must be the same throughout the manoeuvre. 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. The manoeuvre is flown at a constant height and the left and right halves of the manoeuvre should be the same size.

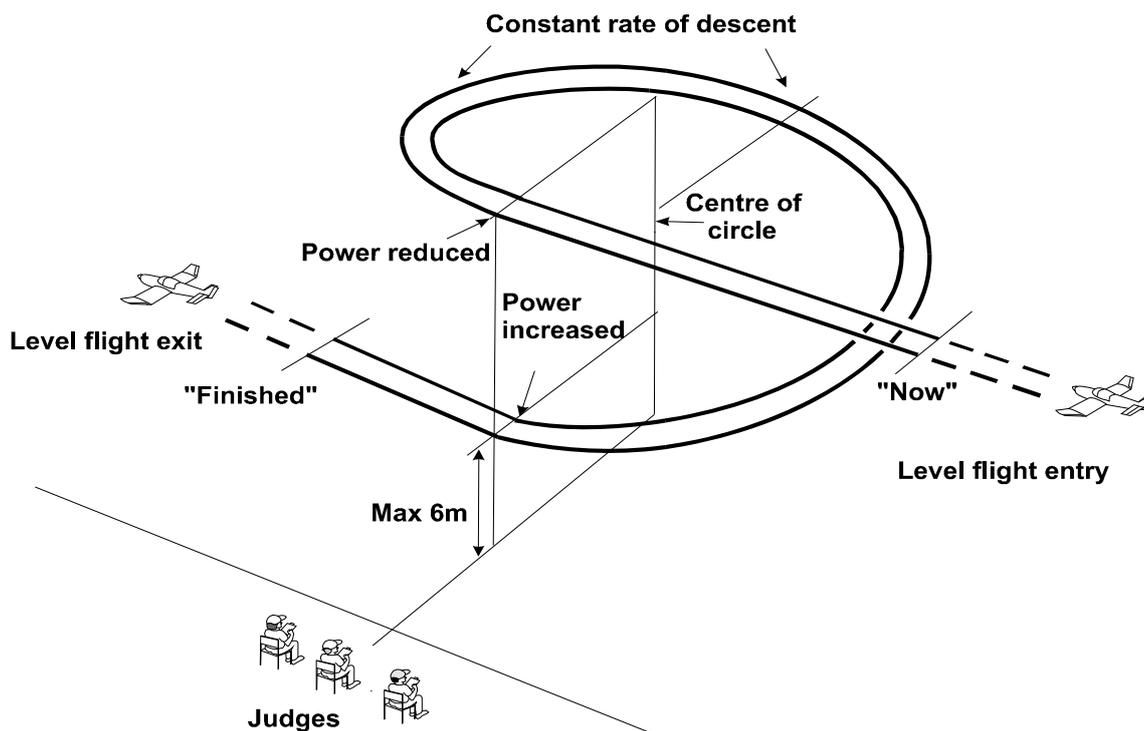


Errors

- (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 flight path not smooth and steady.
- (10) Too far away / too close / too high / too low.

6.3.6.3.2 360° DESCENDING CIRCLE

Commencing from straight and level flight on a track parallel with the judges line above the area in front of the judges, the speed is noticeably reduced and the model turns away from the judges and flies a gentle 360° descending circle at a constant rate of turn and at a constant rate of descent. The turn and the descent are arrested at a maximum height of 6 meters over the area in front of the judges. (2 metres for indoor models) The speed is then increased and the manoeuvre is completed with the model resuming straight and level flight on the same track as the entry



Errors

- (1) Insufficient reduction of speed.
- (2) Rate of Descent too high or too low.
- (3) Rate of descent not constant.
- (4) Circle misshapen.

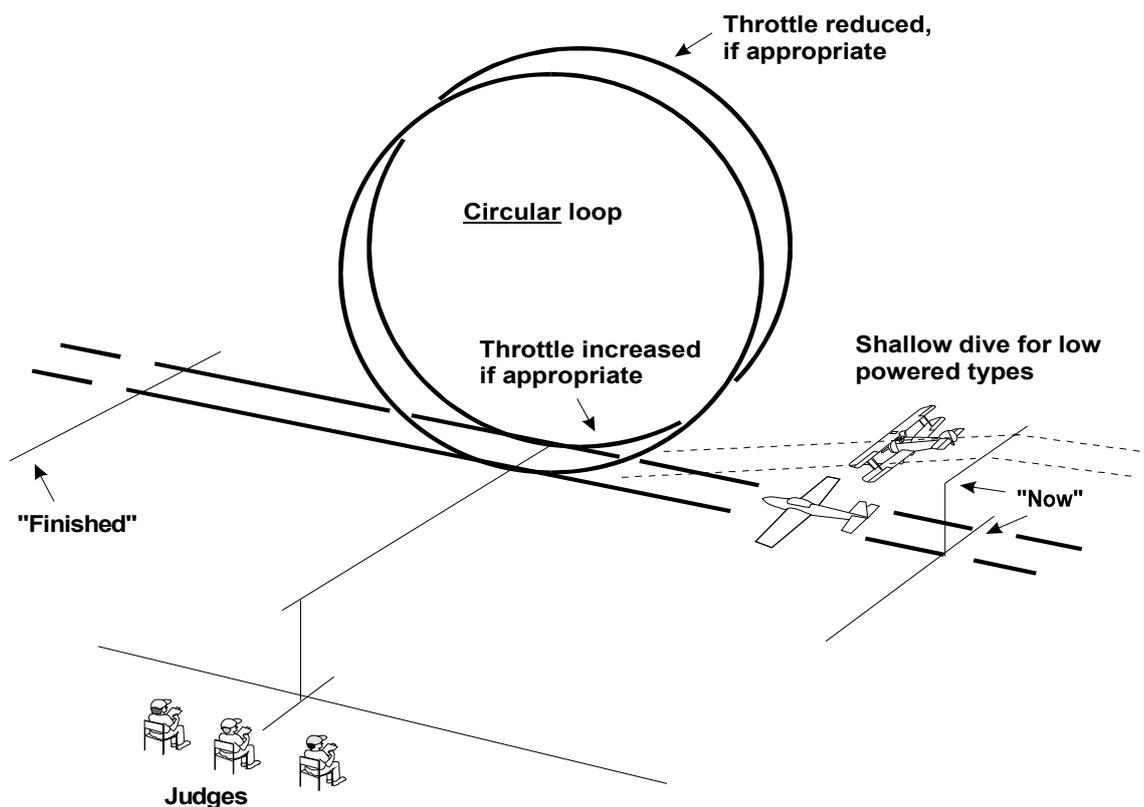
- (5) Circle too big or too small.
- (6) Circle not centred on judges' position.
- (7) Model does not descend to 6 metres or below, (2 metres for indoor).
- (8) Start and completion of circle not over area in front of judges.
- (9) Entry and exit tracks not parallel with the judges' line.
- (10) Model not in straight and level flight when Start and Finish is called.

6.3.6.4 OPTIONAL MANOEUVRES

6.3.6.4.1 INSIDE LOOP

From straight flight, the model pulls up into a 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, in which case the finish height will be the same as the height at pull-up.

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 aerobatic 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.



Errors

- (1) Track of loop not vertical
- (2) Loop not sufficiently circular, commensurate with the subject type.
- (3) Inappropriate use of throttle.

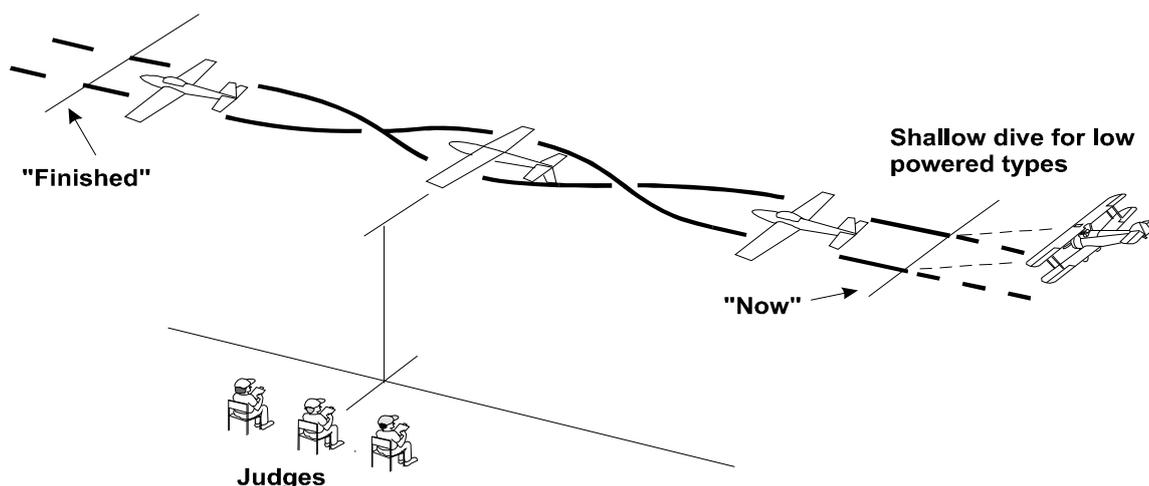
- (4) Size and speed of Loop not in manner of subject aircraft.
- (5) Not centred on judges' position.
- (6) Does not resume straight and level flight on same track and height as the pull up.
- (7) Manoeuvre not flown parallel with judges' line.
- (8) Too far away / too close / too high / too low.

6.3.6.4.2 ROLL

This manoeuvre has two variations:

Continuous Roll, where the model rolls at a constant rate through one complete rotation, and **Roll with a break or a hesitation Roll**. Each of these variations have sub-variations ; e.g. Slow, Barrel, Snap 2-point ,4-point, climbing etc.

Competitors may select a maximum of two sub-variations which must be specified on the score sheet before the flight is commenced. All variations will commence from straight and level flight, and after one complete rotation, resume straight and level flight on the same track and at the same altitude. The one exception to this is a climbing roll where the angle of climb must also be specified before flight. Low powered aircraft would be expected to execute a shallow dive at full throttle before commencing the manoeuvre.

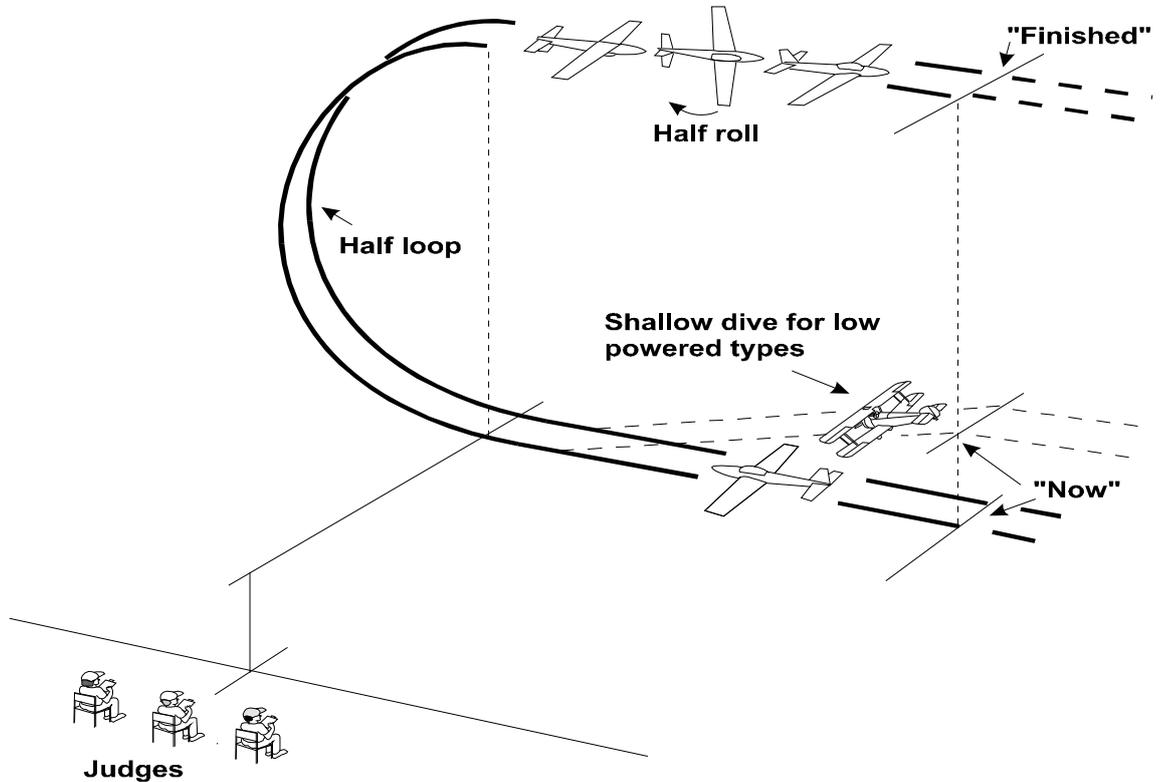


Errors

- (1) Rate of roll is not constant (continuous roll).
- (2) Style of roll not typical for subject aircraft.
- (3) Roll not centred on judges' position.
- (4) Entry and exit at different heights.(not climbing roll)
- (5) Entry and exit at different speeds.(not climbing roll)
- (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) Variation of roll not as nominated.
- (9) Inappropriate use of throttle.
- (10) Too far away / too close / too high / too low.
- (11) Hesitation roll segments not equal
- (12) Climbing roll not at specified angle

6.3.6.4.3 ROLL OFF THE TOP / IMMELMAN TURN

From straight and level flight the model 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. Low powered aircraft types would also be expected to lose some height in the half roll.

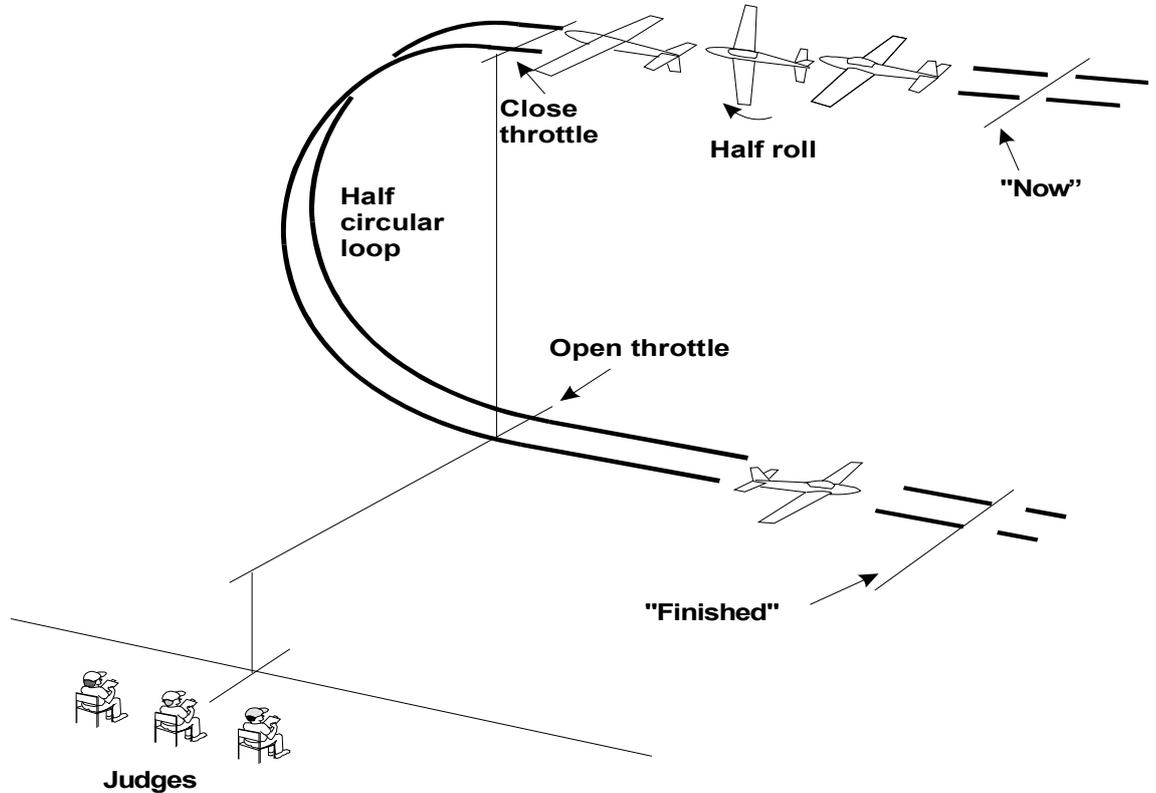


Errors

- (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 subject aircraft.
- (10) Too far away / too close / too high / too low.

