

SAMAA

R/C SCALE RULE BOOK

SAFETY RULES

SERIES SCALE

SPORT SCALE

STAND OFF SCALE

F4C

VALID JANUARY 2006

1. INTRODUCTION

The following is a full update of the Radio Control Scale Rules for all classes and competitions for use in South Africa from **1 January 2006**. As presented these include all relevant amendments since the last edition of the Rule Book.

The Rule Book consists of the following:

1. **Introduction**
2. **Safety Rules**
3. **Series Scale National Series:** Rules and Objectives as well as amendments to the Current SAMAA Sport Scale and Stand Off Scale Rules as applicable to the Series.
4. **SAMAA Sport Scale Rule Book.**
 - 4.1 SAMAA Sport Scale Rule Book: Section 1
 - 4.2 SAMAA Sport Scale Rule Book: Section 2
5. **SAMAA Stand Off Scale Rule Book.**
 - 5.1 SAMAA Stand Off Scale Rule Book: Section 1.
 - 5.2 ANNEX 1A: Judges Guide (Static Section)
 - 5.3 ANNEX 1B: Organisers Guide.
6. **INTERNATIONAL RULES FOR CLASS F4C**
 - 6.1 General Rules (6.1)
 - 6.2 Class F4C (6.3)
 - 6.3 Annex 6A: Judges Guide for Static Judging
 - 6.4 Annex 6C: Judges Guide for Flying
7. **EXAMPLES OF STATIC AND FLYING SCORE SHEETS.**

The **Sport Scale Rule Book** consists of **Paragraph 4** plus **Section 5.3** plus **Section 6.4** as listed above.

The **Stand Off Scale Rule Book** consists of **Paragraph 5** plus **Section 6.4** as listed above.

The **F4C Rule Book** consists of **Paragraph 6** as listed above.

Johan Ehlers
NASA Rules and Judging Co-ordinator

2. SAFETY GUIDELINES

The operation of Scale Model Aircraft are subject to the SAMAA Manual of Procedures and the SAMAA Safety Procedures and Guidelines for the operation of Radio Controlled Aircraft.

Futhermore, where applicable, the LSAA and SAMJA Safety Procedures and Guidelines for Large Scale Aerobatic Aircraft and Model Jet Aircraft apply.

References to Safety are also found under paragraphs 2.6 and 2.7 on page 19, paragraph 8 on page 24 and paragraph 6.3.11 on page 33 of this document.

3. SERIES SCALE NATIONAL SERIES

Rules and Objectives of Series Scale as well as Amendments to the Current SAMAA Scale Rules as applicable to the Series

1. General:

- 1.1 Series Scale is a series of bi-monthly competitions, with the primary emphasis on flying, for scale radio controlled model aircraft, and acts as a qualification for entry and invitation to the South African Scale Masters and the South African F4C Team Trials.
- 1.2 The series will be flown simultaneously in various centres around the country, the scores being coordinated and collated at a central location.
- 1.3 There will be five bi-monthly rounds, commencing in May, of which the three best rounds will count for qualification purposes. The further rounds will be flown in July, September, November and the following January.
- 1.4 The series will form the qualification for the SOUTH AFRICAN SCALE MASTERS, which will be flown the following March at a central venue. All pilots scoring an average in excess of 3600 points derived from an entry with an F4C Static Score, or 2700 points derived from an entry with an SOS Static Score, or 1800 from a Sport Scale Entry in their best three Series Scale rounds will be eligible for entry and invitation to the Masters. The annual Masters will form part of the Team Trials for the F4C Team to the World Championships as specified in the Team Selection Procedure for each World Championships.
- 1.5 Series Scale is open to all scale flyers, provided that they are SAMAA-members. In order to qualify for the Team Trials, uninterrupted SAMAA-membership during the whole run up to the Masters is mandatory.
- 1.6 Although there are no restrictions on model weight and engine size for Series Scale other than the SAMAA Large Aircraft regulations, for an aircraft to be eligible for entry to the F4C Team Trials, it must meet the current limitations as stated in the current FAI Rule Book

2. Rules:

Series Scale will be contested under the current SAMAA Sport Scale, Stand Off Scale or F4C Rules with the following exceptions:

- 2.1 There is no restriction to the number of models a contestant may enter in the series, but a separate entry fee is payable for each model at the discretion of the local organisers.
- 2.2 The Builder of the Model Rule (SOS and F4C Rule Books) is waived for Series Scale, but **not** for the Masters or any other SAMAA-sanctioned SOS and F4C competition. This implies that a modeller may use a model which does not comply with the **BOM** rule during the series in order to qualify for the Masters. It does not mean that a number of contestants may share the same model during Series Scale rounds.

- 2.4 Attempts. In order to encourage newcomers, a contestant may have two attempts to complete an official flight. The attempt must be called before the expiry of the seven minutes time to get airborne, or before the model has been airborne for more than 60 seconds. This only applies to the series and not to the Masters or other SAMAA sanctioned contests.
- 2.5 Number of flights to count. Normally a series round consists of three rounds of flying with the average of the best two flights to constitute the flight score. If only two rounds of flying can be completed, the best flight will constitute the flight score. If only one round of flying can be completed, that flight will constitute the flight score.
- 2.6 Additions to Static Judging (SOS and F4C only):
- 2.6.1 The initial Static Score achieved by an aircraft at its entry point to the series will remain valid for the duration of that series, up to but not including the SA Masters where all scores will be zeroed.*
- 2.6.2 If a flyer feels that his Static Score can be improved after improvements to the model or documentation, or wishes to change to a different aircraft during the series, he can request a further static judging. The score achieved at each subsequent static judging session becomes the ongoing Static Score. Should a flyer be 'down judged' during an attempt to improve his Static Score, he cannot revert back to his previous higher Static Score, but will have to await an attempt at improvement at a forthcoming judging session.*
- 2.6.3 The Static Score achieved in any contest judged to current SAMAA SOS rules or the current F4C rules and published in SAMAA NEWS during the previous twelve months, can be claimed as the Static Score for the aircraft for the Series, obviating the need for further static judging. This will include both Nationals and Masters preceding the Series start.*
- 3.0 There will be an entry fee to cover the costs of hosting each round, the amount to be decided by the local organisers, payable per aircraft entered, for participation per flying day.

4. SAMAA SPORT SCALE RULE BOOK

SECTION 1

Introduction: Sport Scale is a flying-only class to provide an introduction to Radio Controlled Scale Competition.

GENERAL RULES AND STANDARDS

1.1 Definition of Scale Models:

A scale model shall be a reproduction of a heavier-than air, fixed-wing, man-carrying aircraft, which has been airborne.

NB To indicate the subject full-size aircraft being scale modelled, the word 'prototype' is always used.

1.2 Judges:

The organisers of Local or National competitions shall appoint a panel of at least three competent flight judges.

1.3 Coefficient:

Where a K-factor (K) is noted, scoring shall be from zero to 10 inclusive. The score shall then be multiplied by the K-factor (K). Half points may be used.

1.4 Remarks:

- a] All models shall become airborne under their own power in the manner of the prototype. Hand-launching will be permitted at the sacrifice of the total take off points.
- b] Models of seaplanes of all classes are permitted to use wheeled dollies for take off in the absence of suitable water surface conditions.
- c] Metal-bladed flying propellers are forbidden.
- d] The release or dropping of a dolly immediately after take off shall not be considered as jettisoning.
- e] The use of silencers is mandatory.
- f] Explosives may not be dropped.
- g] If the pilot of the prototype is visible from the front or from the side during flight, a dummy pilot of scale size and shape shall be equally visible during flight in the

model. If such a pilot is not fitted, the score for Choice of Options under “Realism in Flight” shall be zero.

- j] No maiden flight of a model will be allowed at a contest.
- k] When jettisoning of any part of the model occurs (except if nominated under 2.5.5 to 2.5.9) the scoring shall cease from that point onwards, including the figure in which it occurred.
- l] The model may not be handled in any manner after commencement of the first manoeuvre, except as outlined under 2.4 (b).
- m] Any manoeuvre which is done out of sequence scores zero.
- n] Any manoeuvre which is not completed scores zero.
- o] Any infringement will result in disqualification.