6.3.6.4.4 SPLIT - S or REVERSAL - FW

From straight flight, the model 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.

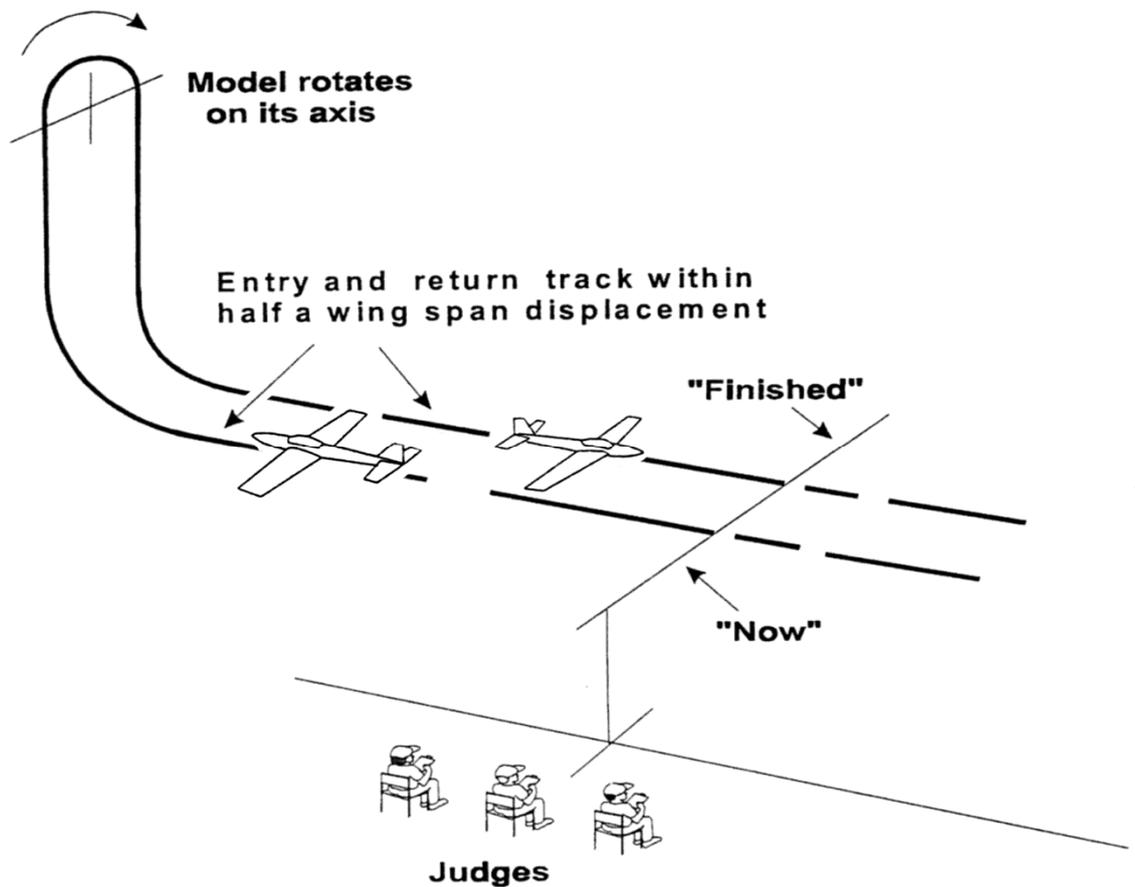


Errors

- (1) Model changes track during half roll.
- (2) Model 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) half loop is too fast or too 'tight'.
- (7) Half loop not centred on judges' position.
- (8) Model does not resume straight and level flight on opposite track to entry.
- (9) Manoeuvre not flown parallel with the judges' line.
- (10) Too far away / too close / too high / too low.

6.3.6.4.5 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 rotates on the yaw axis through 180 degrees in a direction away from the judges, 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. 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.

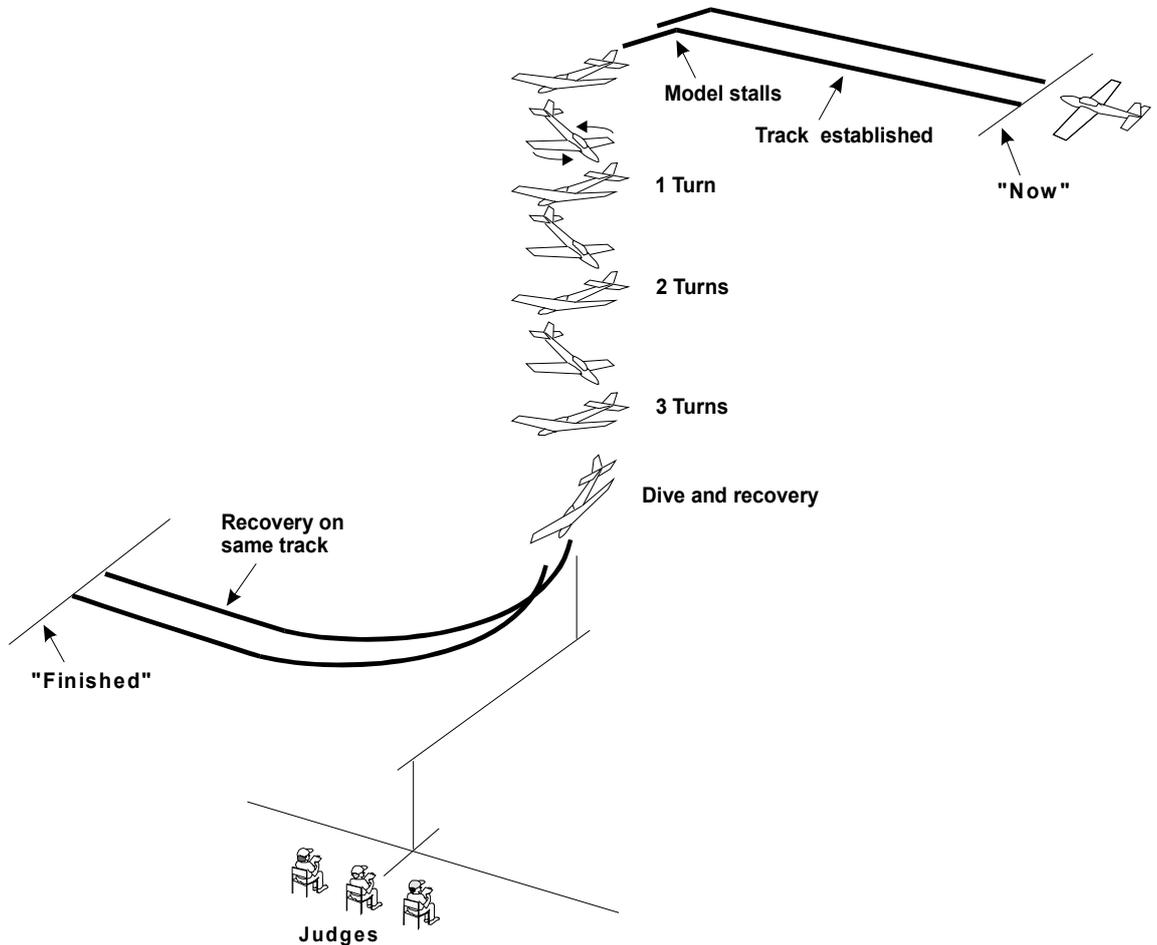


Errors

- (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 does not stop or stall before rotation.
- (6) Model does not turn within half its wingspan and around its vertical axis.
- (7) Model turns towards the judges.
- (8) Entry and exit paths are not at same height.
- (9) Model aircraft does not exit within half span displacement of entry track.
- (10) Entry and exit paths not parallel with the judges' line.
- (11) Too far away / too close / too high / too low.

6.3.6.4.6 SPIN – THREE TURNS - FW

From straight and level flight on a track parallel to the judges line, the throttle is closed and the model is allowed to decelerate-until it stalls in front of the judges and the spin is initiated. After three turns the spin is arrested and the model recovers to level flight on the same track as the initial flight direction. During the spin, any drift due to the wind is to be ignored.



Errors

- (1) Incorrect use of the throttle at point of stall.
- (2) Entry into spin not clean and positive.
- (3) Not a true spin but merely a spiral dive which is a tight vertical barrel roll and which should be marked zero. In a true spin the descent path will be close to the C of G of the model.
- (4) Not three complete turns.
- (5) Start of spin not centred on judges' position.
- (6) Model 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.

6.3.6.4.7 CUBAN EIGHT - FW

This option has four variations as detailed below. Competitors may select a maximum of two variations which must be specified on the score sheet before the flight is commenced.

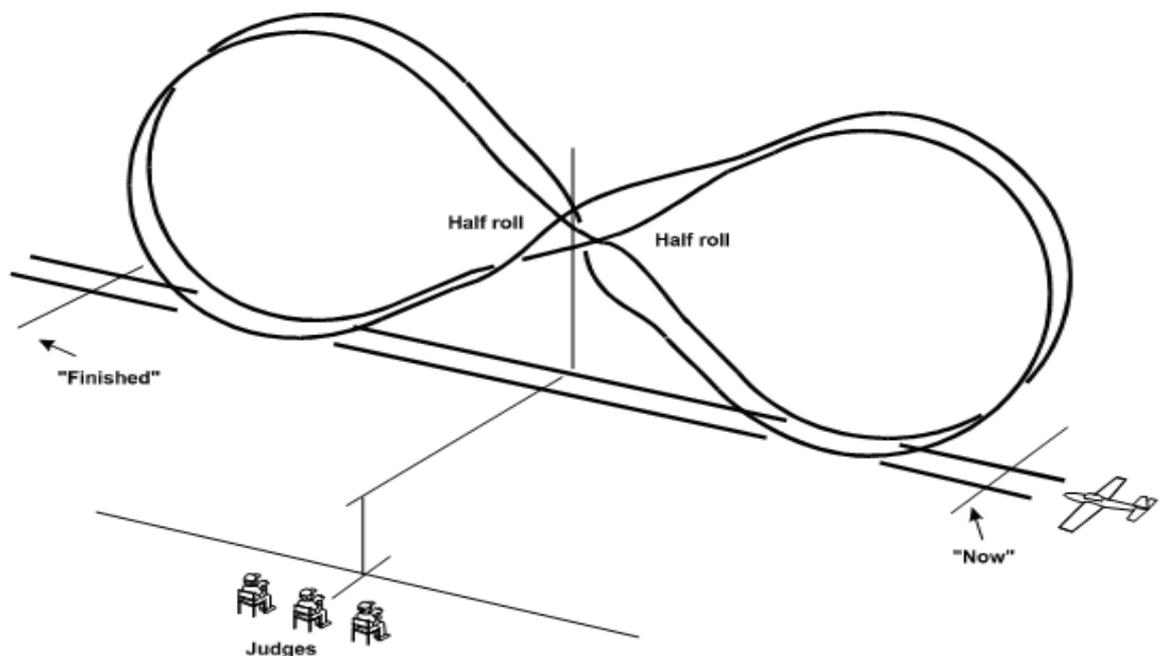
Normal Cuban Eight – From straight and level flight the model flies past the judges and pulls up into a circular inside loop until 45° nose down. In the centre of the 45° inverted dive and when in front of the judges, the model completes a half roll and the 45° dive is continued until the entry height is reached. The model then commences a similar circular inside loop in the opposite direction, followed by a half roll. In the centre of the 45° inverted dive when in front of the judges. The model then pulls out of the 45° dive to straight and level flight at the same height as the original entry to complete the manoeuvre.

Reversed Cuban Eight - The model starts with a 45° climb with half roll when in front of the judges. It then enters a downward loop with the bottom at the original entry height followed by a 45° climb with half roll in front of the judges, before entering the second downward loop, pulling out level at the entry height.

Half Cuban Eight - After the first 45° degree dive, with half roll, the model pulls out level at the entry height.

Reversed Half Cuban Eight - Start with the 45° climb and half roll then downward loop to finish level with 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.



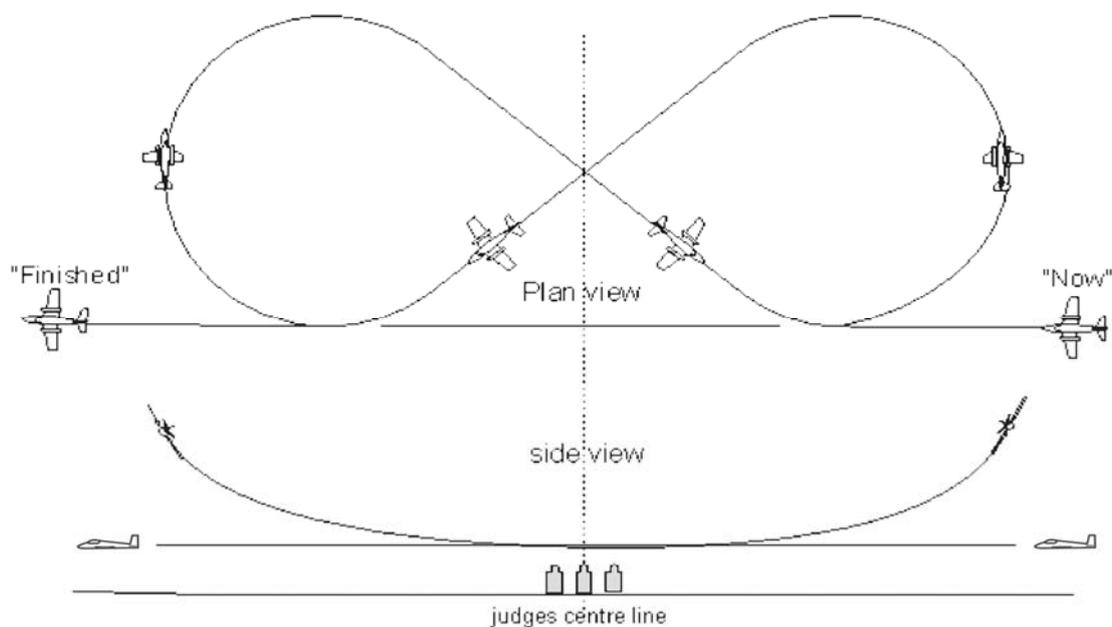
Errors

- (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 does not exit manoeuvre at same height as entry.
- (7) Model 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 subject aircraft.
- (10) Too far away / too close / too high / too low.

6.3.6.4.8 LAZY EIGHT

The model approaches in straight and level flight on a line parallel with the Judges' line. When the model is in line with the judges (the centre) a smooth curving climb is commenced which progresses to a smooth climbing turn of constant radius away from the judges. At the apex of the turn the bank should be the maximum appropriate to the full size aircraft but not more than 90° and the model shall be on a track of 90 degrees to the judges' line. The nose of the model then lowers and the bank comes off at the same rate as it went on. The turn is then continued beyond 180 degree to intercept the centre with the wings level and at the same height as the entry height into the manoeuvre. At the centre another smooth climbing turn is immediately commenced away from the judges, the shape of which should be the same as the first turn. The second turn is then continued beyond 180 degree to cross the centre with wings level and at the the same height as the entry height into the manoeuvre. The Lazy Eight is completed by maintaining this height and heading with wings level before turning to intercept the original approach track to exit the manoeuvre parallel to the judges' line in straight and level 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. The figure should be symmetrical each side of the judges' position.



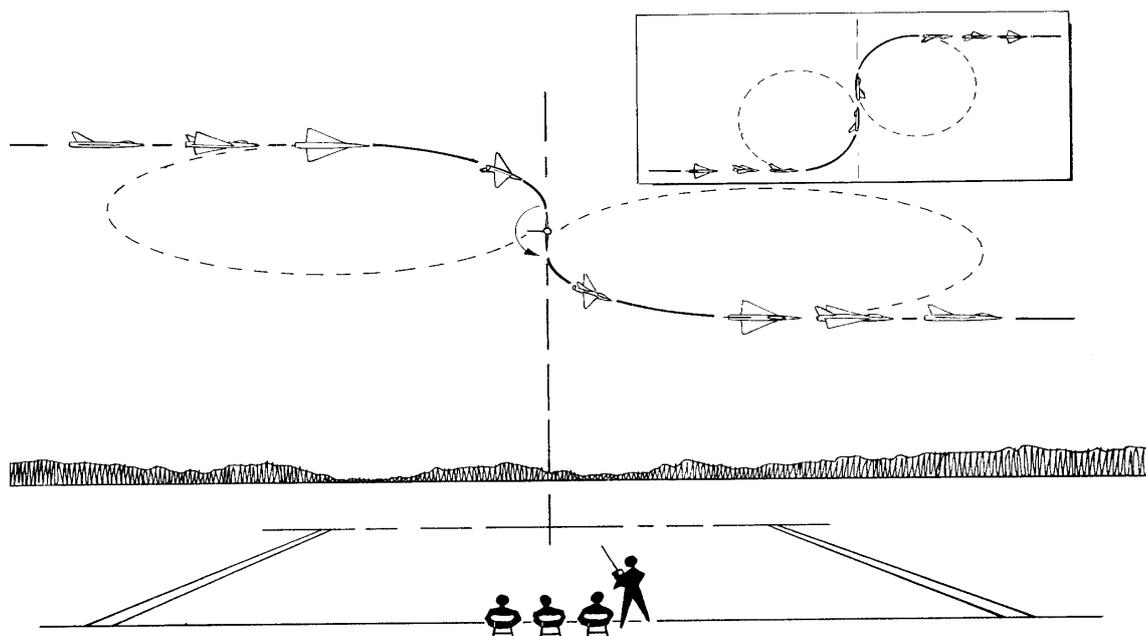
Errors:

- (1) Entry and exit paths not parallel with judges' line.
- (2) Insufficient climb achieved.
- (3) Insufficient bank achieved.
- (4) Climb and descent curves 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 subject aircraft.
- (9) Model flight path not smooth and steady.
- (10) Too far away / too close / too high / too low.
- (11) Apexes of turns not coincident with a model heading of 90 degrees.
- (12) Wings not level at the crossover.

6.3.6.4.9 DERRY TURN - FW

The model approaches at a high speed in straight and level flight on a line parallel with the judge's line. The model then makes a steep (in excess of 60° bank) one quarter circle turn in a direction away from the judges, without losing height. When centred in front of the judges the model makes a half roll in the same rolling direction as the entry, again directly followed by a steep one quarter circle turn in the opposite direction, and then flies off straight and level on a line parallel with that of the entry to the manoeuvre. The manoeuvre should be smooth and continuous.



Errors

- (1) Entry not in parallel with the judge's line.
- (2) The manoeuvre not centred in front of the judges.
- (3) The rolling manoeuvre in front of the judges not axial.
- (4) The roll in centre not in the same direction as the entry to the manoeuvre.
- (5) The roll not carried out on a line directly away from the judges.
- (6) Any hesitation between the end of the first quarter turn, the roll and/or the start of the second turn.
- (7) Exit not parallel with entry.
- (8) Significant height difference during the manoeuvre.

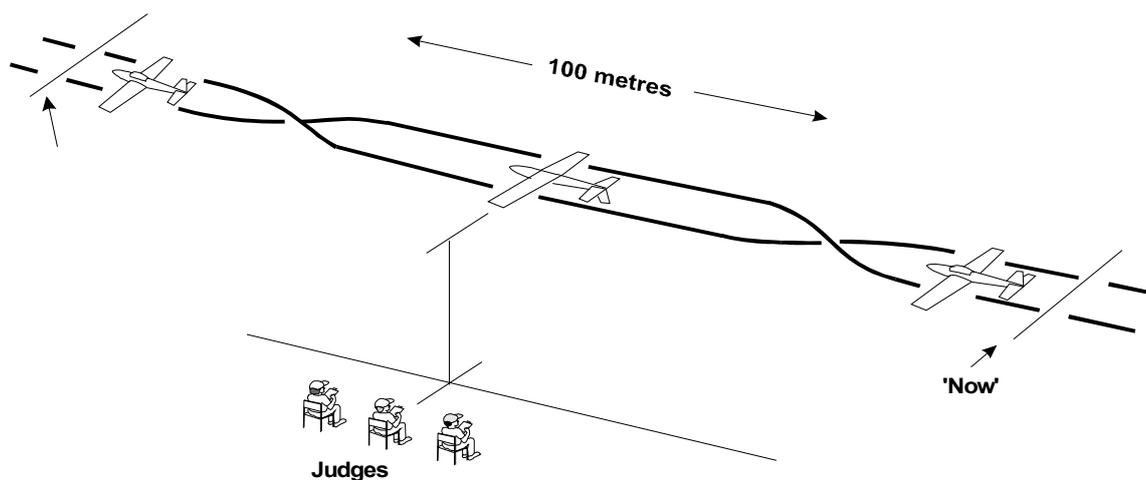
- (9) The manoeuvre misshapen as seen as part of a figure eight.
- (10) The manoeuvre is executed too low or too high to be easily judged.

6.3.6.4.10 INVERTED FLIGHT - FW

Model half rolls into inverted attitude and makes a straight inverted flight at constant speed, track and altitude for a minimum of 100 metres (5 metres indoor) centred on the judges position, 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.

N.B. Competitors must be prepared to provide evidence that the subject aircraft was capable of sustained inverted flight.

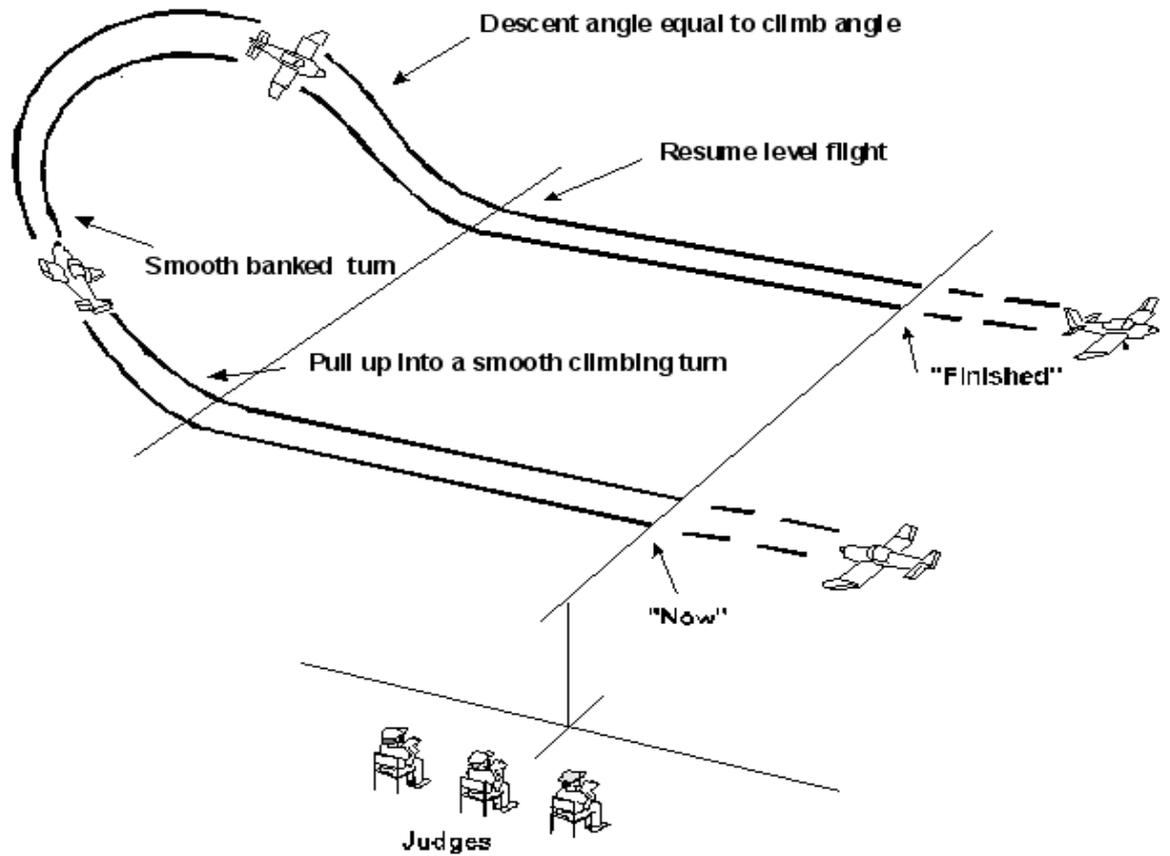


Errors

- (1) Half rolls not performed on same track as inverted flight.
- (2) Model does not fly a straight course.
- (3) Altitude not constant throughout
- (4) Model does not remain inverted for 100 metres.(5 metres indoor)
- (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.

6.3.6.4.11 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 model should track 90 deg to the entry track and the bank angle should be appropriate for the subject aircraft. The height gain should be appropriate to the capability of the subject aircraft. The model then continues on a mirror image of the entry flight path and recovers to straight and level flight at the same height but on the opposite heading to the entry and on a line displaced away from the judges.

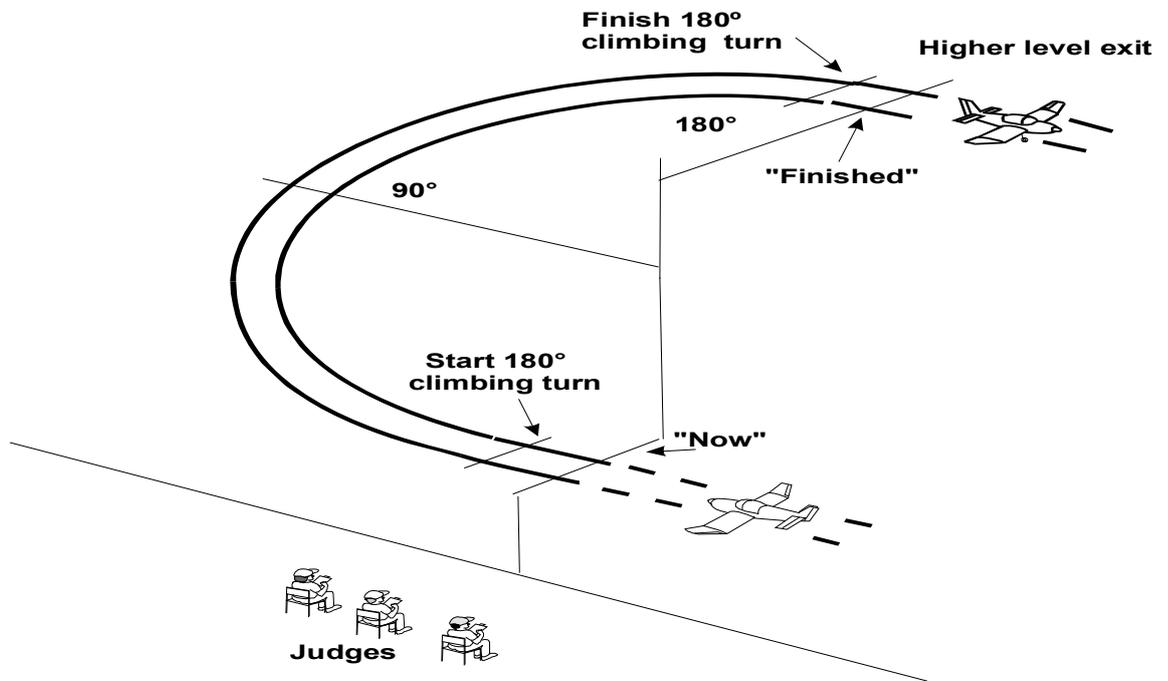


Errors:

- (1) Start and finish positions not as indicated.
- (2) Insufficient climb achieved.
- (3) Bank angle not appropriate for subject aircraft
- (4) Climb and descent angles not equal throughout manoeuvre.
- (5) Model 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 flight path not smooth and steady.
- (9) Too far away / too close / too high / too low.

6.3.6.4.12 CHANDELLE

From straight and level flight the model passes the judges and then performs a 180° constant rate climbing turn in a direction away from the judges, resuming straight and level flight on the opposite heading. The rate of climb should be the maximum which is appropriate for the subject aircraft.



Errors

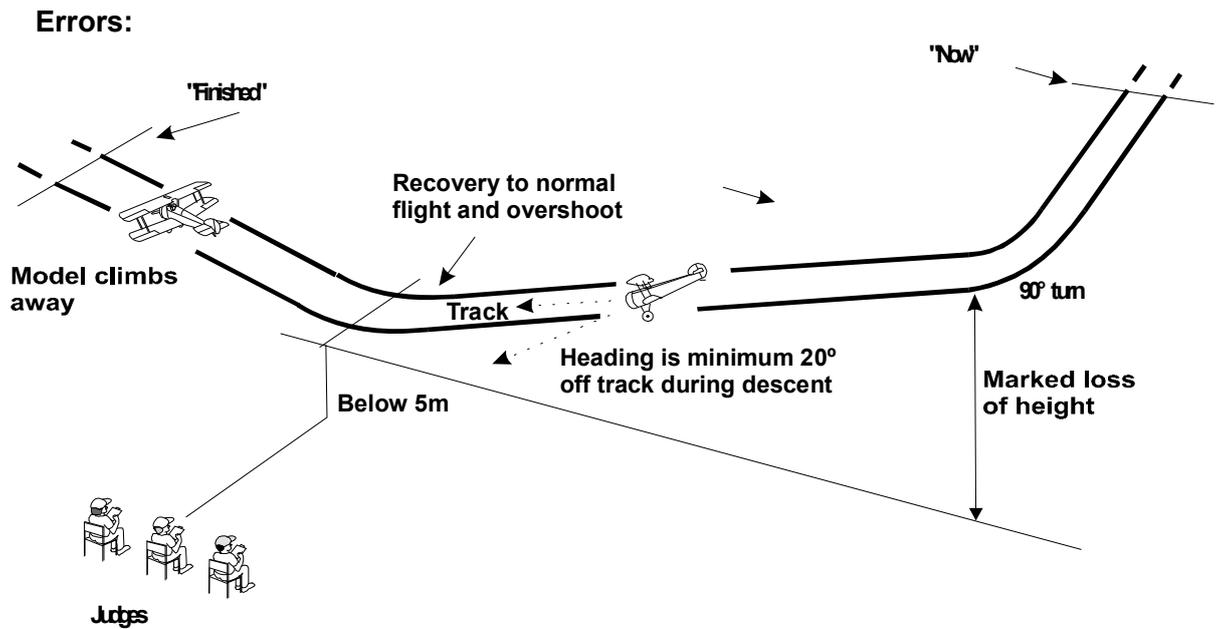
- (1) Turn not smooth and continuous.
- (2) Climb not smooth and continuous.
- (3) Half height gain not at 90° position.
- (4) Excessive/unrealistic engine power used to achieve the climb.
- (5) Insignificant height gain/inappropriate rate of climb.
- (6) Start & finish not centred on judges' position.
- (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.