1.5 Number of models:

Each contestant may compete with one model only. The application of this rule is at the discretion of the contest organiser for competitions other than the Masters and National Championships, where the rule shall apply.

1.6 Helpers:

A contestant may have one helper during an official flight. An additional helper may assist with starting and pre-flight preparations. All but one helper must retire clear from the flying area before the flight is called. No helper may touch the transmitter during an official flight.

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

1.7 Builder/flier:

Although there is no Builder of the Model Rule for Sport Scale, the person entering the model must also pilot it and a model may not be shared among competitors.

1.8 Proof of scale:

1.8.1 Proof of scale is the responsibility of the contestant.

1.8.2 Name of Entry:

Exact name and model designation of the subject aircraft shall be indicated in the space provided on the flight score sheet

1.8.3 The scale to which the model is built is optional, but must be stated in the space provided on the flight score sheet.

- 1.8.4 The model must be a **clearly recognisable rendition** and not a caricature of a full size fixed wing aircraft. ARF Scale Models are eligible. For example an 'Ugly Stick' does not fulfil the criterion that it represents a Fokker Monoplane, neither does a 2 x 2 'Caprise' represent a CAP 232 etc. The decision of the flight judges in this regard will be final. Any scale model with any colour scheme is acceptable, provided that the model fulfils this criterion.

SECTION 2

MODEL CHARACTERISTICS, FLIGHT TIMING, FLIGHT SCHEDULE, ORGANISATION AND SCORING

2.1 Model Characteristics:

2.1.1 Mass & engine displacement:

- a) SAMAA size, mass and engine size restrictions for large model aircraft to apply.
- b) Jet reaction motors:

Rocket or pulse jet may not be used.
Turbines are allowed.

2.1.2 Radio equipment:

There shall be no limitations on the radio or mechanical equipment used by the contestant, except that the use of attitude or motion stabilising devices eg. gyros are forbidden.

2.2 Official Flights:

- a) Each contestant will be called to fly three times and must execute an official flight within the required time limit (see 2.3) on each occasion to be eligible for flight points for that flight.
- b) If a contestant is unable to start or complete a flight and, in the opinion of the CD, the cause is outside the control of the contestant, the CD may, at his discretion, award the contestant a re-flight. The CD shall decide when the re-flight shall take place.
- c) An official flight commences at the earliest of the following:
 - 1. in the case of a piston engine, when the contestant or his helper begins to crank the engine in order to start it, or
 - 2. in the case of an electric motor, when the contestant or his helper announces the commencement of the first manoeuvre, or

3. three minutes after the contestant is instructed to start his flight. (See 2.3 (b)).
 4. An official flight is terminated when the model lands and stops, except during the option 2.6 1. (Touch and Go).
- d) For the purpose of 2.8, an official flight shall be considered to have been completed when the model has been airborne for 60 seconds.

2.3 Flight Timing:

- a) The contestant will be advised that he will be required to start his flight not less than 5 minutes before the instruction to start.
- b) The contestant will then be instructed to start his flight.
- c) Timing of the flight will commence when the official flight commences. (See 2.2 (c))
- d) The contestant will be allowed 17 minutes to complete his flight.
- e) In the case of a piston-engine powered model of a multi-engine prototype, the time allowed in d), above, will be increased by one minute for each additional engine.
- f) No points will be awarded for any manoeuvre which is not completed at the end of the time allowed.

2.4 Starting Time

- a) If the model is not airborne within seven minutes, plus one additional minute for each engine, after the official flight and timing commence, the official flight will end and no points will be awarded for the flight.
- b) If the engine stops after take-off has commenced, but before the model is airborne the engine may be restarted, but no points will be awarded for take-off. There is only one attempt allowed to repeat the take-off.

Note: In this case, rule 2.4 a. still applies.

2.5 Flight:

2.5.1	Take off	K = 9
2.5.2	Straight flight.....	K = 3
2.5.3	Figure eight	K = 9
2.5.4	Descending 360° Circle.....	K = 9
2.5.5	Option.....	K = 6
2.5.6	Option.....	K = 6
2.5.7	Option.....	K = 6
2.5.8	Option.....	K = 6
2.5.9	Option.....	K = 6
2.5.10	Approach and Landing	K = 12
2.5.11	Realism in flight	
	a) Engine noise (tone & tuning).....	K = 3

- b) Speed of model.....K = 7
- c) Smoothness of Flight.....K = 6
- d) Choice of Options.....K = 12

Notes:

- 1) The scale of the model and the cruising speed or maximum speed of the prototype must be stated on the score sheet.
- 2) Only one attempt is permitted for each manoeuvre.

2.6 Optional Demonstrations:

The contestant shall be prepared, if required by the judges, to give evidence that the subject normally performed each selected option. Only one 'mechanical' option may be included in the selection of options. Selected options must be announced to the judges in writing before commencement of the flight. The options may be selected in any order. (Options m, p, q, r and t are for models of non-aerobatic aircraft only). A contestant may not select option a) if option b) has also been selected.

The order in which the optional manoeuvres are to be flown must be indicated on the score sheet before the flight. Any manoeuvre flown out of order will be marked zero.

- a) Retract and extend landing gear. Gear may be retracted immediately after take off and extended for landing. Model must complete the manoeuvre as per Judges Guide: 6.3.7 B, to qualify for points.
- b) Extend and Retract Flaps (see Judges' Guide: 6.3.7 C)
- c) Dropping of bombs or fuel tanks. If bombs are carried internally, bomb bay doors shall open, bombs drop and doors close for maximum score. If bombs or fuel tanks are carried externally, they may be dropped as per prototype.
- d) Stall turn
- e) Immelmann turn
- f) One loop
- g) Split S (Reversal)
- h) Cuban 8
- i) Normal Spin (3 turns)
- j) Roll
- k) Parachute drop
- l) Touch and go
- m) Overshoot
- n) Side slip

- o) Contestant may demonstrate two flight functions of his own choice which may not be the same. He must be prepared if required by the judges to supply evidence that this function was performed by his subject. He must indicate to the Flight Judges the nature of his demonstration before going to the flight line.
- p) Flight in Triangular circuit
- q) Flight in Rectangular circuit
- r) Flight in a Straight line at constant height below 6 m
- s) Flight in a Straight Line with one engine throttled (multi-engines)
- t) Chandelle
- u) Wing-over
- v) Inverted flight
- w) Derry Turn

Notes:

In the case of uncertainty as to the aerobatic/non-aerobatic status of a particular subject, the contestant shall be prepared to, if required by the judges, supply published evidence to support his choice.

The pilot should at all times be allowed to choose at least the direction of the Take-off, Landing and Touch and Go, provided they do not over-fly a designated safety area behind the judges line laid out for the protection of spectators, officials, other contestants and helpers. All flying manoeuvres start by a trajectory parallel to the judges' line, except 2.6 (l) and (m), which start with a trajectory perpendicular to the judges' line.

2.7 Marking (Flight points):

Each manoeuvre may be awarded from zero to 10 inclusive using increments of half a mark by each of the judges during the flight. These marks are multiplied by the K-factor listed for each manoeuvre. The manoeuvres must be performed in a plane and at a height which will allow them to be seen clearly by the judges. The non observance of this rule will be penalised by loss of points. If and when the model passes behind the judges before a manoeuvre is completed, no points shall be given for this manoeuvre. If in the opinion of the Contest/ Flight Line Director or Judges the model is unsafe or being flown in an unsafe manner, they may instruct the pilot to land.

In the case of doubt regarding the zeroing of a manoeuvre, the other judges will abide by the decision of the Chief Judge.

2.8 Flight Score

The flight score shall be the aggregate sum of the points awarded by all three judges in 2.7.

2.9 Organisation of Radio Control Flying Scale Events

All transmitters likely to be used during the contest must be checked and placed in an impound kept under supervision. During the contest, a steward must be in control of the transmitter impound and will issue the transmitter to the competitor only when his name is called for him to stand by to make his flight. As soon as the flight has ended, the competitor must immediately return his transmitter to the steward at the transmitter impound.

All unauthorised transmissions during the contest will result in automatic disqualification of the offender from the entire contest, and render him liable for further penalties.

The timekeeper will notify the pilot when his model is flying outside the prescribed area.

The order of starting of the various competitors will be established by means of a draw before the start of the contest. The flight order of the competitors will not be changed.

Competitors must be called at least five (5) minutes before they are required to occupy the starting area.

2.10 Final Scoring

Three rounds are to be flown. The lowest flight score is to be deleted and the average of the remaining flight scores is to constitute the final flight score. In the event that for reasons beyond the control of the organiser only two rounds of flying can be completed in the time available for the contest, the lower flight score will be deleted and the remaining flight score will constitute the final flight score. If only one round can be completed, the flight score will constitute the final flight score. The final flight score will be used to rank the contestants in order of merit.

4. SAMAA STAND OFF SCALE RULEBOOK

SECTION 1

GENERAL RULES AND STANDARDS FOR STATIC JUDGING

1.1 Definition of Scale Models:

A scale model shall be a reproduction of a heavier-than air, fixed-wing, man-carrying aircraft, which has been airborne.

NB To indicate the subject full-size aircraft being scale modelled, the word 'prototype' is always used.

1.2 Judges:

The organisers of local or National competitions shall appoint three competent judges who shall determine the degree of fidelity to scale and craftsmanship, and a panel of at least three competent flight judges.

1.3 Coefficient:

Where a K-factor (K) is noted, scoring shall be from zero to 10 inclusive. The score shall then be multiplied by the K-factor (K). Fractions of a point may be used in determining fidelity to scale and craftsmanship scores and half points maybe used in flight scores.

1.4 Remarks:

- a] All models shall become airborne under their own power in the manner of the prototype. Hand-launching will be permitted at the sacrifice of the total take off points.
- b] Models of seaplanes of all classes are permitted to use wheeled dollies for take off in the absence of suitable water surface conditions. Deviation from Scale through inclusion of permanently attached wheels, skids or similar non-prototype devices in the model structures shall be in this case not taken into consideration in the scoring of fidelity to scale and craftsmanship.
- c] No parts of a model, except propeller and spinner, may be removed between scale judging and flying, nor may anything except a dummy pilot and antenna be added externally to the model. Bombs, drop tanks, etc. must be presented for static judging but may be replaced before flying by simpler and repairable examples of the same shape, colour, size and weight. Additional air entries are permitted, provided they are covered by movable hatches for static judging; these hatches may be moved or opened manually prior to flight, or in flight by means of radio control. The appearance of the model in flight must not be affected.
- d] A flying propeller of any form or diameter may be substituted for a scale propeller. The size, shape and colour of the spinner may not be changed.
Note: Substitution of the scale propeller relates only to powered propellers that were intended to propel the subject aircraft. If a model of a multi-engined aircraft uses non-powered (windmilling) propellers, these may not be changed between static and flying. Features such for example the small generator propeller on the nose of an aircraft such as the Me163, may likewise not be changed for flying propellers.

- e] Metal-bladed flying propellers are forbidden.
- f] The release or dropping of a dolly immediately after take off shall not be considered as jettisoning.
- g] The use of silencers is mandatory. Effective concealment of a silencer within the scale outline of the model may be considered for craftsmanship points.
- h] Explosives may not be dropped.
- i] If the pilot of the prototype is visible from the front or from the side during flight, a dummy pilot of scale size and shape shall be equally visible during flight in the model. If such a pilot is not fitted, the total flight score shall be reduced by 10%. The dummy pilot may be present during scale judging but will not be taken into account.
- j] No maiden flight of a model will be allowed at a contest.
- k] When jettisoning of any part of the model occurs (except if nominated under 2.5.5 to 2.5.9) the scoring shall cease from that point onwards, including the figure in which it occurred.
- l] The model may not be handled in any manner after commencement of the first manoeuvre.
- m] Any manoeuvre which is done out of sequence scores zero.
- n] Any manoeuvre which is not completed scores zero.
- o] Any infringement will result in disqualification.

1.5 Number of models:

Each contestant may compete with one model only. The application of this rule is at the discretion of the contest organiser for competitions other than the Masters and National Championships, where the rule shall apply.

1.6 Assistants:

A contestant is permitted one helper during an official flight. An additional helper is permitted to assist with engine starting and pre-flight preparation if so required by the competitor. All but one helper must retire clear from the flying area before the flight is called. No helper may touch the transmitter during an official flight.

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

1.7 Builder/flier:

The competitor must be the builder of the model and must pilot it.

1.8 Proof of scale:

1.8.1 Proof of scale is the responsibility of the contestant.

1.8.2 Name of Entry:

Exact name and model designation of the subject aircraft shall be indicated on entry blank and in “Proof of Scale” presentation.

1.8.3 The scale to which the model is built is optional, but must be stated in the “Proof of Scale” presentation.

1.8.4 Documentation:

To prove that the model resembles a particular prototype, documentation is required. This **MUST** be affixed to the inside of a single cardboard folder approximately 25 x 35 cm (or similar) comprising a maximum coverage of four pages (no loose leaves) with the contestant’s name and designation of his model appearing on the outside. Documentation shall include proof of cruising speed or maximum speed of the prototype.

Documentation shall consist of a published three-view drawing or silhouette together with a maximum of three photographs of the prototype. A selection of photos, showing the aircraft in front-view, side-view and plan-view can replace the three-view drawing or silhouette of old-timer aircraft for which no drawings may exist.

Minimum wingspan of the three-view documentation shall be 100 mm.

For scoring under “Colour” and “Markings” the colour scheme must be proved by a colour print or photo, or by a printed description. A “Profile” or similar publication is an ideal proof, both for outline and colour scheme. If no proof of scale material accompanies the model only Craftsmanship and Flight points may be awarded.

Included in the documentation shall be a signed declaration that the competitor is the builder of the model entered. If found in violation, the competitor will be disqualified from the contest.

1.8.5 Static Judging:

Static judging shall be done at a distance of 6 metres from the model. No measurements are to be taken.

A prototype with a retractable undercarriage shall be presented for static judging with the undercarriage in the extended position.

1.8.6 Static Scoring:

Fidelity to scale (accuracy of outlines)

1.	SIDE VIEW:.....	K = 10
2.	PLAN VIEW:.....	K = 10
3.	END VIEW:.....	K = 10
4.	COLOUR:.....	K = 7
5.	MARKINGS:.....	K = 7
6.	CRAFTSMANSHIP:.....	K = 6

Total 50

1.8.7 Scoring:

For flying Scale Contests the final static score shall be the aggregate sum of points awarded by the three judges. These points can be used for final classification only when the model completes an official flight.

SECTION 2

MODEL CHARACTERISTICS, FLIGHT TIMING, FLIGHT SCHEDULE, ORGANISATION AND SCORING

2.1 Model characteristics:

2.1.1 Mass & engine displacement:

a) SAMAA size, mass and engine size restrictions for large model aircraft to apply.

b) Jet reaction motors:

Rocket or pulse jet may not be used.
Turbines are allowed.

2.1.2 Radio equipment:

There shall be no limitations on the radio or mechanical equipment used by the contestant, except that the use of attitude or motion stabilising devices eg. gyros are forbidden.

2.2 Official Flights:

- a) Each contestant will be called to fly three times and must execute an official flight within the required time limit (see 2.3) on each occasion to be eligible for flight points for that flight.
- b) If a contestant is unable to start or complete a flight and, in the opinion of the **CD**, the cause is outside the control of the contestant, the **CD** may, at his discretion, award the contestant a re-flight. The **CD** shall decide when the re-flight shall take place.
- c) An official flight commences at the earliest of the following:
 1. in the case of a piston engine or turbine, when the contestant or his helper begins to crank the engine in order to start it, or
 2. in the case of an electric motor, when the contestant or his helper announces the commencement of the first manoeuvre, or
 3. three minutes after the contestant is instructed to start his flight. (See 2.3 (b)).
 4. An official flight is terminated when the model lands and stops, except during the option 2.6 1. (Touch and Go).

- d) For the purpose of 2.8, an official flight shall be considered to have been completed when the model has been airborne for 60 seconds.