6.3.6.4.13 SIDESLIP - FW

This manoeuvre may be flown into the wind and the model may cross the judges line without penalty

The purpose of this manoeuvre is to demonstrate a marked loss of height on final approach without the use of flap, whilst maintaining the final approach track and avoiding an excessive build up of speed.

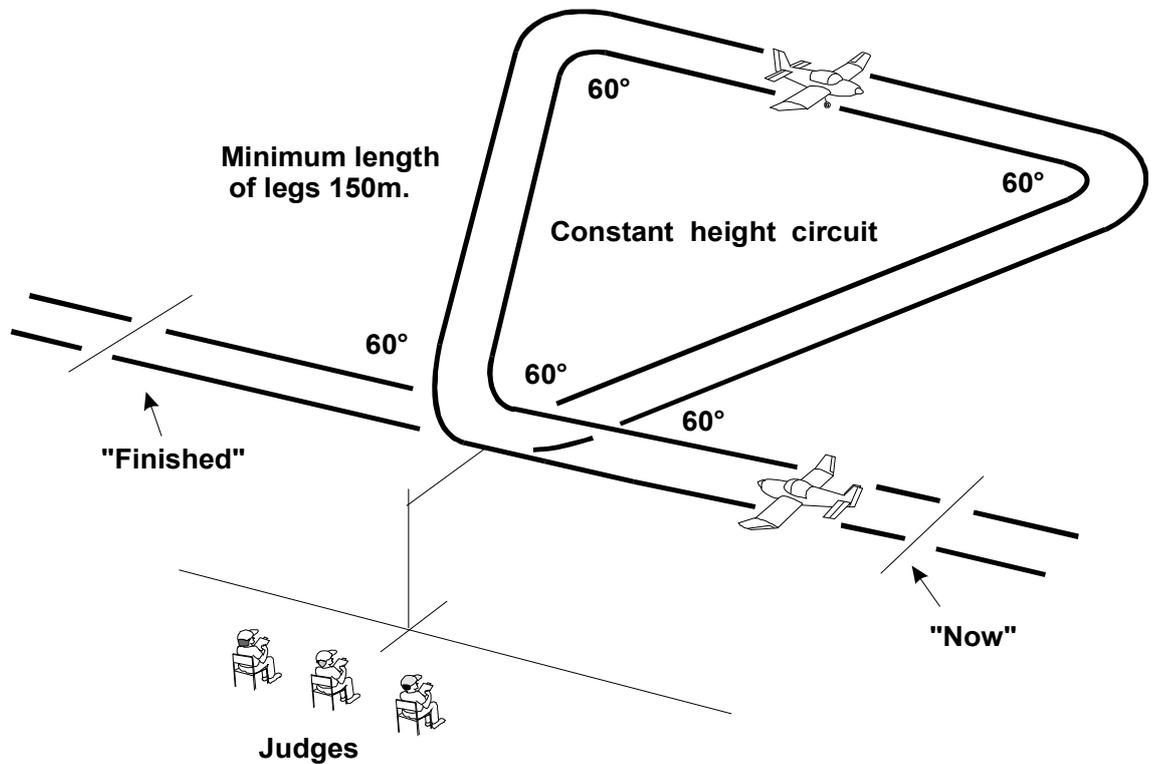
The model commences the manoeuvre in level flight by reducing power on base leg, and then turns through 90° onto a higher than normal final approach which may be orientated into wind. After the model has completed the turn it starts a sideslip to the left or the right achieving a yaw of at least 20° off track. The sideslip is continued to a point below 5 metres (2 metres indoor) in front of the judges when the sideslip is corrected, normal straight flight is resumed and the model climbs away.



- (1) Model does not smoothly enter sideslip after turning onto final approach.
- (2) Model is not yawed at least 20° off track during sideslip.
- (3) Rate of sideslip and descent are not constant.
- (4) There is insufficient height loss.
- (5) Excessive speed is built up during descent.
- (6) Approach track not maintained
- (7) The sideslip is not corrected before passing the judges.
- (8) Overshoot is not below 5 metres. (2 metres indoor)
- (9) Not a smooth transition during return to normal flight and climbout.
- (10) Too far away / too close / too high / too low.

6.3.6.4.14 TRIANGULAR CIRCUIT

The model approaches in a straight and level flight to a point directly in front of the judges and then turns away to track 60° away from the judges' line. It then flies straight and level for a minimum of 150 metres, turns through 120° to track parallel with the judges' line, flies a further minimum of 150 metres, then turns through 120° 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 included angles of 60°), before making a final turn to intercept the original entry track. NOTE. When flown indoors this manoeuvre should make the most use of the available space.

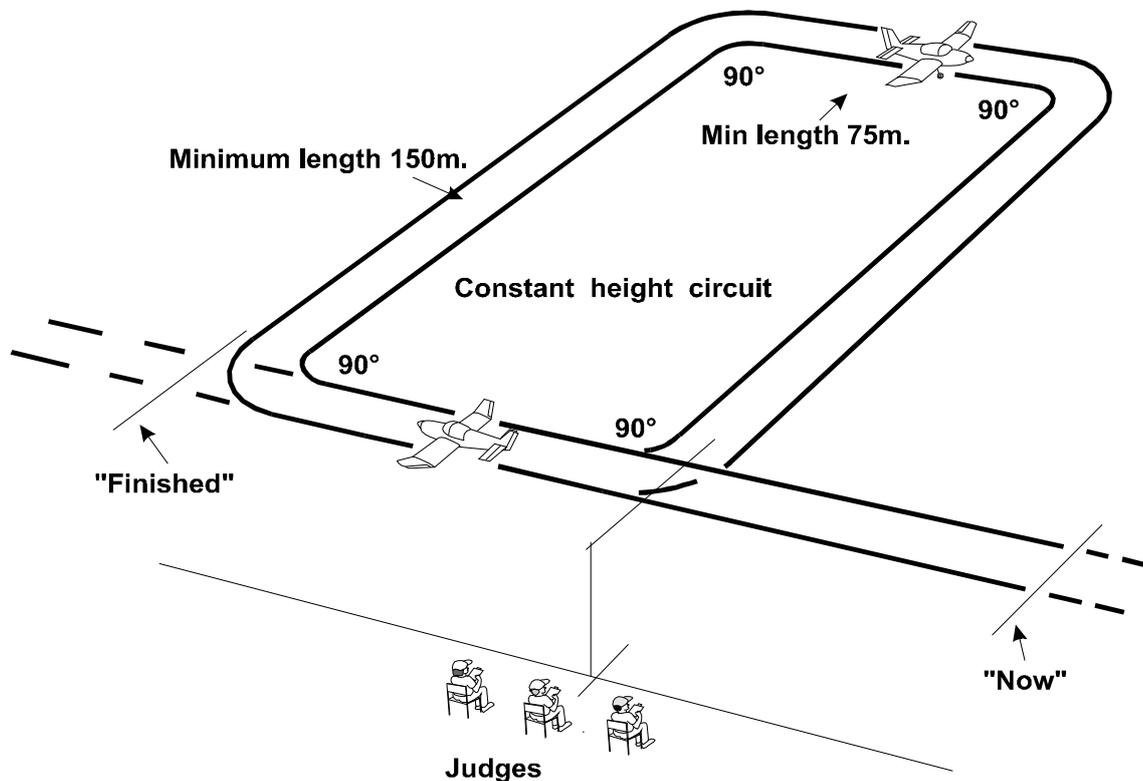


Errors

- (1) Not commenced and finished at points equidistant from the judges.
- (2) Model 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.

6.3.6.4.15 RECTANGULAR CIRCUIT

The model approaches in straight and 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 90° turn to intercept the original entry track. This manoeuvre describes a rectangle over the ground. NOTE. When flown indoors this manoeuvre should make the most use of the available space.



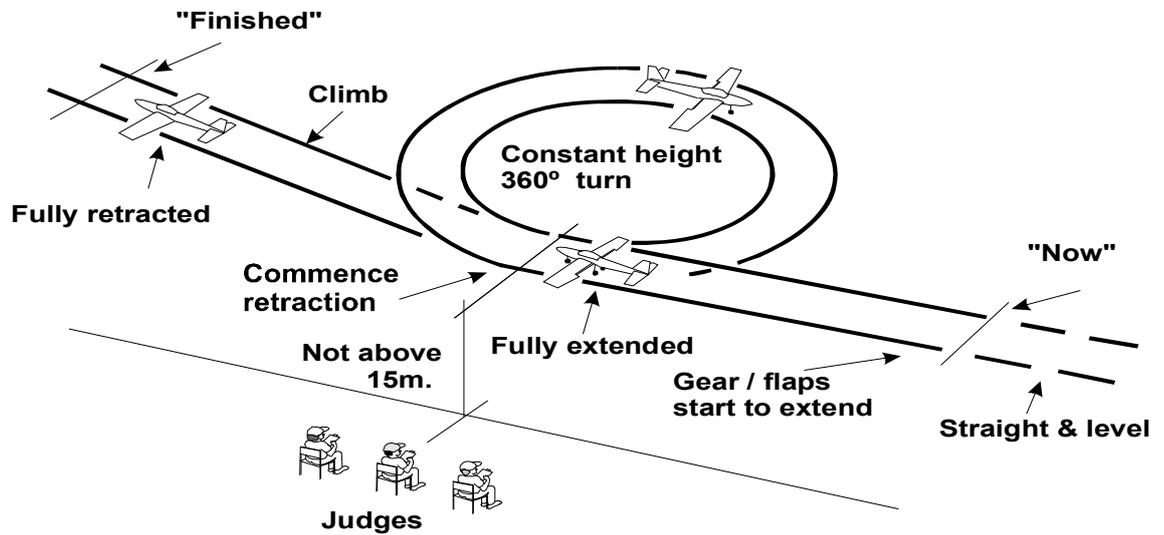
Errors

- (1) Not commenced and finished at points equidistant from the judges.
- (2) Model 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.

6.3.6.4.16 EXTEND AND RETRACT LANDING GEAR OR FLAPS – FW

(Diagram and errors applicable to both manoeuvres unless stated)

The model approaches the landing area in straight and level flight at a height not exceeding 15m.(2 metres indoor) and in full view of the judges, extends the landing gear or flaps. When in front of the judges the model then executes a 360° turn in a direction away from the judges and with a bank angle not exceeding 30°. After the turn and when again directly in front of the judges, retraction of the landing gear or flaps commences and the model climbs away in straight flight.

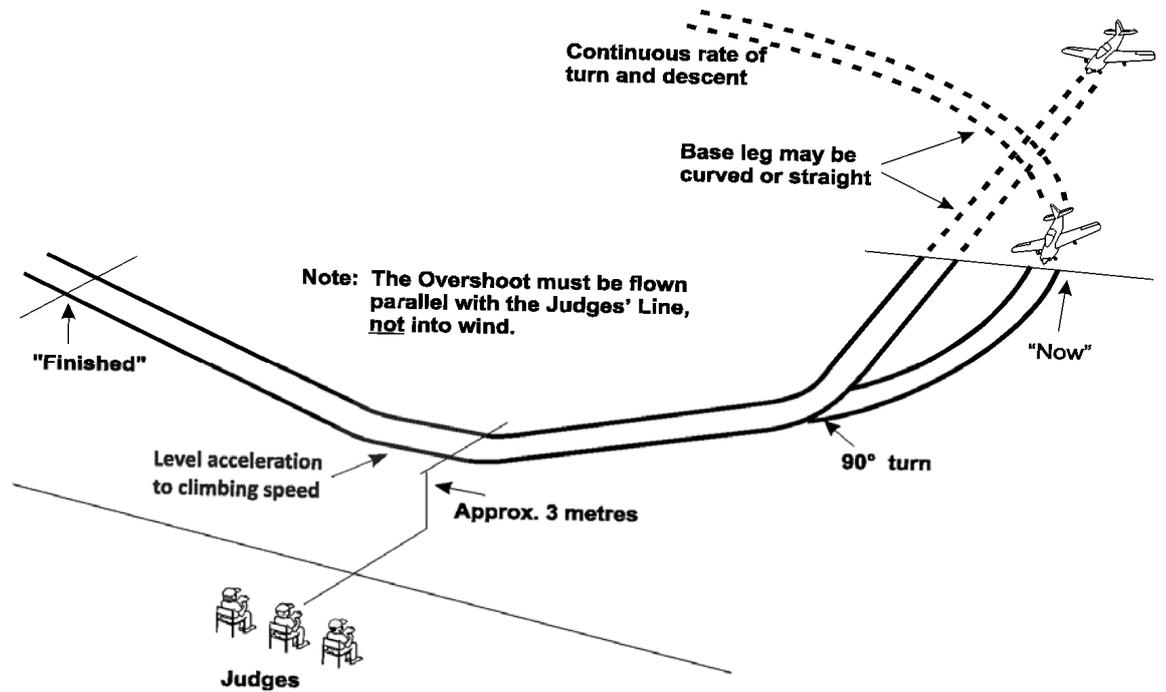


Errors

- (1) Model 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) Instability with flaps or landing gear lowered.
- (5) No change in attitude with flaps down.
- (5) Misshapen circle or not constant height.
- (6) Circle height exceeds 15 metres. (2 metres indoor)
- (7) Inappropriate rate of turn / excessive bank angle
- (8) Circle not centred on judges' position.
- (9) Retraction not commenced abeam judges.
- (10) Entry and exit paths not parallel with the judges' line.
- (11) Entry and exit tracks not the same.
- (12) Too far away or too close.

6.3.6.4.17 **OVERSHOOT or GO AROUND - FW**

The model commences the manoeuvre by descending from base leg, which may be either curved or straight as required by the pilot. The turn is continued through 90° onto a normal landing approach on low throttle, using flaps if applicable. On reaching the landing area the landing is aborted at a height of approximately 3 metres (0.5 metre indoor) and power is applied to check the descent. After normal flying speed and attitude are attained the model climbs straight ahead. The aim of the manoeuvre is to simulate an aborted landing due to circumstances beyond the pilot's control, e.g. unfavourable cross-wind or obstruction on runway etc.