2.3 Flight Timing:

- a) A contestant will be advised that he will be required to start his flight not less than 5 minutes before the instruction to start.
- b) The contestant will then be instructed to start his flight.
- c) Timing of the flight will commence when the official flight commences. (See 2.2 (c))
- d) The contestant will be allowed 17 minutes to complete his flight.
- e) In the case of a piston-engine or turbine powered model of a multi-engine prototype, the time allowed in d), above, will be increased by one minute for each additional engine.
- f) No points will be awarded for any manoeuvre which is not completed at the end of the time allowed.

2.4 Starting Time

- a) If the model is not airborne within seven minutes, plus one additional minute for each additional engine, after the official flight and timing commence, the official flight will end and no points will be awarded for the flight.
- b) If, in the case of a piston engine or turbine, the engine stops after the take-off has commenced, but before the model is airborne the engine may be restarted, but no points will be awarded for take-off.

Note: In this case, rule 2.4 a. still applies.

2.5 Flight:

2.5.1	Takeoff.....	K = 9
2.5.2	Straight flight.....	K = 3
2.5.3	Figure eight.....	K = 9
2.5.4	Descending 360° Circle.....	K = 9
2.5.5	Option.....	K = 6
2.5.6	Option.....	K = 6
2.5.7	Option.....	K = 6
2.5.8	Option.....	K = 6
2.5.9	Option.....	K = 6
2.5.10	Approach and Landing.....	K = 10
2.5.11	Realism in flight	
	a) Engine noise (realistic tone & tuning).....	K = 3
	b) Speed of the model.....	K = 7
	c) Smoothness of flight.....	K = 6
	d) Choice of options.....	K = 12

Total 100

Notes:

- 1) The scale of the model and the cruising speed or maximum speed of the prototype must be stated on the score sheet.
- 2) Only one attempt is permitted for each manoeuvre, the only exception is the procedure of getting the model airborne, as defined in 2.4(b).

2.6 Optional Demonstrations:

The contestant shall be prepared, if required by the judges, to give evidence that the subject normally performed each selected option. Selected options must be announced to the judges in writing before commencement of the flight. The options may be selected in any order. (Options m, p, q, r, t and v are for models of non-aerobatic aircraft only).

- a) Retract and extend landing gear. Gear may be retracted immediately after take off and extended for landing. Model must complete the manoeuvre as per Judges Guide: 6C.3.7, to qualify for points.
- b) Extend and Retract Flaps (see Judges Guide: 6C.3.7)
- c) Dropping of bombs or fuel tanks. If bombs are carried internally, bomb bay doors shall open, bombs drop, and doors close for maximum score. If bombs or fuel tanks are carried externally, they may be dropped as per prototype (see Judges Guide 6C.3.7)
- d) Stall turn
- e) Immelmann turn
- f) One loop
- g) Split_S (Reversal)
- h) Cuban 8
- i) Normal spin (3 turns)
- j) Roll
- k) Parachute drop
 - 1) Touch and go
- m) Overshoot
- n) Side slip
- o) Contestant may demonstrate two flight functions of his own choice which may not be the same. He must be prepared if required by the judges to supply evidence that this function was performed by his subject. He must indicate to the Flight Judges the nature of his demonstration before going to the flight line.
- p) Flight in Triangular circuit
- q) Flight in Rectangular circuit

- r) Flight in a Straight line at constant height below 6 m
- s) Flight in a Straight Line with one engine throttled (multi-engines)
- t) Chandelle
- u) Lazy Eight
- v) Wing-over
- w) Inverted Flight
- x) Derry Turn

Notes:

Contestants must be prepared, if required by the judges, to provide evidence that the options selected are typical and within the normal capabilities of the subject aircraft modeled.

Only one mechanical option may be included in the contestants choice of options.

The pilot should at all times (except when conflicting with safety) be allowed to choose at least the direction of take-off and landing. All flying manoeuvres start by a trajectory parallel to the judges' line, except 2.6 (l) and (m), which start with a trajectory perpendicular to the judges' line.

The order in which the optional manoeuvres are to be flown must be marked on the score sheet and any manoeuvre flown out of order will be marked zero.

2.7 Marking (Flight points):

Each manoeuvre may be awarded marks from zero to 10 inclusive using increments of half a mark by each of the judges during the flight. These marks are multiplied by the K-factor listed for each manoeuvre. The manoeuvres must be performed in a plane and at a height, which will allow them to be seen clearly by the judges. The non-observance of this rule will be penalised by loss of points. If and when the model passes behind the judges before a manoeuvre is completed, no points shall be given for this manoeuvre. If the model, in the opinion of the judges, is unsafe or being flown in an unsafe manner, the judges may instruct the pilot to land.

In the case of doubt regarding the zeroing of a manoeuvre, the other judges will abide by the decision of the Chief Judge.

2.8 Flight Score

The flight score shall be the aggregate sum of the points awarded by all three (or five) judges in 2.7.

2.9 Organisation of Radio Control Flying Scale Events

All transmitters likely to be used during the contest must be checked and placed in an impound kept under supervision. During the contest, a steward, must be in control of the transmitter impound and will issue the transmitter to the competitor only when his name is called for him to stand by to make his flight. As soon as the flight has ended, the competitor must immediately return his transmitter to the steward at the transmitter impound.

All unauthorised transmissions during the contest will result in automatic disqualification of the offender from the entire contest, and render him liable for further penalties.

The timekeeper will notify the pilot when his model is flying outside the prescribed area.

The order of starting of the various competitors will be established by means of a draw before the start of the contest. The flight order of the competitors will not be changed unless the organisers need to do so to avoid frequency clashes.

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

Competitors must be called at least five (5) minutes before they are required to occupy the starting area.

2.10 Final Scoring

Three rounds are to be flown. The lowest flight score is to be deleted and the average of the remaining flight scores is to constitute the final flight score. In the event that for reasons beyond the control of the organiser only two rounds of flying can be completed in the time available for the contest, the lower flight score will be deleted and the remaining flight score will constitute the final flight score. If only one round can be completed, the flight score will constitute the final flight score. The final flight score is to be added to the static score for the final result.

ANNEX 1A.

JUDGES GUIDE (Static Section)

It is recommended that the judges review the whole entry prior to commencement in order to establish the standard of the entries as well as to determine their grading under Craftsmanship.

A chief judge shall be appointed as a spokesman. He must discuss the merits and criticisms of each item with the other judges, in an attempt to arrive at a unanimously agreed score for each item. Each judge will retain the right to differ. Any degree of difference should however be marginal.

The use of fractions of a point is important when judging top-class models.

1.8.4 Documentation for proof of scale: -

The minimum documentation required must be provided. Failure to comply shall result in zero marks being awarded under 1.8.6.1, 2, 3, 4 and 5.

1.8.5 Judging

The model should be presented to the judges by a handler (who could be the contestant). For this purpose a suitable table should be provided by the contest organisers in a position 6 metres in front of the judges. The judges must not examine the models at a closer distance than 6 metres prior to, or during the static judging.

The handler is required to turn the model into the positions requested by the judges in order to compare the model with the drawings and photograph(s).

Discussions between the handler and the judges are forbidden.

1.8.6 Static Scoring

Using the photograph(s) and drawings check:

1.8.6.1 The Side View: including the fuselage outline, cabin or canopy shape, cockpit aperture shape, engine cowling and spinner shape, outlines of fin and rudder, wing and tailplane sections, wing stagger and struts on biplanes, shape angle and position of undercarriage legs and tailwheel or skid, size of wheels and tyres.

1.8.6.2 The Plan View: for wing outline and fairings, aileron size, tailplane size and outline; elevator size, shape and cutouts, trim tabs, fuselage shape and taper, cockpit or canopy shape, engine cowling shape.

1.8.6.3 The End View: for dihedral, wing thickness and taper, wing struts, bracing and gap on biplanes, thickness of fin, rudder and tailplane, cross sections of fuselage and engine cowling, cowling shape and cutouts, dummy propeller size and shape, shape of cockpit canopy or windshields; size, shape, position and angle of undercarriage; wheel track tyre thickness.

Note: The photographs take precedence over drawings, when there is any doubt concerning any item of scale accuracy.

1.8.6.4 Colour

Correct colour may be established by colour photographs, acceptable colour charts, acceptable published descriptions, or from acceptable published colour drawings.

Note: Judges should keep in mind the vagaries of colour emulsions (and thus colour photographs) as well as the effect of weathering on the original paints - in other words, they must not judge colour in absolute terms. The main question to be answered is: "Does the colour(s) of the model conform to the documentation?" Subtle variations in tone and intensity of colours should not carry too great weight in this evaluation.

Colours of national markings and lettering should also be evaluated under this category.

1.8.6.5 Markings

Check position, size, proportions and style of markings and lettering. Check camouflage patterns for correct positioning and the correct degree of merging of shades.

1.8.6.6 Craftsmanship:

This is a complex category which entails the degree of craftsmanship exhibited by the modeller in his execution of the model. This includes correct gaps between fixed and moveable surfaces the fit of fuselage to wings, and general finesse. The degree of realism that results from these aspects, forms an integral part of this evaluation.

Note:

The degree of complexity of the model, the colour scheme and markings should not be judged in Stand Off Scale competition. These categories should be judged for correctness of representation only. Stand Off Scale competitions should not be confused with International Class F4C competitions.

ANNEX 1 B.

ORGANISERS' GUIDE

1 Contest Director:

The organiser shall appoint a Contest Director who will have overall control over the proceedings.

2 Judges:

The organiser of a local or national competition shall appoint three competent judges who shall determine the degree of fidelity to scale and craftsmanship, and a panel of at least three competent flight judges.

3 Equipment:

Judges shall be provided with the following:

Shade, clip boards, prepared score sheets, table for static judges and table or tables for model base and chairs.

4 Location:

For static judging, a secluded area shall be provided, access to which is exclusive to the Judges, Contest Director, and the entrant concerned with each model.

5 Preparation:

If time permits, judges shall be provided with a scale model which is not entered in the contest, and this will be used as a practice subject for static judging. The results obtained will be discussed before the entered models are judged.

6 Personnel:

The following will be provided:

- Flight line director
- Timekeepers
- Score sheet runners
- Scorers equipped with suitable machines
- Scoreboard officials

7 Score Sheets:

These should be in duplicate so that a copy can be given to the contestant at the completion of all static judging and after each flight.

8 Flying Site:

The flying area should be of sufficient size, and the ground layout should be sufficiently flexible to allow scale models to take off into wind without obstruction, or overflying the spectator area. The judges should be a minimum of 15 metres back from the centre of the take off strip, or the portion of the take off area most likely to be used by contestants.

5.

CLASS F4C

INTERNATIONAL RADIO CONTROL

SCALE RULE BOOK

JANUARY 2006

PART SIX

TECHNICAL RULES FOR FLYING SCALE MODEL CONTESTS

6.1 GENERAL RULES AND STANDARDS FOR STATIC JUDGING OF SCALE MODELS

6.1.1. Definition of Scale-Models:

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

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

6.1.2. System of Rules:

Rules are numbered as follows:

- 6.1. General rules and standards for judging Fidelity to Scale
- 6.3. Radio Controlled Flying Scale Models

6.1.3. Competition Program:

A competition program for a particular event shall consist of part 6.1 plus the regulations for the specific event

The R/C event will commence with flying on the first day of competition, with static judging commencing after the first model has been flown. Thereafter flying and static judging will be carried out concurrently, models being flown before being presented for static judging.

If there are more than 40 competitors in a World or Continental Championship, the organiser may use two separate panels for static judging. Each panel will consist of three judges. The first panel will judge the points Scale Accuracy (6.1.10.1 - Side view, End view and Plan view). On completion of this, the second panel will judge the remaining aspects. (6.1.10.2 - 6.) Under these circumstances Flight Judging will commence once the first 10 models have been Static judged.

6.1.4. Judges

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

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

All the judges (static and flying) must be of a different nationality and selected from a list submitted by their NAC and approved by the CIAM.

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

The static judges must have a common language.

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

6.1.5. Coefficient

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

6.1.6. Remarks

- a) All models shall become airborne in the manner of their prototype.
- b) In the absence of suitable water surface conditions, models of seaplanes are permitted to use wheels or wheeled dollies for take-off. The release or dropping of a dolly immediately after takeoff will not therefore be penalised. Deviation from Scale because of the inclusion of permanently attached wheels, skids or similar non-prototype devices in the model structures will not be taken into consideration in the scoring of Fidelity to Scale and Craftsmanship.
- c) No parts of a model, except propeller and spinner may be removed, nor may anything except a dummy pilot and antenna be added externally to the model, between scale judging and flying. Bombs, drop-tanks, etc. must be presented in static, but may be replaced before flying by simpler and repairable examples of the same shape, colour, size and weight. Any infringement will result in disqualification. Additional air entries are permitted, provided they are covered by movable hatches for static judging; these hatches may be moved or opened manually prior to flight, or if in flight by means of radio control. Necessary repairs due to flight damage are permitted, but the maximum weight limit still applies. The appearance of the model in flight must not be unduly affected.
- d) A flying propeller of any form or diameter may be substituted for a scale propeller. The size, shape and colour of the spinner may not be changed.
Note: Substitution for a scale propeller relates only to powered propellers that were intended to propel the subject aircraft. If a model of a multi-engined aircraft uses non-powered (windmilling) propellers, these may not be changed between static and flying. Features such as for example, the small generator propeller on the nose of an aircraft such as a Me163, may likewise not be changed for flying propellers
- e) Metal bladed flying propellers are forbidden.

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

6.1.7 Number of Models

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

6.1.8. 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. All but one helper must retire clear of the flying area before the flight is called. For radio controlled events no helper may touch the transmitter during the official flight.

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

6.1.9. Documentation (Proof of Scale)

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

6.1.9.2. The exact name and model designation of the prototype shall be indicated on the entry form, on the score sheet, and also in the "Proof of Scale" presentation. The documentation submitted by the competitor must state if the original prototype is non-aerobatic. The judges will discuss this information before the first flight in F4C commences. The Chief Judge shall make the final decision before any flight is made. This may influence the marks awarded under 6.3.6.11.d (Choice of Options).

- 6.1.9.3. The scale to which the model is built is optional, but it must be stated in the “Proof of Scale” presentation.
- 6.1.9.4. To be eligible for Fidelity to Scale (Static) points the following is the minimum documentation must be submitted to the judges (See Annex A – 6A.1.9. for recommended presentation of documentation) :-
- a) Scale Drawings:
Accurate scale drawings of the full size aircraft that show at least the three main aspects of Side View, Upper Plan View and Front View. These drawings must be to a common scale giving a minimum span of 250 mm, and a maximum span of 500 mm or if the fuselage is longer than the wingspan, these measurements apply to the length of the fuselage. The drawings must be submitted in triplicate. Unpublished drawings by the competitor or other draftsman are not acceptable unless certified accurate in advance of the contest by an authoritative source such as the respective National Scale Committee or equivalent, the builder of the original aircraft, or other competent authority.
 - b) Proof of Colour:
Correct colour may be established from colour photographs, from accepted published descriptions if accompanied by colour chips certified by a competent authority, from samples of the original paint, or from accepted published colour drawings, e.g. “Profile” type publications.
 - c) Photographic evidence:
At least three photographs or printed reproductions of the prototype, including at least one of the actual subject aircraft being modeled are required. Each of these photographs or printed reproductions must show the complete aircraft, preferably from different aspects. These main photos must be submitted in triplicate, the second and third copies may be photocopies. The photographic evidence is the prime means of judging scale accuracy against the prototype.
 - d) Aircraft speed:
The cruising or maximum speed of the subject aircraft must also be included in the documentation, and repeated on all flight score sheets before the start of each official flight. 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.
 - e) Competitor’s declaration:
The competitor must include in his documentation a declaration that he is the builder of the model aircraft entered, listing all components of the model he did not make himself. The competitor must also complete and sign the required declaration form (See Annex 6E) confirming these and other aspects. If found in violation the competitor may be disqualified from the contest.