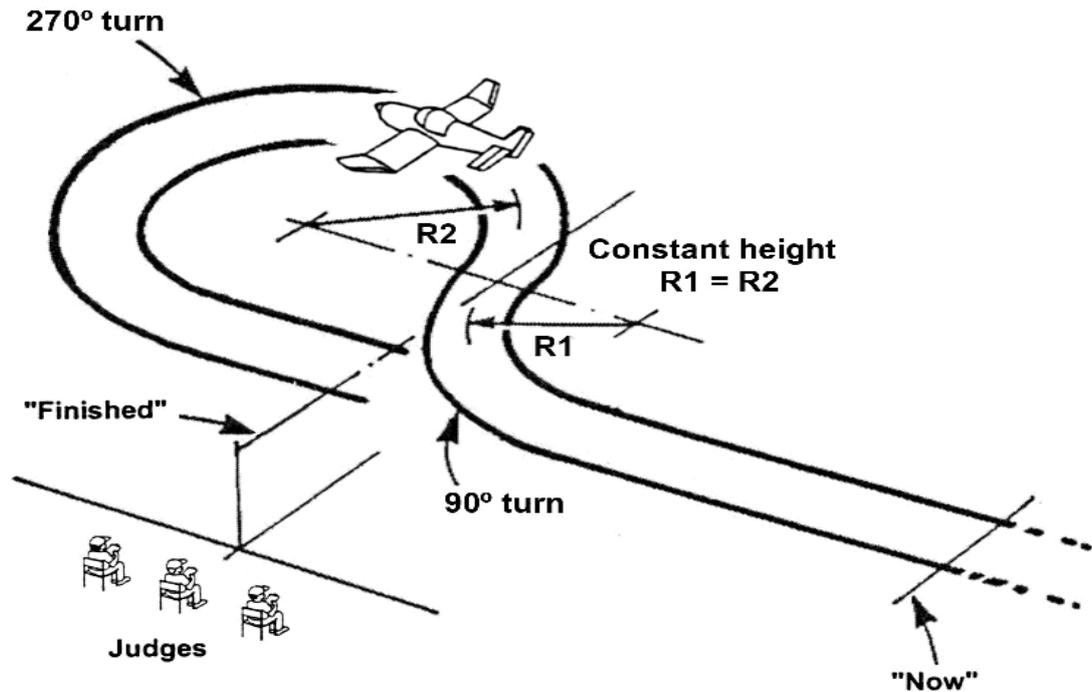


Errors:

- (1) Manoeuvre does not commence on base leg
- (2) Turn onto final approach not smooth and continuous or not 90°.
- (3) Model does not achieve correct high landing approach.
- (4) Model does not achieve correct landing speed or attitude.
- (5) Not continually descending until power applied.
- (6) Model descends to significantly above or below 3 metres. (0.5 metre indoor)
- (7) Lowest point of manoeuvre not achieved in front of judges.
- (8) Not smooth transition of speed and attitude from approach, through descent check, to climb out.
- (9) Inappropriate use of flap and/or landing gear.
- (10) Model does not climb away smoothly.
- (11) Approach and climb out tracks not the same.
- (12) Too close or too far away.
- (13) Model gains height before accelerating

6.3.6.4.18 PROCEDURE TURN

The model approaches in straight and level flight on a track parallel with the Judges' line, and then makes a 90° turn in a direction away from the Judges' line. This is followed by a 270° turn in the opposite direction, completing the manoeuvre on the reciprocal heading and track. The manoeuvre must be commenced so as to place the point where the model changes from the 90° turn to the 270° on a line which is at a right angle to the direction of entry and passes through the centre of the Judges'. The radius of the turns must be the same throughout the manoeuvre.



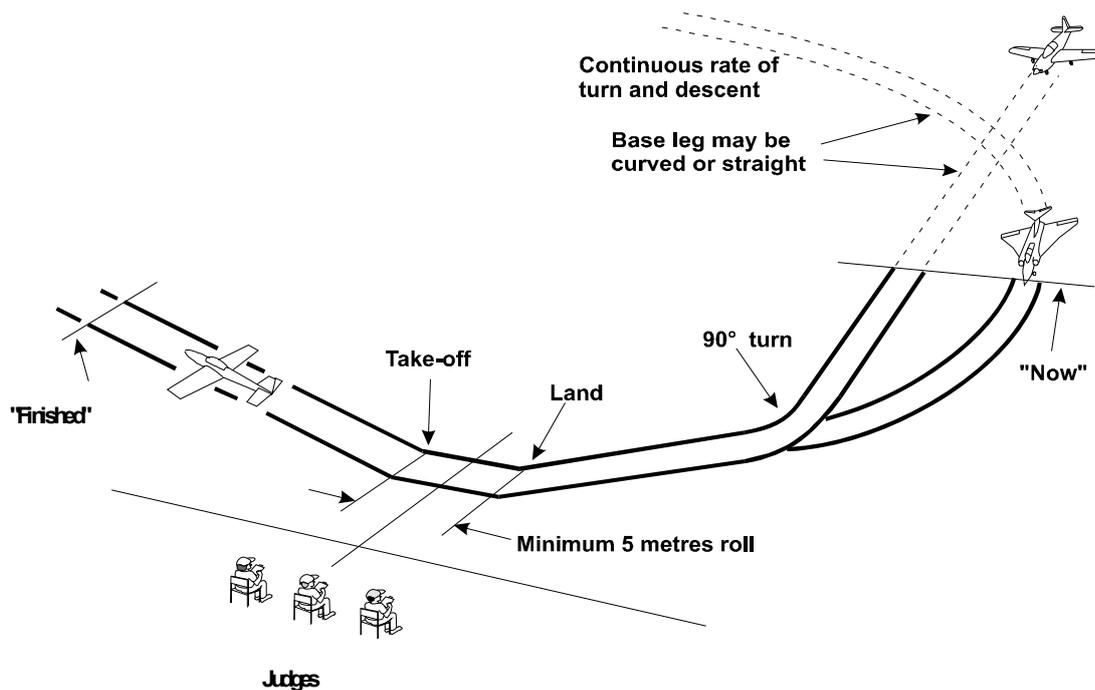
Errors

- (1) Rate of turn is not constant.
- (2) Radius of turn is not constant.
- (3) Constant height not maintained.
- (4) Entry and exit tracks not the same
- (5) Entry and exit tracks not parallel with Judges' line.
- (6) Change from 90° to 270° turn not at right angles to original flight path.
- (7) Change from 90° to 270° turn not centred on Judges' position.
- (8) Overall size of manoeuvre not realistic for subject aircraft.
- (9) Model flight path not smooth and steady.
- (10) Too far away / too close / too high / too low.

6.3.6.4.19 TOUCH AND GO - FW

This manoeuvre may be flown into the wind and the model may cross the judge's line without penalty

The model commences the manoeuvre by descending from base leg, which may be either curved or straight as required by the pilot. The turn is continued through 90° onto final approach. The model 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. The ground roll does not have to be centred on the judges position but the manoeuvre must make the best use of the available landing area. (For Scale R/C Indoor the ground roll shall be 2 metres). Flaps will be used if applicable.

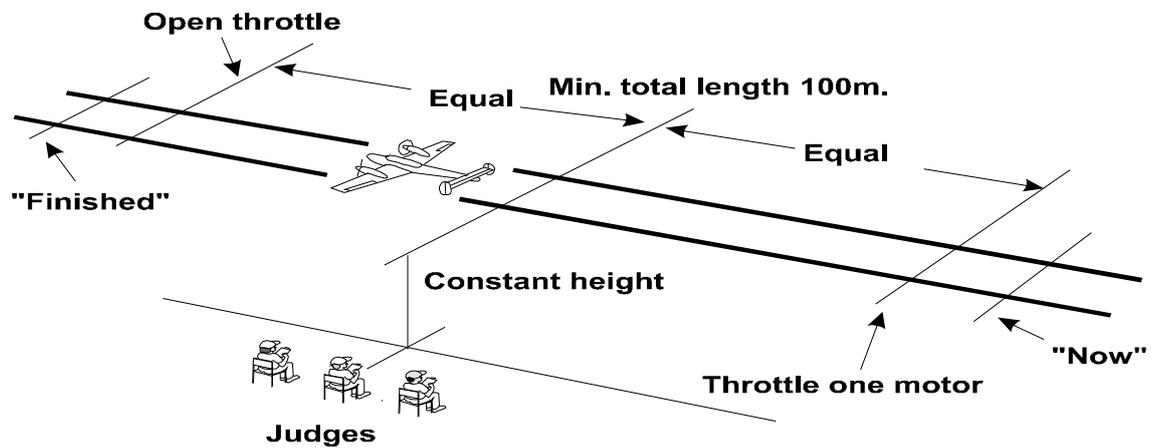


Errors

- (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 does not achieve correct landing approach prior to touchdown.
- (5) Model does not achieve a minimum ground roll of 5 metres or 2 metres for indoor models. (Note: if prototype has two main wheels then both wheels must roll on ground for a minimum of 5 metres or 2 metre for indoor models).
- (6) Model bounces excessively 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.

6.3.6.4.20 STRAIGHT FLIGHT WITH ONE MOTOR THROTTLED - FW

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



Errors

- (1) Flight not straight.
- (2) Model 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.

6.3.6.4.21 STRAIGHT FLIGHT AT LOW SPEED - FW

The speed of the model must be reduced to represent the minimum safe flying speed for the subject aircraft. If the subject aircraft is fitted with retractable undercarriage then the U/C must be extended. If the subject aircraft is fitted with any L/E or T/E flaps, slats, speed brakes, spoilers or other high drag/low speed/high lift devices then these must be deployed, unless the competitor can provide evidence that such devices were disabled or not routinely used.

After reducing speed, the manoeuvre is commenced and the model then flies in a straight line parallel with the judges line over the landing area for a minimum distance of 100 meters (5 Metres indoor) and centered on the judges position. The height must be constant and not exceeding 6 meters (2 metres indoor).

Errors

- (1) Not a constant heading
- (2) Not a constant height.
- (3) Above 6 meters (2 metres indoor).
- (4) Model does not pass over the landing area.
- (5) Manoeuvre not centered on judges' position.
- (6) Not parallel with the judges' line.

- (7) Too short distance (too long is not an error).
- (8) Failure to extend U/C or deploy high drag/low speed/high lift devices.
- (9) Model flying too fast.

6.3.6.4.22 DROPPING BOMBS

If bombs are carried internally, bomb-bay doors must be opened before the drop and closed after the drop. If bombs are carried externally, they must be carried in the correct positions and released in the manner of the subject aircraft. The flight profile during the manoeuvre must be in the manner of the subject aircraft and any special features of the manoeuvre should be declared to the judges before the flight commences.

Dropping must be within clear view of the judges and the target must be centred in front of the judges' position.

Errors

- (1) Bombs 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.

6.3.6.4.23 PARACHUTE DROP

The drop should be in the manner of the full size aircraft. For example, cargo should be dropped from a hatch, bomb bay or rear ramp. A dummy man should exit from the cockpit, an escape hatch or door; fall from an inverted aircraft or be ejected in the manner of the full size. If appropriate the model should reduce speed before commencing the drop, possibly by using flaps and lowering the landing gear.

6.3.6.4.24 FIXED HEADING SQUARE - HELI

The manoeuvre is commenced with the model in a hover over the helipad on a reciprocal heading to the judges (i.e. facing the judges) and at an altitude of between 3 and 5 metres (1 & 2 metres indoor). The model then flies sideways to starboard for a minimum of 15 metres (3 metres indoor), then pauses for a maximum of 3 seconds before flying backwards for a minimum of 15 metres (3 metres indoor), pauses and flies sideways to port for a similar distance, pauses and then flies forward to hover over the helipad, where the manoeuvre is completed. The starting height and heading is maintained throughout the manoeuvre.

Diagram TBA

Errors:

- (1) Hovering height outside limits
- (2) Manoeuvre not a square

- (3) Heading not constant
- (4) Pauses at corners more than 3 seconds.
- (5) Sides of square too short, (too long is not an error)
- (6) Height not constant.
- (7) Start and finish not over helipad.

6.3.6.4.25 QUICK STOP - HELI

The model approaches the helipad on a heading parallel to the judge's line, at an altitude which is not higher than 10 metres (2 metres indoor) and at the maximum speed appropriate to the subject full size helicopter. Whilst maintaining altitude the model then commences a high alpha deceleration to stop in the hover over the helipad. The hover is maintained for a minimum of 5 seconds before the model flies away normally on the same heading.

Diagram TBA

Errors:

- (1) Heading not parallel with judges line/not constant
- (2) Speed inappropriate
- (3) Helicopter balloons
- (4) Helicopter yaws
- (5) Deceleration not smooth and progressive
- (6) Model does not stop over helipad
- (7) Hover not steady

6.3.6.4.26 AUTOROTATION - HELI

This manoeuvre may be flown into the wind and the model may cross the judges line without penalty

The purpose of this manoeuvre is to demonstrate a full autorotational descent to a soft landing. It is not necessary to land on the helipad, but the pilot must make the best use of the landing area available. The manoeuvre is flown into the wind and the model commences the manoeuvre at cruising speed and at a minimum height of 30 metres (max available height indoor). The throttle is then closed and the model commences an auto-rotational descent at a minimum angle of 30°. At an appropriate height the flare is commenced and a smooth landing made with minimal forward speed. The manoeuvre is complete when forward speed is reduced to zero. A normal take off will follow to allow the competitor to complete the flight program.

Diagram TBA

Errors:

- (1) Insufficient altitude at start
- (2) Significant yaw or change of heading
- (3) Erratic descent

- (4) Unrealistic attitude during flare
- (5) landing not smooth
- (6) Excessive forward speed at touchdown

6.3.6.4.27 CONFINED AREA TAKE-OFF - HELI

The helicopter lifts off from the helipad and climbs vertically for a minimum of 5 metres (2 metre indoor). Forward speed is then progressively increased whilst the climb is sustained with an altitude gain similar to the vertical lift. A 180° climbing turn is then commenced with a similar altitude gain to the vertical lift. The manoeuvre is completed when the model has passed the line of the helipad in level flight at a minimum altitude of 15 metres (3 metres indoor) and on a reciprocal heading to the start. The altitude gain in each of the three stages of the manoeuvre must be equal.

Diagram TBA

Errors:

- (1) Initial climb not vertical
- (2) Transition to forward flight too low
- (3) Transition not smooth
- (4) Helicopter yaws during lift and forward climb.
- (5) Climbing turn initiated at too low an altitude
- (6) Climbing turn not 180°.
- (7) Level flight not achieved at completion of turn.
- (8) Manoeuvre not smooth and progressive
- (9) Height gain during the three stages of manoeuvre not the same.

6.3.6.5 NON-LISTED MANOEUVRES OR FLIGHT FUNCTIONS PERFORMED BY THE SUBJECT AIRCRAFT.

A competitor may include in his flight schedule one or two manoeuvres or flight functions which are not described in this section e.g. crop spraying, outside loop etc. Full details of the proposed manoeuvre/s preferably with a diagram must be presented to the flight judges and agreement reached as to the precise nature of the intended manoeuvre/s before going to the flight line. The competitor must be prepared to supply evidence that any manoeuvre or function was within the performance capability of the aircraft subject type modelled,

Procedural flying manoeuvres such as climbing turn, descending turn, etc. are not acceptable.

Mechanical functions and demonstration of functional scale detail, such as dropping auxiliary fuel tanks; sliding canopies and switching on and off lights, are not acceptable as optional flight manoeuvres, but may be included in the schedule to enhance realism.

6.3.6.6 APPROACH AND LANDING

6.3.6.6.1 APPROACH AND LANDING – FW

This manoeuvre may be flown into the wind and the model may cross the judges line without penalty

The manoeuvre is commenced with the model on the base leg (in the same way as the Touch and Go). Prior to this point the model may complete any form of appropriate circuit to achieve a landing configuration. The model completes the turn on to the final approach which may be made into wind, or as required by the competitor to make best use of the landing area available.