6.1.10. Judging for Fidelity to Scale and Craftsmanship

		K-Factor
1.	Scale Accuracy	
	Side view	15
	End view.....	15
	Plan view.....	15
2.	Colour	
	Accuracy.....	3
	Complexity.....	2
3.	Markings	
	Accuracy.....	8
	Complexity.....	3
4.	Surface texture and realism.....	12
5.	Craftsmanship	
	Quality.....	11
	Complexity.....	4
6.	Scale detail	
	Accuracy.....	8
	Complexity.....	4

Total: K=100

Item 1 to be judged at a minimum distance 5m from the centre of the model. in F4C.
Judges must not touch the model.

6.1.11 Static Scoring

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

6.1.12 Organisation of Scale Events

For transmitter and frequency control see Section 4b, Para B.10.

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

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

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

Competitors must be called at least seven minutes for F4B and five minutes for F4C before they are required to occupy the starting area.

6.3. CLASS F4C - RADIO CONTROLLED FLYING SCALE MODELS

6.3.1. General Characteristics

Maximum weight of the complete model without fuel in flying condition including any dummy pilot:..... 15 kg

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

Motive Power:

- a) Rocket or pulse jet engines may not be used.
- b) The maximum thrust for a turbine motor shall be 100 Newton.
- c) Electric motors; maximum no load voltage of power source:... 42 volts.

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

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

6.3.2. Radio Equipment

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

6.3.3. Official Flights

- a) Each competitor will be called to fly three times, and must execute an official flight within the required time limit (see 6.3.4.) on each occasion to be eligible for flight points for that flight.

- b) If a competitor is unable to start or complete a flight and, in the opinion of the Contest / Flightline Director, the cause is outside the control of the competitor, the Contest / Flightline Director may, at his discretion, award the competitor a reflight. The Contest Director shall decide when the reflight shall take place.
- c) An official flight commences at the earliest of the following:
 - i) The competitor signals to the timekeeper that he is commencing to start his motor(s).
 - ii) Two minutes after the competitor is instructed to start his flight.
 - iii) An official flight is terminated when the model lands and stops, except during the option 6.3.7.M. (Touch and Go).

6.3.4. Flying Time

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

6.3.5. Starting Time

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

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

6.3.6. Flight

- 6.3.6.1. Take-off..... K = 9
- 6.3.6.2. Straight flight..... K = 3
- 6.3.6.3. Figure Eight..... K = 9
- 6.3.6.4. Descending 360° Circle..... K = 9

6.3.6.5. Option.....	K = 6
6.3.6.6. Option.....	K = 6
6.3.6.7. Option.....	K = 6
6.3.6.8. Option.....	K = 6
6.3.6.9. Option.....	K = 6
6.3.6.10. Approach and Landing.....	K = 12
6.3.6.11 Realism of flight	
a) Engine sound (realistic tone & tuning).....	K = 3
b) Speed of the model.....	K = 7
c) Smoothness of flight.....	K = 6
d) Choice of Options.....	K = 12
	Total.....K = 100

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

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

6.3.7. Optional Demonstrations

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

Selection must be given to judges in writing before taking off. The options may be flown in any order. It is expected that options A, N, R, S, T and W are intended for subjects with little or no aerobatic capability. (See 6.3.7 Realism in Flight and 6.3.6.11 Choice of Options). A competitor may not select option C (Retract and Extend Flaps) if option B (Retract and Extend Landing Gear) has already been selected.

The order in which the optional manoeuvres are flown must be marked on the score sheet and any manoeuvre flown out of order will be marked zero.

A	Chandelle.....	K = 6
B	Retract and extend landing gear.....	K = 6
C	Retract and extend flaps.....	K = 6
D	Dropping of bombs or fuel tanks.....	K = 6
E	Stall turn.....	K = 6
F	Immelman turn.....	K = 6
G	One loop.....	K = 6
H	Split S (Reversal).....	K = 6
I	Cuban eight.....	K = 6
J	Normal spin (three turns).....	K = 6

K	Roll.....	K = 6
L	Parachute.....	K = 6
M	Touch and go.....	K = 6
N	Overshoot.....	K = 6
O	Side slip to left or right.....	K = 6
P	1 st Flight function by subject aircraft.....	K = 6
Q	2 nd Flight function by subject aircraft.....	K = 6

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

R	Flight in triangular circuit.....	K = 6
S	Flight in rectangular circuit.....	K = 6
T	Flight in a straight line at constant height (maximum height 6 metres).....	K = 6
U	Flight in a straight line with one motor throttled (for multi-engined models only).....	K = 6
V	Lazy Eight.....	K = 6
W	Wingover.....	K = 6
X	Inverted flight.....	K = 6
Y	Derry Turn.....	K = 6

6.3.8. Marking (flight points)

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

The manoeuvres must be performed in a plane and at a height that will allow them to be seen clearly by the judges. The non-observance of this rule will be penalised by loss of points.

6.3.9. Flight Score

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

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

6.3.10. Final Scoring:

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

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

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

6.3.11 Safety:

- a) All manoeuvres must be performed parallel with the judges line such that if any part of a manoeuvre is performed behind the judges line, it will score zero.
- b) Exceptions from this rule are manoeuvres 6.3.6.1 Take-off, 6.3.6.10 Approach and Landing, and 6.3.7.m Touch and Go. The contestant has the right to perform these manoeuvres into wind as long as the Safety Line designated to protect spectators, officials and other competitors and helpers is not crossed.
- c) If a model is in the opinion of the Judges or Contest/ Flightline Director unsafe, or being flown in an unsafe manner, they may instruct the pilot to land.

**ANNEX 6A
TECHNICAL RULES FOR FLYING SCALE MODEL CONTESTS
CLASS F4**

JUDGES GUIDE FOR STATIC JUDGING

6A.1 General

a) Before Static Judging commences the judges should review the whole entry at a distance not closer than 3 metres in order that a standard is established for grading of points to be awarded. The entries should be studied in relationship to each other from a superficial aspect before detailed examination commences. The Chief Static Judge should take this opportunity to ensure that all judges are of similar mind as to what is involved, particularly with respect to complexity aspects where these are applicable.

b) A trial assessment using one or more non-competition models should be done prior to the start of the competition to establish a uniform standard.

c) A Chief Judge shall be appointed as a spokesman for the static judges, and if two panels of static judges are to be used, the second panel will have a Deputy Chief Judge appointed to assist the Chief Judge in his work. The Chief / Deputy Chief Judge should discuss the merits and criticisms of each item in his area of responsibility with the other judges in his team, making suggestions for the scores.

d) The static evaluation is broken down into six items as listed in 6.1.10. Judges must discuss each item as a team and attempt to arrive at a unanimously agreed score for each item, although each will retain the right to differ. Any degree of difference should however be minimal.

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

f) Regardless of the actual marks awarded, it is imperative that an accurate and fair comparison is attained across the whole range of models entered. The relative mark of one model compared to another is the most important standard to be achieved. Judges are encouraged to make use of analysis sheets and electronic or other archive devices to achieve this comparison.

g) Upon completion of the static judging of each model, the Chief Judge must check all score sheets for completeness before submitting them for processing. The panel of Static Judges has the right to alter scores retrospectively that they subsequently feel to be wrong (e.g. first model deviations, details not proven by documentation, overlooked commercial items etc). Sufficient time must be allocated by the organizers for this review to be done. Only when the Chief Judge agrees that this has been achieved, should the scores be released for publication.

h) If models are flown before being static judged (see 6.1.3.), any damage sustained during flight shall be ignored by the static judges provided the model is intact and it is practical to do so.

6A.1.9. Documentation for Proof of Scale

The minimum documentation as stated in 6.1.9.4 must be provided. Failure to comply shall result in penalty marks as follows :

Less than 3 full photos of prototype:	Zero Points for Scale Accuracy (6.1.10.1) Likely down marking of Realism (6.1.10.4) Likely down marking of Craftsmanship (6.1.10.5)
---------------------------------------	---

Likely down marking of Scale Detail (6.1.10.6)

Missing or unauthorized drawings: Zero Points for Scale Accuracy (6.1.10.1)

No photo of Subject Aircraft: Zero Points for Markings (6.1.10.2)
Likely down marking for Realism (6.1.10.4)

Incomplete Colour Documentation: Zero Points for Colour 6.1.10.3)

The documentation stated above is the absolute minimum required for participation. In reality more comprehensive evidence is needed to assess the model relative to the prototype. As the full size aircraft cannot be presented, it follows that the photographic documentation provided should be as comprehensive as possible if a high score is to be achieved.

All documentation should relate to the subject aircraft whenever possible; variations from this must be clearly marked if not otherwise obvious. All relevant notes and corrections to the documentation should be in English.

The static judges have a difficult task to do in a short period of time. Documentation should therefore be presented in a format that can be quickly and accurately assessed. Superfluous and/or contradictory evidence should be avoided. The documentation should be presented on separate sheets to avoid the requirement for judges to continually turn pages for cross references. A stiff A2 sheet is considered to be the largest format that may be comfortably handled by the judges. It will assist the judges if the documentation is presented in a format that reflects the sequence of the judging aspects, e.g. Side View, End View, Plan View, Colour, Markings, etc.

6A.1.10. Static Judging

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

The model must be judged against the documentation presented and the judges should award marks solely on this evidence. The quality of the documentation/evidence provided by the competitor will normally be reflected in the score that the judges award. Accurate and clear evidence deserves good marks if the model matches it. Judges should ensure that a competitor does not benefit by default by submitting poor or incomplete documentation.

Judges must assess both accuracy and complexity of those aspects where indicated.

6A.1.10.1. Scale Accuracy

The photographs are the prime means of determining the accuracy and realism relative to the full size aircraft and must always take precedence over drawings if there is any doubt concerning an item of scale accuracy. Caution should however be exercised when determining rigging angles using photographs taken at an oblique angle, as these might give the wrong impression. In this particular case the drawing may be a more appropriate reference for checking dihedral and incidence angles.

The model should first be positioned in a pose similar to that in the best photograph and checked for obvious discrepancies. This procedure is then repeated with any other suitable photographs.

Then using photographs and drawings, check:

- a) Side View, this may be either left or right depending on the most suitable photograph. A check should be made of the fuselage outline, cabin or canopy shape, cockpit aperture shape, engine cowling and spinner shape, outline of fin and rudder, wing and tailplane sections. Also the shape, angle and position of landing gear legs and tail wheel or skid, the size of wheels and tyres. On multi-wing aircraft a check should be made of wing stagger, wing gap and the shape and arrangement of struts and incidence wires.
- b) Front End View, for dihedral, wing thickness and taper, wing struts, bracing and gap on multi wing aircraft. Also the thickness of fin, rudder and tailplane, cross-sections of fuselage and engine cowling, cowling shape and cut-outs, propeller size and shape, shape of cockpit canopy or windshields, size, shape, position and angle of landing gear, wheel track and tyre thickness.
- c) Upper Plan View, for wing outline and fairings, aileron size, flaps, tailplane size and outline, elevator size, shape and cut outs, trim tabs, fuselage shape and taper, cockpit or canopy shape, engine cowling shape.

6A.1.10.2. Colour

Colour Accuracy:

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

Colour Complexity:

Consideration should be given to the greater effort involved in reproducing multi-coloured finishes compared to models which feature only one or two basic colours. The system for awarding colour complexity points should be agreed upon before starting competitive judging. Up to two complexity points may be given for each main colour that covers a significant part of the airframe. A maximum of a single point may be given for each minor colour, such as those for the insignia, struts, guns, bombs etc. Basic colours such as black and white should receive a fraction of a complexity point. It is essential that if high marks are to be awarded, a comprehensive standard of colour documentation must be presented.

6A.1.10.3. Markings

If a single panel of 3 judges is involved, much of the Markings aspect can be assessed whilst checking Scale Accuracy. The relative positioning and shape of the markings on the model are often a good indication of Scale Accuracy as they highlight errors in shape and outline. The opportunity to check markings on the underside of the model can also be taken whilst checking the plan view.

Markings Accuracy:

Check the position and size of all markings and lettering. Particular emphasis should be made to the relative positioning of markings to other markings and key features on the airframe. Check that the style and thickness of all letters and figures are correct. Check that any trim strips are of the correct dimensions and are correctly positioned. Check camouflage patterns.

Markings Complexity:

The system for awarding marks for Markings Complexity should be agreed upon before starting competitive judging. A high mark for complexity is not solely dependent upon the number of markings, but the difficulty in achieving the required effect. Complex lettering, particularly when spread over a large area or relating to key positions on the airframe, should attract a higher complexity mark than sparsely positioned markings of more simple design. Curved lines are usually more complex than straight lines. Camouflage patterns should be considered carefully, with the more complex styles involving irregular patterns and indistinct edges being rewarded accordingly. For high marks to be given in this section it is important that documentation covering all the markings to be assessed is presented.

6A.1.10.4. Surface Texture and Realism

Realism is a question of how well the model captures the character and surface texture of the full size aircraft. The judges should ask themselves if they are looking at the subject aircraft in miniature, or just a model airplane.

The texture and appearance of the surface of the model should be a good reproduction of that of the prototype. Fabric covered types should be covered in the correct material, and the outline of stringers and wing ribs should be visible. Ply covered or wooden monocoque types should be correctly simulated and any sag between the ribs and formers should be apparent if this is present on the prototype. Metal stressed skin types should show simulation of panels and rivets. In all instances, the appropriate gloss, eggshell or matt finish should be correctly reproduced.

If the subject aircraft is an unblemished museum example, then the model should be in similar pristine condition. If the subject aircraft is an operational aircraft, then a degree of weathering and signs of regular use should be evident if appropriate to the full size machine.

The documentation should show these aspects and the judges should mark accordingly.

6A.1.10.5. Craftsmanship

This section deals with the skill, ingenuity, general finesse and complexity involved in the construction of the model.

Craftsmanship Quality:

Model should be checked for quality of workmanship, with particular reference to clean, sharp edges, especially trailing edges of wings and tail surfaces; correct gaps at hinge line of control surfaces; close fit where non scale joints are used for dismantling the models or access hatches used for model operation.

Non-scale items such as switches, needle valves, silencers, control horns etc. should not be visible.

Craftsmanship Complexity:

Judges should consider the overall complexity of the design, awarding higher marks for more intricate shapes and structure. Special items of ingenuity may also be rewarded under this section.

In assessing both the above aspects the judges should consult the competitors declaration and check for any components that have not been made by the competitor (see 6.1.9.4e) and adjust the marks awarded accordingly.

The points that are awarded must again reflect the standard of documentation presented.

6A.1.10.6. Scale Detail

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

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

The marks awarded should reflect both the accuracy and the quantity of the scale detail present.

Scale Detail Accuracy:

The documentation presented should clearly show the features that are being assessed. Higher marks should be awarded to those competitors who accurately reproduce these items.

Scale Detail Complexity:

A well documented highly detailed model should score proportionately higher than a model with little detail, even though the full-size prototype of the latter is itself sparsely detailed. Judges should ensure when marking this aspect that they are relating to the complexity of detail actually on the model, and not award marks for what is shown in the documentation.

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

6C.1 General

All flying manoeuvres must be judged bearing in mind the performance of the full size prototype. The aim of the scale flight schedule is to recreate the flight characteristics and realism of the full-size aircraft. Judges must not therefore confuse scale contests with aerobatic contests.

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

1. The shape, size and technical requirements of the intended manoeuvre.
2. The positioning of the manoeuvre relative to the judges position or other datum.
3. The scale realism achieved relative to the subject aircraft.

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

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

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

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

Apart from the manoeuvres mentioned above, all manoeuvres must be performed parallel with the judges' line such that if any part of the manoeuvre is performed behind the judges' line it will score ZERO.

In the interests of safety, any manoeuvres overflying a designated area behind the judges line, laid out for the protection of spectators, officials and other competitors or helpers will score ZERO.