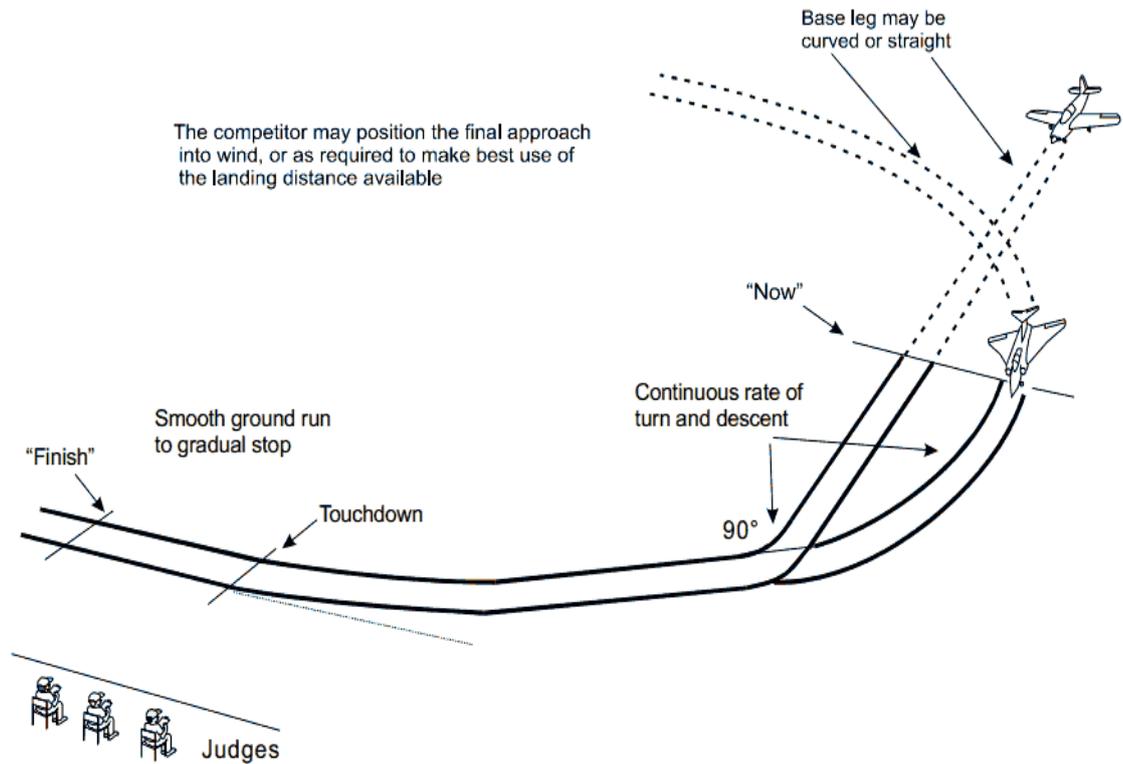
The model should descend smoothly, adopting the attitude applicable to the subject aircraft. An aircraft with conventional landing gear will make a three point landing or will land on the main wheels and then gently lower the tail. An aircraft with tricycle landing gear will land on the main wheels first and then gently lower the nose wheel. The model is then braked or allowed to roll smoothly to a complete stop when the landing is complete.

Dependent upon the surface of the landing area and the prevailing wind conditions, a slight bounce or failure to touch down immediately in front of the judges are not errors.

If the subject aircraft is fitted with wing tip protection devices then such devices fitted to the model may contact the ground without penalty.

If the subject aircraft used flaps, lift enhancing devices and/or speed brakes for landing, then the model should also and these devices should be deployed at the appropriate point in the landing circuit up to and including the final approach. In the event of a strong or gusty wind, the competitor may choose not to deploy these devices during landing providing the judges are advised. However this may result in a reduction of the marks awarded.

If the subject aircraft used a drogue parachute during landing the competitor may demonstrate this. The drogue must be deployed at the correct point in the landing and released when the model has come to a stop.



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 does not achieve correct landing approach prior to touchdown.
- (5) Model does not round out smoothly.
- (6) Excessive bouncing.
- (7) Drops a wing during landing.
- (8) Touches wing tip on ground (unless full size a/c has wing tip protection devices).
- (9) Does not come to a gradual and smooth stop after landing.
- (10) Does not adopt landing attitude appropriate to subject type.
- (11) Model runs erratically or turns after landing.
- (12) Model noses over (2 mark penalty if only nose-down - zero if it over-turns).
- (13) Flaps and/or speed brakes not used if applicable.

Note:

A crash landing will be marked zero but if the model makes a good landing and then stops nose down towards the end of the landing run, then the landing marks which would have been otherwise awarded will be reduced by 2 marks. If the nose down situation is solely the result of the model running off the prepared area, because this is too short for the particular wind direction, the above down marking will not apply.

Models 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 on its back will be considered a crash landing.

6.3.6.6.2 APPROACH AND LANDING – HELI

The model may complete any form of appropriate circuit to achieve a landing configuration. The circuit may be rectangular or oval, but after “start” is called, the model must make a final turn of at least 90° onto final approach. The model then approaches the helipad with a rate of descent and at an attitude appropriate to the full size, to transition into a hover over the helipad at an altitude of 0.5 to 2 metres (less than 0.5 metre indoors). After a 3 second hover, the model then descends to touchdown and the landing is complete when the rotor/s have stopped turning.

Models with retractable landing gear which land with one or more gears retracted should have the landing points reduced by 30%.

Diagram TBA

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) Descent and deceleration rate not appropriate.
- (5) Model does not transition into hover over helipad.
- (6) Model does not hover for 3 seconds.
- (7) Hover not steady.
- (8) Descent to touchdown not smooth
- (9) Model not stationary during rotor rundown.

6.4 FREE FLIGHT

6.4.0 GENERAL FREE FLIGHT RULES

6.4.0.1 The use of 2.4GHz Radio Control (R/C) in BMFA Free Flight Scale models is approved only for the sole purpose of bringing a flight to an end should the competitor wish to do so before the flight terminates naturally. If fitted, R/C should be declared to the judges before flight and declared to the judges if and when it is used. The flight scoring will cease at the point of initiation of the R/C device.

6.4.0.2 Dummy Pilots may or may not be fitted to Scale Free Flight models. Models without pilots may be marked down for realism where the absence of a pilot detracts from realism.

6.4.0.3 Models of aircraft with retractable landing gear may be flown gear down or up. If the model is presented for static judging with the landing gear down, the landing gear must be fitted to the model for flight, but it need not necessarily be in the down position. Models that make an approach to land gear up will not be penalised for lack of visible landing gear.

6.4.1 SCALE OUTDOOR FREE FLIGHT (I/C Piston Engine Powered)

6.4.1.1 General Characteristics

Maximum surface area 150 dm²

Maximum weight of complete model without fuel 2 kg

Maximum loading 50 g / dm²

Motive Power I/C Piston engine(s), individual 2.5cm³ max or for multi-engine models total 5cm³ max.

6.4.1.2 Definition of an Official Flight

An official flight shall be recorded when the competitor releases the model with the intention of making an official flight. The model must remain airborne for at least 30 seconds for the flight to be judged and a flight score returned, when the wind velocity exceeds 4 m/s, the qualifying time shall be reduced to 20 seconds.

6.4.1.3 Number of Flights

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

6.4.1.4 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.

6.4.1.5 Flight

(a) Take-off.....K = 15

(b) Initial Climb.....K = 15

(c) Cruise.....	K = 30
(d) Transition to descent.....	K = 10
(e) Descent and landing approach.....	K = 15
(f) Realism.....	K = 15
	Total. K = 100

6.4.1.6 Complexity Bonus

The flight score shall be subject to a complexity bonus as listed in the following schedule. All bonuses are additive.

Engines (on different thrust lines).....	Bonus
Single	0
Two or more engines.....	10%
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 subject aircraft modelled. The engines must deliver similar levels of power.	
Undercarriage	
Fixed (any configuration).....	0
Retracts in flight.....	5%
Lowers in flight	5%

6.4.1.7 Marking and Scoring

Each flight judge awards marks out of 10 for each part of the flight, as defined in 6.4.1.5. These marks are then multiplied by the appropriate K factor and aggregated before the bonuses are applied as described in 6.4.1.6. The aggregate sum of the individual judges scores including the bonuses is the Total Flight Score.

The Final score is the sum of the Total Static Score and the best Total Flight Score.

6.4.2 SCALE OUTDOOR FREE FLIGHT (Rubber Powered)

6.4.2.1 General Characteristics

Maximum surface area	150 dm ²
Maximum weight of complete model	2 kg
Maximum loading	50 g / dm ²
NB. There is no minimum wingspan	

6.4.2.2 Definition of an Official Flight

An official flight shall be recorded when the competitor releases the model with the intention of making an official flight. The model must remain airborne for at least 20 seconds for the flight to be judged and a flight score returned

6.4.2.3 Number of Flights

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

6.4.2.4 Flying Time

Competitors must be called at least five minutes before they are required to occupy the starting area. Each competitor shall have five minutes to complete each flight

programme. This time shall commence two minutes after entering the starting area. The competitor may wind, or commence to wind, the motor(s) at any time beforehand. No points may be scored after the end of the time limit.

6.4.2.5 Flight

(a) Initial Climb.....	K = 20
(b) Cruise.....	K = 35
(c) Transition to descent.....	K = 15
(d) Descent and landing approach.....	K = 15
(e) Realism	K = 15
	Total K = 100

6.4.2.6 Complexity Bonus

The flight score shall be subject to a complexity bonus as listed in the following schedule. All bonuses are additive.

Engines (on different thrust lines).....	Bonus
Single	0
Two or more engines.....	10%

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 subject aircraft modelled. The engines must deliver similar levels of power.

Undercarriage

Fixed (any configuration).....	0
Retracts in flight.....	5%
Lowers in flight	5%

6.4.2.7 Marking and Scoring

Each flight judge awards marks out of 10 for each part of the flight, as defined in 6.4.2.5. These marks are then multiplied by the appropriate K factor and aggregated before the bonuses are applied as described in 6.4.2.6. The aggregate sum of the individual judges scores including the bonuses is the Total Flight Score.

The Final score is the sum of the Total Static Score and the best Total Flight Score.

6.4.3 SCALE OUTDOOR FREE FLIGHT (CO₂ or Electric Powered)

6.4.3.1 General Characteristics

Maximum surface area.....	150 dm ²
Maximum weight (no fuel but including cells or tanks)	2 kg
Maximum wing loading.....	50 g / dm ²

Motive Power:

- (a) CO₂ motors
- (b) Electric motors (battery to be carried in the model)

Models above 200gms fitted with electric motor(s) driving external propeller(s) must have a safety device(s) which cuts the power when the model's progress is terminated at any time or for any reason after release. The device must also prevent the motor(s) being accidentally restarted if the model is picked up by a third

party. The competitor may be required to demonstrate the effectiveness of the safety device to the Competition Director. The use of a 2.4GHz Radio Control safety device is acceptable, but it must be operated by the competitor and all judging of the flight stops at the point when the competitor touches the Tx.

6.4.3.2 Definition of an Official Flight

An official flight shall be recorded when the competitor releases the model with the intention of making an official flight. The model must remain airborne for at least 20 seconds for the flight to be judged and a flight score returned

6.4.3.3 Number of Flights

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

6.4.3.4 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 5 minutes to complete each flight programme, the flying time commencing two minutes after entering the starting area. No points may be scored after the expiration of the flying time.

6.4.3.5 Flight

(a) Takeoff	K = 15
(b) Initial Climb.....	K = 15
(c) Cruise	K = 30
(d) Transition to descent.....	K = 10
(e) Descent & Landing approach	K = 15
(f) Realism	K = 15
	Total K = 100

6.4.3.6 Complexity Bonus

The flight score shall be subject to a complexity bonus as listed in the following schedule. All bonuses are additive.

Engines (on different thrust lines).....	Bonus
Single	0
Two or more engines.....	10%

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 subject aircraft modelled. The engines must deliver similar levels of power.

Undercarriage	
Fixed (any configuration).....	0
Retracts in flight.....	5%
Lowers in flight	5%

6.4.3.7 Marking and Scoring

Each flight judge awards marks out of 10 for each part of the flight, as defined in 6.4.3.5. These marks are then multiplied by the appropriate K factor and aggregated before the

bonuses are applied as described in 6.4.3.6. The aggregate sum of the individual judges scores including the bonuses is the Total Flight Score.

The Final score is the sum of the Total Static Score and the best Total Flight Score.

6.4.4 SCALE OUTDOOR FREE FLIGHT OPEN - FLYING ONLY

6.4.4.1 General Characteristics and Eligibility

The competition is open to any free-flight scale model that complies with the General Free Flight Rules regarding weight and power.

6.4.4.2 Flight Rules

Four rounds will be flown. Qualifying time for all models will be 20 seconds.

ROG is optional but will not be scored.

- (a) Initial climb.....K = 10
- (b) Cruise.....K = 20
- (c) Transition.....K = 10
- (d) Descent.....K = 20
- (e) Realism.....K = 5

The single best flight score will be used to determine the winner.

6.4.5 SCALE OUTDOOR FREE FLIGHT AEROMODELLER/MODEL AIRCRAFT DESIGNS - FLYING ONLY

6.4.5.1 General Characteristics and Eligibility

The competition is open to any Free Flight flying scale design published in Aeromodeller or Model Aircraft magazine.

Any form of motive power within the Free Flight rules is permitted, as are conversions from one to another.

Scaling of designs is permitted up to a maximum of 10% either way.

The only documentation required is the original plan, which may be used by the judges to verify adherence to the original design. Structural modifications for practicality are permitted.

6.4.5.2 Flight Rules

Four rounds will be flown. Qualifying time for all models will be 20 seconds.

ROG is optional but will not be scored (many designs have no U/C).

- (a) Initial climb.....K = 10
- (b) Cruise.....K = 20
- (c) Transition.....K = 5
- (b) Descent.....K = 10
- (e) Realism.....K = 5

The single best flight score will be used to determine the winner.

6.4.6 SCALE OUTDOOR KIT SCALE (Rubber Powered) FLYING ONLY

6.4.6.1 General Characteristics

This competition rewards consistency of performance over duration and is intended to attract new participants to Free Flight Scale.

6.4.6.2 General Characteristics and Eligibility

Any rubber powered scale aircraft kit model ever manufactured

There will be no judging of appearance, scale accuracy or flight realism, but competitors must bring with them the original plan or a copy to prove eligibility if requested by the CD or Judges. A reduced size copy is acceptable.

6.4.6.3 Permitted modifications:

The model should be built to the kit plan but the scale can be changed.

Colour scheme is to be in keeping with the subject

Minor modifications to the published design are permitted and may include the following:

- a) Wings and tail can be detachable, with appropriate changes to structure.
- b) Additional wing spars may be added and /or moved to the top surface.
- c) Built up empennages in character with the prototype's design may be substituted for solid originals
- d) The nose area may be changed to allow a removable nose block.
- e) Any covering material is acceptable.
- f) The rear motor peg may be repositioned.
- g) A plastic or balsa propeller may be substituted for the original, but it should have at least two blades and be non-folding in flight.
- h) All manner of scale embellishments are permitted, including outline improvements (scale tail size & profile) and details, provided the kit character is maintained.

6.4.6.4 Flight Rules

Dethermalisers

or any other mechanical or electronic device to limit flight time are not permitted.

The competition will be held over a one hour time period to be decided on site. All flights will be hand launched from a 10m X 10m area designated by the CD and Competitors will make 3 official flights from within this launch area. All other trimming flights must be made outside the area.

The target time will be set on the day by the CD. This will usually be 30 seconds.

The flight score is the difference plus or minus in whole seconds from the target time.

Competitors are required to record all their flight times to full seconds only (i.e 23.6 seconds = 23 seconds) on a card supplied by the CD and must be timed by another competitor or appropriate person.

If a competitor fails to record 3 scores, a nominal score of 100 will be allocated for each missing flight.

If a flight is less than 5 seconds, this will count as an attempt. One per flight.

The flight time difference of each of the three flights from the target time is summed for each competitor and the results published in increasing order. The winner is the model with the lowest score.

In the event of a tie, the winner will be decided by a fly-off, with the winning time being that closest to the target time.

6.4.7 SCALE INDOOR FREE FLIGHT (Rubber Powered)

6.4.7.1 General Characteristics

Maximum weight.....200g (including motor)
Maximum wing loading 15 g / dm²
Motive Power extensible motors (rubber) only

6.4.7.2 Definition of an Official Flight

An official flight shall be recorded when the competitor releases the model with the intention of making an official flight. The model must remain airborne for at least 15 seconds for the flight to be judged and a flight score returned.

6.4.7.3 Number of Flights

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

6.4.7.4. Flying Time

A minimum period of 15 minutes shall be allocated for trimming before the competition begins and the competitor must be called five minutes before he/she is required to occupy the starting area. Failure to comply will result in the loss of the flight. The model will be released, after notifying the flight judges, within a period of 3 minutes, plus one minute for each additional motor. Only one release is permitted during the allocated time.

6.4.7.5 Flight

(a) Takeoff.....	K = 15
(b) Initial Climb.....	K = 15
(c) Cruise.....	K = 30
(d) Descent and landing approach.....	K = 15
(e) Quality of landing.....	K = 15
(f) Realism.....	K = 10
	Total K = 100

6.4.7.6 Complexity Bonus

The flight score shall be subject to a complexity bonus as listed in the following schedule. All bonuses are additive.

Engines (on different thrust lines).....	Bonus
Single	0
Two or more engines.....	10%

Note - To qualify for the multiengine bonus each propeller must be driven by a separate engine unless this was not the case with the subject aircraft modelled. The engines must deliver similar levels of power.

Undercarriage	
Fixed (any configuration).....	0
Retracts in flight.....	10%
Lowers in flight	10%

6.4.7.7 **Marking and Scoring**

Each flight judge awards marks out of 10 for each part of the flight, as defined in 6.4.7.5. These marks are then multiplied by the appropriate K factor and aggregated before the bonuses are applied as described in 6.4.7.6. The aggregate sum of the individual judges scores including the bonuses is the Total Flight Score.

The Final score is the sum of the Total Static Score and the best Total Flight Score.

6.4.8 **SCALE INDOOR FREE FLIGHT (CO₂ or Electric Powered)**

6.4.8.1 **General Characteristics**

Maximum weight (no fuel but including cells or tanks)	200g
Maximum wing loading	15 g / dm ²

Motive Power:

- (a) CO₂ motors
- (b) Electric motors (battery to be carried in model)

6.4.8.2 **Definition of an Official Flight**

An official flight shall be recorded when the competitor releases the model with the intention of making an official flight. The model must remain airborne for at least 15 seconds for the flight to be judged and a flight score returned.

6.4.8.3 **Number of Flights**

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

6.4.8.4 **Flying Time**

A minimum period of 15 minutes shall be allocated for trimming before the competition begins and the competitor must be called five minutes before he/she is required to occupy the starting area. Failure to comply will result in the loss of the flight. The model will be released, after notifying the flight judges, within a period of 3 minutes, plus one minute for each additional motor. Only one release is permitted during the allocated time.

6.4.8.5 **Flight**

(a) Takeoff.....	K = 15
(b) Initial Climb.....	K = 15
(c) Cruise.....	K = 30
(d) Descent and landing approach.....	K = 15
(e) Quality of landing.....	K = 15
(f) Realism	K = 10

Total K = 100

6.4.8.6 Complexity Bonus

The flight score shall be subject to a complexity bonus as listed in the following schedule. All bonuses are additive.

Engines (on different thrust lines).....	Bonus
Single	0
Two or more engines.....	10%

Note: To qualify for the multiengine bonus each propeller must be driven by a separate engine unless this was not the case with the subject aircraft modelled. The engines must deliver similar levels of power.

Undercarriage

Fixed (any configuration).....	0
Retracts in flight.....	10%
Lowers in flight	10%

6.4.8.7 Marking and Scoring

Each flight judge awards marks out of 10 for each part of the flight, as defined in 6.4.8.5. These marks are then multiplied by the appropriate K factor and aggregated before the bonuses are applied as described in 6.4.8.6. The aggregate sum of the individual judges scores including the bonuses is the Total Flight Score.

The Final score is the sum of the Total Static Score and the best Total Flight Score.

6.4.9 SCALE PEANUT

6.4.9.1 Qualification

Open to any scale free flight rubber powered model of either not more than 13" span or not more than 9" overall length excluding propeller.

Documentation and Static Judging requirements are as shown below:

6.4.9.2 Documentation

The minimum documentation is to be one of the following:

- (a) A general arrangement drawing of at least 2 inches wing span, plus one photograph or printed reproduction of the full size subject aircraft. If the photograph or printed reproduction is not in colour, then an authentic written colour description must be included.
- (b) A coloured 3-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 on the model.

6.4.9.3 Static Judging/Appearance

Models will be judged visually, in comparison with the documentation provided, by one or more judges. No scale measurements will be taken and there is no restriction to static judging distance. Marks will be awarded as follows:

- (a) Workmanship, marked on merit 0 - 15
- (b) Complexity and accuracy of colour and markings..... 0 - 10

(c)	Authentic details	0 - 5
(d)	Flying surfaces	
	All double surface	4
	Double surface wing but single surface tail.....	2
	Single surface	0
Note: If the full size aircraft was single surface, then the model should be likewise single surface and be awarded the full 4 points.		
(e)	Surface Finish	
	Authentic Colour	5 - 9
	Unpainted coloured tissue.....	4
	Unpainted condenser paper.....	3
	Clear film.....	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)	Empennage	0 - 3
(i)	Bonus points for complexity	
	Low wing (in line with bottom surface of fuselage).....	9
	Biplane	9
	Triplane	15
	Autogyro.....	21
	Helicopter.....	27
	Flying boat or floatplane.....	9
	Scale number of wing ribs.....	2 per wing
	Scale number of tailplane ribs.....	1
	Scale number of rudder ribs.....	1/2
	Separate control surface	1/2 each
	Other than square fuselage	1
	Wheel pants or spats	1
	Three dimensional pilot.....	1
	Exposed engine	1
(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 or outline	2
	Enlarging rudder	2
	All other non-scale performance aids.....	2 each

Competitor's appearance score will be the sum of the marks awarded in 6.4.9.4(a) through to 6.4.9.4.(i) less the points awarded in 6.4.9.4.(j).

6.4.9.4 Flying Rules

Each competitor is allowed up to 9 official flights. An official flight is counted each time the model is released for a declared flight. The times of the longest 2 flights (each

rounded down to the nearest second) 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 the flight time recorded.

6.4.9.5 Scoring

The order of marking in 6.4.9.3 and 6.4.9.4 will produce a 'place' in the Flying and Appearance sections respectively. Each contestants numerical 'places' in the two sections are added. The lowest overall totals then determine the final overall placings in the competition.

In the event of a tie, final overall places shall be determined by referring to the appearance score, followed if necessary by reference to the flight scores, comparing first flights, then second flights. If there is still a tie, the places will be decided by a duration fly off.

Models that do not record an official flight time will not qualify for a placing in the competition.

6.4.10 SCALE PISTACHIO

6.4.10.1 Qualification

Open to any scale free flight rubber powered model of either not more than 8" span or not more than 6" overall length excluding propeller.

Documentation and Static Judging requirements are as shown below:

6.4.10.2 Documentation

The minimum documentation is to be one of the following:

- (a) A general arrangement drawing of at least 2 inches wing span, plus one photograph or printed reproduction of the full size subject aircraft. If the photograph or printed reproduction is not in colour, then an authentic written colour description must be included.
- (b) A coloured 3-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 on the model."

6.4.10.3 Static Judging/Appearance

Models will be judged visually, in comparison with the documentation provided, by one or more judges. No scale measurements will be taken and there is no restriction to static judging distance. Marks will be awarded as follows:

- (a) Workmanship 0-10
- (b) Complexity and authenticity of colour and markings 0 - 5
- (c) Authentic details 0 - 3
- (d) Scale dihedral..... 0 - 2

(e) Scale empennage/foreplane	0 - 2
(f) Surface finish (no penalty for single surface)	0 - 5
(g) Complexity	
Low wing (in line with bottom surface of fuselage).....	4
Biplane	4
Triplane (or more)	7
More than one powered propeller	3
Floats	2
Helicopter/autogyro	5
For each flying surface with separate controls.....	1 each
Fuselage cross-section	0 - 3
Dummy Pilot.....	0 - 2
Exposed engine	0 - 2
Wheel spats/pants	1
Rigging or flying wires	0 - 3
(h) Deviations to aid flying performance	minus 2 each

Competitor's appearance score will be the sum of the marks awarded in 6.4.10.4(a) through to 6.4.10.4.(g) less 6.4.10.4(h).

6.4.10.4 Flying

Each competitor is allowed up to nine official flights. An official flight is counted each time the model is released for a declared flight.

There is no bonus for a successful RoG.

The times of the longest two flights (each rounded down to the nearest second) will be aggregated to form the competitor's flight score.

6.4.10.5 Scoring

The order of marking in 6.4.10.3 and 6.4.10.4 will produce a 'place' in the Flying and Appearance sections respectively. Each contestant's numerical 'places' in the two sections are added. The lowest overall totals then determine the final overall placing in the competition.

In the event of a tie, final overall places shall be determined by referring to the appearance score, followed if necessary by reference to the flight scores, comparing first flights and then second flights. If there is still a tie, the places will be decided by a duration fly off.

Models that do not record an official flight time will not qualify for a placing in the competition.

6.4.11 SCALE INDOOR KIT SCALE

6.4.11.1 Qualification

This competition is open to any scale model built from a commercial kit or a design that has been kitted. 150% enlargements of KK, Veron, Frog or any other manufacturers' flying scale designs (originally from Replikit, VMC and Physics of Flight) are allowed in Kit Scale – Short and full kits are allowed. However, it is the responsibility of the

competitor to prove that the model was indeed kitted at 150% (or any other percentage increase from original) and to provide that proof within his documentation pack for the static judge.

Models must also meet the following general characteristics:

Maximum weight..... 200g (including motor)
Maximum wing loading 15g/dm²
Motive Powerrubber, CO₂ or electric

Models of gliders are approved for this competition, they may be launched in any manner appropriate to the subject aircraft modelled. A single helper is permitted to assist with the launch.

Models may be built from kit parts or the builder's own wood. Alternative material to that provided in the kit may be used for covering and for the application of colour and markings.

The only modifications permitted from the original kit or design are those associated with fitting an alternative power source, a replacement propeller (including for rubber), alternative wheels and moving the rear motor peg for rubber powered models.

Models that have achieved a podium position in Kit Scale at the BMFA Scale Indoor Nationals from 2017 onwards, i.e. the model has achieved 1st, 2nd or 3rd place, are not eligible for entry to any subsequent Kit Scale Indoor Nationals event.

6.4.11.2 Documentation

No declaration as to compliance is required from the competitor

The minimum documentation required is the original (or photocopy) plan from which the model was built and one photograph, drawing or painting (e.g. box art) of either the aircraft modelled or a similar aircraft from the same era to authenticate the general colour scheme and markings. When models are based on enlargements of the original kit, This minimum documentation can be the kit box, a copy of an advert or web page or a statement from the manufacturer.

6.4.11.3 Static Judging

The philosophy is different from other scale classes in that models are judged against authenticity and accuracy to the kit plan rather than absolute accuracy to photographs and 3 views.

Marks will be awarded up to the maximum of 100 to reflect the quality of workmanship and character of the models as follows:

- (a) Workmanship (finesse, accuracy to plan, warps, neatness of covering etc)... (60%)
- (b) Authenticity of Colour Scheme & Accuracy of Markings (if present)..... (20%)
- (c) Overall Character(20%)

It is expected that most models will have a coloured tissue finish with painted, printed, transfer or tissue markings. Fully painted models or those using extensive computer generated colour schemes will not be excluded but will have 5 marks deducted from their static score. 5 marks will also be deducted for each significant deviation from the original design other than those permitted above, or specified on the plan. (Typical deductions include: increased dihedral, separate control surfaces where these are not shown on the plan etc)

6.4.11.4 Definition of an Official Flight

An official flight shall be recorded when the competitor releases the model with the intention of making an official flight. The model must remain airborne for at least 10 seconds for the flight to be judged and a flight score returned.

6.4.11.5 Number of Flights

Each competitor should have the opportunity to make a minimum of 4 flights, unless there are more than 30 entries in which case it may be necessary to reduce this to 3 flights.

6.4.11.6 Flying Time

A minimum period of 15 minutes shall be allocated for trimming before the competition begins. Thereafter, each competitor shall be called five minutes before he/she is required to occupy the starting area. The model shall be released, after confirming that the flight judges are ready, within a period of 3 minutes, plus one minute for each additional motor. Failure to comply will result in the loss of the flight. Only one release is permitted during the allocated time.

6.4.11.7 Marking

Each phase of the flight will be awarded marks between 0 and 10 by each judge during the flight as follows:

- (a) Take-off.....K = 1
- (b) Initial Climb.....K = 1
- (c) Cruise.....K = 1
- (d) Descent and Landing Approach.....K = 1
- (e) Quality of Landing.....K = 1
- (f) Realism.....K = 1

6.4.11.8 Flight Score

The flight score will be the aggregate of the 2 highest scores awarded by each of 2 judges. If only one flight judge is available, the flight scores will be doubled.

If fewer than three rounds are flown, the flight score will be twice the highest single flight score awarded by each of the two judges.

6.4.11.9 Total Score

The total score will be the aggregate of the static mark and flight score (Maximum 340). In the event of a tie, the model with the higher flight score will take the higher place.

6.4.12 EDDIE RIDING DESIGNS - CLASS RULES

6.4.12.1 The EJR Designs Class Qualification

The 'Eddie Riding Designs' Class is a subclass of the main Eddie Riding (EJR) Competition and is open to any of the eight Eddie Riding designs published in the Aeromodeller between 1943 and 1950.

6.4.12.2 The 'EJR Designs' Class Objective

As well as a tribute to EJR himself, the Class objective is to encourage participation by those modellers who cannot or do not wish to go to the lengths of producing a highly detailed scale model to compete in BMFA FF classes.

The class rules encourage and reward adherence to the original Eddie J. Riding designs rather than to a full size aircraft and only the limited detail shown on plan will be required and marked.

6.4.12.3 The 'EJR Designs' Class Judging

Static Judging will be carried out by two judges who will be **different** to those who judge the other classes in the EJR competition.

Flight judging will be carried out by the same judges as the BMFA FF Classes and using the same scoring system.

Qualifying times will be:

Power	30 Sec
Rubber/CO2/Electric	20 Sec
Reaction and Compressed Air	15 Sec

These qualifying times will be site and weather dependent and may be revised by the Contest Director on the day.

6.4.12.4 Eligible EJR Designs

There are eight eligible models:

- a) **Westland Widgeon** - Published April 1943 - 37" Rubber - Plan FSP211 (power conversion published in Jan 1984 Both plans are eligible.)
- b) **BE2c** - Published Dec 1943 - 55" Rubber - Plan SR215 (featured as an Article with no plan. Plan subsequently made available by the APS).
- c) **Bristol Racer Type 77** - Published Oct 1944 - 45" Rubber - Plan FSR216
- d) **Bristol Scout Type D** - Published Dec 1945 - 37" Rubber - Plan FSR226
- e) **ABC Robin** - Published July 1946 - 36" Rubber - Plan N/K (The I/C power conversion for this model is **NOT** eligible – see 6.4.12.7 below)
- f) **Fairchild Argus** - Published Oct 1947 - 36.5" Rubber - Plan FSR272
- g) **Chrislea Super Ace** - Published Aug 1949 - 54" I/C power - Plan FSP331
- h) **Missel Thrush** - Published Dec 1950 - 42" IC power - Plan FSP404

6.4.12.5 The EJR Designs Class Rules.

The subject modelled must be one of the eight recognised EJR flying designs. The only documentation required is the full size copy of the plan the model was built from and this must be provided for static judging.

The outline of the model must not be altered in any way - even if considered to be 'un-scale'. No enlargement or reduction of the original design is permitted.

Any structure of the model visible against the covering must be as per plan. Changes made to improve structural integrity are permitted but must not show against the covering. The replacement of outdated materials with modern substitutes will be permitted.

If "knockoffability" is a feature of the original design then this feature must be retained. Alterations to the structure of any eligible model to introduce or provide improved "knockoffability" for any component will be permitted.

Change of motive power is permitted. Electric and CO₂ may be used for all designs or conversion from Rubber to I.C and vice versa. Permitted changes of motive power will include the use of compressed air, reaction motors and the deletion of or inclusion of geared motor trains or Moore Diaphragms.

Features (hatches etc) necessitated by a change of power source are permitted. However, the necessity of any feature will be assessed and any considered unnecessary at the judges' discretion will be penalised.

Propeller size and shape may be altered to allow for change in motive power or to permit ROG. Wheels may be constructed of alternative materials for strength and abrasion resistance if required but diameter and profile should remain as per the plan.

Modifications to components for the purposes of flight trimming including adjustable and/or separate control surfaces will be allowed if in keeping with the full size prototype but adjustable trim tabs outside the plan profile will be penalised.

Covering materials must be of an appropriate type for the period. Modern coverings with an appearance sympathetic to the original designs such as Tissue or Silk on Mylar, Airspan or Lightspan will be permitted. The use of shiny plastic films will be penalised

Finishing and decoration of the model should be sympathetic to the original designs and descriptive articles. The use of coloured tissues or textured covering films to give the effect of the original colour scheme is permitted but may be penalised if the original EJR model was painted. Registration markings applied should be as shown on the original plan or photographs in the original article.

6.4.12.6 Static Judging Guidelines

The objective of the class is to encourage and reward adherence to the original Eddie J. Riding designs rather than to a full size prototype and only the limited detail shown on plan should be marked.

The entrant must present the plan from which the model was built for static judging purposes.

The models presented must not be enlarged or reduced or have increased dihedral. A set of full size building plans will be provided to aid judging along with dihedral templates.

Any structure of the model visible against the covering should be as per plan. Changes to the structure visible through cockpit glazing or any cockpit openings should not be penalised unless they are visible and in contact with the covering.

The following aspects of the model must be judged against the presented plan. Any non-permitted alterations to the model structure or outline must be marked down. The model can be awarded a maximum of 100 points and must be judged against the following criteria:

Criteria 1)	Outline accuracy and fidelity to plan (side view)	Max 20 points
Criteria 2)	Outline accuracy and fidelity to plan (plan view)	Max 20 points
Criteria 3)	Outline accuracy and fidelity to plan (front view)	Max 20 points
Criteria 4)	Craftsmanship	Max 15 points
Criteria 5)	Covering and markings	Max 15 points
Criteria 6)	Overall impression and rendition of the EJR concept	Max 10 points

Assessment of criteria 1), 2), 3) should each include a maximum of 10 marks for accuracy of the outline and 2 negative marks should be applied for each significant deviation. Similarly, accuracy of the structure **visible in contact with the covering** should include a maximum of 10 marks for accuracy of the outline and 2 negative marks should be applied for each significant deviation

Assessment of criterion 4) - Craftsmanship should include a maximum of 15 marks rewarding accuracy of joints, crispness of the structure, alignment and fit of components etc and the quality of the surface finish of both strip and sheet components.

Assessment of criterion 5) - Covering/Markings should include a maximum of 5 marks for the authenticity (compliance with the plan/original article), a maximum of 5 marks for the accuracy of the applied markings and a maximum of 5 marks for the overall quality of the covering finish and markings

Assessment of criterion 6) should consider the overall impression of the model and it's rendition of the original EJR concept with the award of a maximum of 15 marks. The original models were relatively simple structures with limited detail and were tissue covered with an opaque painted finish. The inclusion of additional scale detail which detracts from the original EJR concept should be marked down. The substitution of a

coloured tissue finish, while contemporary with designs of the period but resulting in a wing loading advantage, should be marked down.

Any features such as hatches, switches, fuel tanks, or anything else introduced to support a change of motive power must be assessed with regard to their necessity and, if judged not to be essential, must be marked down, once only, under the appropriate heading in d. above. For any considered essential, join lines or texture changes should be ignored whereas any resulting changes to the model outline should be marked down.

6.4.12.7. IMPORTANT NOTE REGARDING THE ABC ROBIN POWER CONVERSION PLAN .

There has been considerable discussion concerning the "ABC Robin" power conversion plan that is available, and it has been decided that this model is not eligible for the 'Eddie Riding Designs' class for the following reasons:

It is a different model as redesigned by Bob Lynn and is only superficially similar to the original design,

The many changes made put the model outside of the spirit of the 'Eddie Riding Designs' competition.

While it is erroneously credited to EJR in the designer name box, it is not characteristic of his other designs

Consequently, If an ABC Robin plan is presented showing a power conversion – the plan or a model built from that plan cannot be accepted in this class. Any alternative power conversion must be based on the original 35" Rubber plan and that plan should be presented.

6.4.13 SCALE FREE FLIGHT – FLIGHT CHARACTERISTICS

Applicable to the following classes:

Scale Outdoor F/F I/C Piston Engine Powered - 6.4.1

Scale Outdoor F/F Rubber - 6.4.2

Scale Outdoor F/F CO2 / Electric - 6.4.3

Scale Outdoor F/F OPEN Flying Only - 6.4.4

Scale Outdoor Aeromodeller/Model Aircraft Designs Flying Only – 6.4.5

Scale Indoor F/F Rubber - 6.4.7.

Scale Indoor F/F CO2 / Electric - 6.4.8

Scale Indoor Kit Scale - 6.4.11

Eddie Riding Class – 6.4.12

6.4.13.1 Flight Phases

The flight of a Scale Free Flight model is broken down into several phases for judging purposes and the following descriptions apply to these phases. Not all these phases apply to all free flight classes and the individual class rules should be referred to as appropriate.

These descriptions are largely theoretical and indicate the typical performance of a Scale Free Flight model, **however the model should at all times fly in the same manner as the subject aircraft.**

The errors listed for each phase cannot be an exhaustive list of all possible faults, but they are intended to show the sort of errors that are likely during that phase of the flight.

6.4.13.2 Takeoff

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:

- (1) Ground run too short, too long or assisted
- (2) Ground run curved. Note – Taildraggers may exhibit a slight swing as the tailwheel leaves the ground which should not be penalised.
- (3) Tail or nose wheel does not leave the ground before the main wheels,
- (4) One wing drops

6.4.13.3 Initial Climb

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

Errors:

- (1) Climb too steep or too shallow
- (2) Bank angle too high.
- (3) Wing drop or wing rock occurs
- (4) Pitch attitude too high or too low.

6.4.13.4 Cruise

The model may fly in a straight line or turn in either or both directions. Any change of direction should reflect the agility of the subject aircraft and turns should display an appropriate amount of bank.

Errors:

- (1) Model flies too slowly or too fast
- (2) Nose attitude is too high or too low
- (3) Model stalls, or shows fugal flight path
- (4) Model flies one wing low or is unstable laterally
- (5) Model is unstable and does not recover smoothly after hitting turbulence
- (6) Turns are flat or out of balance, e.g. left turn with right bank.

6.4.13.5 Transition to Descent

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

Errors:

- (1) Model stalls or an excessive pitch change is apparent as the motor stops
- (2) Model drops a wing or wing rock occurs

6.4.13.6 Descent and Landing Approach

The descent should be smooth, continuous and stable. It may be straight or curved. The rate of descent should be consistent with that of the subject aircraft 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.

Models will not be penalised if the approach is made wheels up, provided the angle of approach is appropriate.

Errors:

- (1) Model stalls, drops or rocks the wings
- (2) Glide angle too steep. Note: the glide angle may change significantly with engine on or off.
- (3) Model does not adopt a landing attitude

6.4.13.7 Quality of Landing (Indoor Only)

After adopting the landing attitude, the model should descend slowly to the floor, and touch down without bouncing. The ground run should be smooth and straight, with the model coming slowly to rest. Models with Tricycle u/c should touchdown on main wheels only; taildraggers should three-point.

Errors:

- (1) The model bounces
- (2) Ground run not straight
- (3) Model does not stop
- (4) Model ground loops
- (5) Model touches down too hard.
- (6) Model lands in a nose down attitude.

6.4.13.8 Overall Realism

The model should mirror the flight characteristics of the subject aircraft in speed, flight attitude, stability and balance.

The flight should be smooth and continuous, especially the transitions between takeoff, climb, cruise, descent and landing approach. Due allowance must be made for the prevailing wind conditions.

Errors:

- (1) Model pitches harshly when motor stops
- (2) Model dihedral or other rigging angle changes significantly in flight
- (3) A model that should have an opaque finish, is 'see through' in the air
- (4) Lack of pilot when it should be seen, or an obviously empty cockpit.

ANNEX 6A

BMFA SCALE TEAM SELECTION PROCESS

CLASSES F4C and F4H

6A.1 Application for Team Selection

Any F4C or F4H competitor who is prepared to make the commitment to travel to the venue of the next World Championships is invited to apply for team selection using the proforma which can be downloaded from the Scale Website.

Applications can be submitted from 1st January to the 1st October in the year preceding the Championships.

NOTE: The next Scale World Championships will be at Tonsberg in Norway 25th July to 2nd August 2020.

6A.2 Minimum Performance Standards for Team Selection

All successful applicants shall achieve a standard of at least 70% of the available marks for both static judging and flight judging in each class.

6A.3 Static Qualification

The model intended for the international event must be the same model entered for static assessment.

Models must achieve 2 static scores of 70% (normalised) at any 2 STC organised events prior to 1st October (which may including the Nationals), in the year before the World Championship.

Scheduled F4C or F4H events may be cancelled due to bad weather and if necessary the STC will make separate arrangements with applicants for static judging of their models in order to ensure that the static qualification can be achieved.

6A.4 Flight Qualification

Applicants must achieve flight scores above 70% (normalised) at a minimum of 4 different STC run competitions prior to 1st October in the year before the championships.

The model intended for the international event must be flown at a minimum of two events and achieve a minimum of two qualifying flight scores. Any scale model complying with the current F4C/F4H weight limit may be used to attain the remaining qualifying flight scores.

In the event of a tie, for a team place, flight scores achieved at STC events other than the minimum 4 shall be used to determine placings.

6A.5 Team Selection

The teams will be selected by the STC at the first committee meeting after the closing date for submission of applications. Selection will be made in order of merit based on the Static and Flight Scores achieved at STC organised events (which may include the Nationals) during the year.

Following team selection any remaining applicants who have achieved the qualifying standard will be seen as reserves. In the event of any team member or members having to leave the team prior to the Championship, the vacancy will be offered to the reserves in order of merit.

Successful applicants including reserves must be prepared to attend team flight training and also agree where practicable to correct any errors on the model or its documentation which has been identified during static judging.

NOTES:

1. Applicants trying for a place in the F4C Team who are not selected may be considered for the F4H Team with the same model.
2. Applicants trying for a place on both teams will require two eligible models; one for each class. Other than the requirement at 6A.4 (above) the flight scores achieved during the season may be applied to both models.
3. Because competitors are restricted to entering one class only at the Nationals, applicants trying for a place on both teams will be expected to enter F4C at the Nats. i.e. a qualifying flight score in F4C at the Nationals can be considered as a qualifier for F4H (if needed) but not the other way round.
4. Following team selection, any substitution of a model, for whatever reason prior to the international event shall be subject to individual approval by the Scale Technical Committee.

ANNEX 6B

ANNUAL SCALE TROPHIES

6.B.1 Official BMFA Trophies

These trophies are administered by the BMFA Records Officer and are awarded at the AGM Dinner.

6.B.2 BMFA National Championships

(a) Handley Page Trophy (122)

Awarded to the highest scoring multi-engined model, competing in all classes at the Nationals. Scoring is based upon each model's percentage score of the maximum available for its class.

6.B.2.1 Scale R/C classes

(a) Radio Modeller Scale Trophy (57)

Winner of the F4C event.

(b) Radio Modeller II Trophy (65)

Winner of Scale R/C "Flying Only" class.

(c) Stand-Off Trophy (108)

Winner of Stand-Off Scale.

(d) Radio Modeller Trophy Number I (Number to be advised)

Awarded to the highest placed competitor in the "Flying Only" class who has not competed in a previous Scale R/C class at the National Championships. This trophy may be awarded at the AGM dinner but does not qualify for a free dinner ticket.

6.B.2.2 Scale C/L Classes

(a) Knokke No 2 Trophy (18)

Winner of the Scale C/L event.

6.B.2.3 Scale F/F (outdoor)

(a) Superscale Trophy (19)

Winner of Scale F/F Power event.

(b) Model Flier Trophy (97)

Winner of Scale F/F Rubber event.

(c) Knight & Pridham Trophy (104)

Winner of Scale F/F CO2/Elec event.

6.B.2.4 Scale Indoor Nationals

(a) Hotham Trophy (58)

Winner of Scale Open Rubber event.

(b) Doug Sheppard Trophy (101)

Winner of Scale CO2/Elec. event.

(c) Butch Hadland Memorial (75)

Winner of Scale Peanut event.

(d) Mike Goldby Memorial Trophy

Winner of the Kit Scale event.

- (e) **RC Model Flyer Trophy** - Donated by RC Model Flyer Magazine to be awarded to the best scratchbuilt Scale Indoor RC model at the Scale Indoor Nationals.

6.B.3 Official BMFA Trophies at Other Events

- (a) **Ripmax Trophy (47)**
Winner of Scale R/C at an event nominated each year by the Scale Technical Committee
- (b) **Eric Coates Memorial Trophy (131)**
Awarded each year across all Scale disciplines to the model that in the opinion of the Scale Technical Committee, best captures the spirit and endeavour of Scale modelling.

6.B.4 Scale Technical Committee Trophies

These trophies are administered by the BMFA Scale Technical Committee and are not eligible for AGM Dinner awards.

- (a) **John David Jones Painting**
The original painting is awarded each year to the highest placed new model in the Scale R/C(F4C), Scale R/C Stand-off and F/F classes at the National Championships, based upon each model's percentage score of the maximum available for its class. The model may have been flown previously during that season but must not have flown at a previous National Championship.

In the opinion of the Scale Technical Committee, the model must be a genuinely new model and not modifications or a rebuild of an existing model. The CDs of FF and RC events will have the sole responsibility for nominating candidates for the Trophy.
- (b) **Aeroplane Monthly Trophy**
The original painting is awarded at the BMFA Scale Indoor Nationals each year to the highest placed model of a pre WWII British ultralight aeroplane
- (c) **Modellers Den Peanut Trophy**
Awarded to the winner of the Scale Peanut event at the BMFA's Autumn scale indoor event.
- (d) **Credgington Trophy** – Awarded annually at the National Championships to the winner of Free Flight Scale at an event to be nominated by the Scale Technical Committee.
- (e) **Selby Trophy** – Awarded annually at the National Championships to the highest scoring model across all FF scale Classes. Scoring is based upon each model's percentage score of the maximum available for its class.
- (f) **Brian Downham Trophy** – Awarded to the highest placed model of an aircraft powered by a reaction motor/s (i.e. turbojet or rocket) competing in all classes at the Nationals. Scoring is based upon each model's percentage score of the maximum available for its class.
- (g) **Calcutta Cup** – Awarded to the winning team in the England V Scotland challenge for R/C Scale Flying Only to be held at a nominated event each year.

6B.5. Eddie Riding Competition & Trophy

The Eddie Riding competition is an annual event for free flight scale models with individual classes catering for all contemporary forms of free flight motive power. Each class has an individual trophy with the highest scoring model overall being awarded the Eddie Riding Trophy.

Static judging of the EJR Designs class is fundamentally different from the other FF classes in the Eddie Riding Competition and entries in this class will **not** be eligible for the overall Eddie J. Riding Trophy.

BRITISH MODEL FLYING ASSOCIATION

SMAE Ltd

Chacksfield House, 31 St Andrews Road, Leicester, LE2 8RE

Telephone - 0116 2440028 Fax - 0116 2440645

E-Mail - admin@bmfa.org Website - <http://www.bmfa.org>

Scale Website - www.scalebmfa.co.uk