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

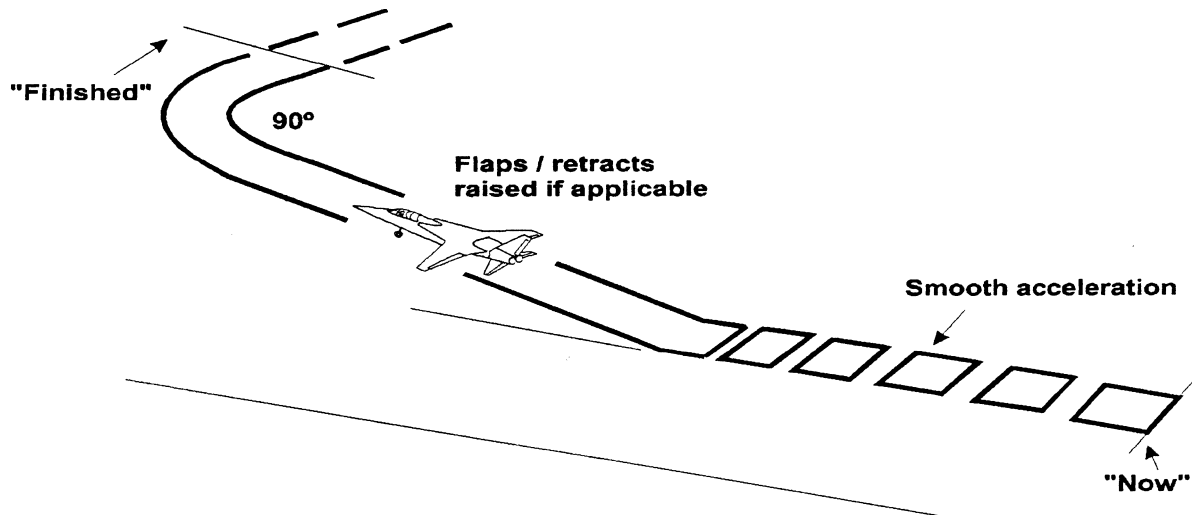
The item 6.3.6.11. "Realism in Flight", should be discussed by all judges after completion of the flight and they should attempt to arrive at an agreed score for this item. At the end of each flight, the chief judge must check all score sheets for completeness.

After each flight the Chief Judge will record any non-standard event that gave rise to loss of points e.g. missed figures, figure flown out of order, out of time, flying behind judges line, missing dummy pilot or crash landing.

6C.36.1. Take-Off:

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

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

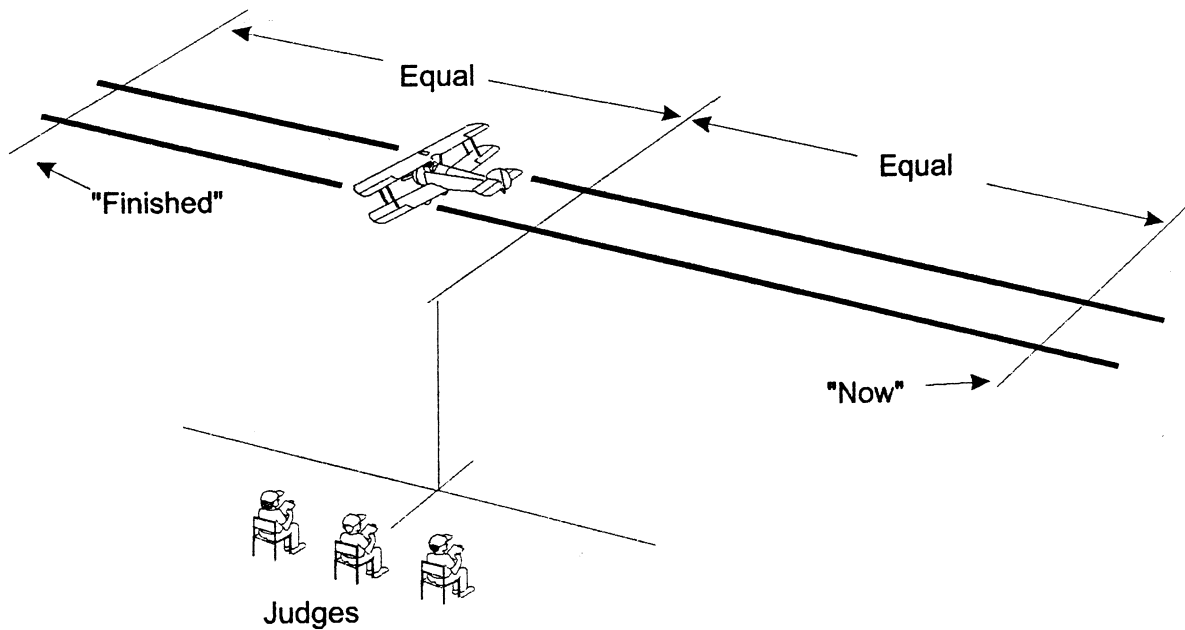


Errors:

1. Model touched after calling "Now" (zero marks).
2. Swings on Take-off (a slight swing with other than a tricycle undercarriage is acceptable as the aircraft tail is raised).
3. Take-off run too long or too short.
4. Unrealistic speed / too rapid acceleration.
5. Inappropriate attitude at lift-off for undercarriage configuration.
6. Not a smooth lift-off.
7. Climb rate wrong (too steep or too shallow).
8. Nose attitude wrong during climb (nose too high or too low).
9. Flaps not used if applicable.
10. Wheels not raised if applicable.
11. Significant wing drop.
12. Climb-out track not same as take-off run.
13. Unrealistic rate of turn onto crosswind leg.
14. Crosswind track not 90° to climb out track.

6C.3.6.2. Straight Flight:

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



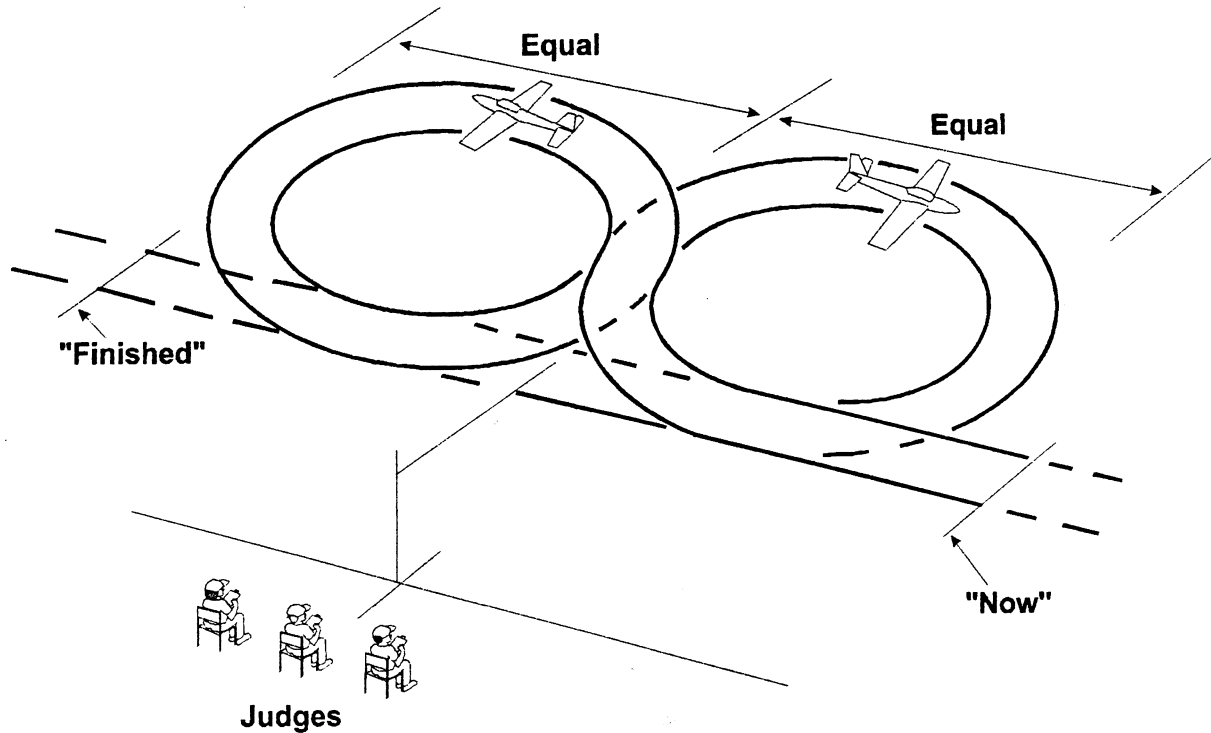
Errors:

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

6C.3.6.3. Figure Eight:

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

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

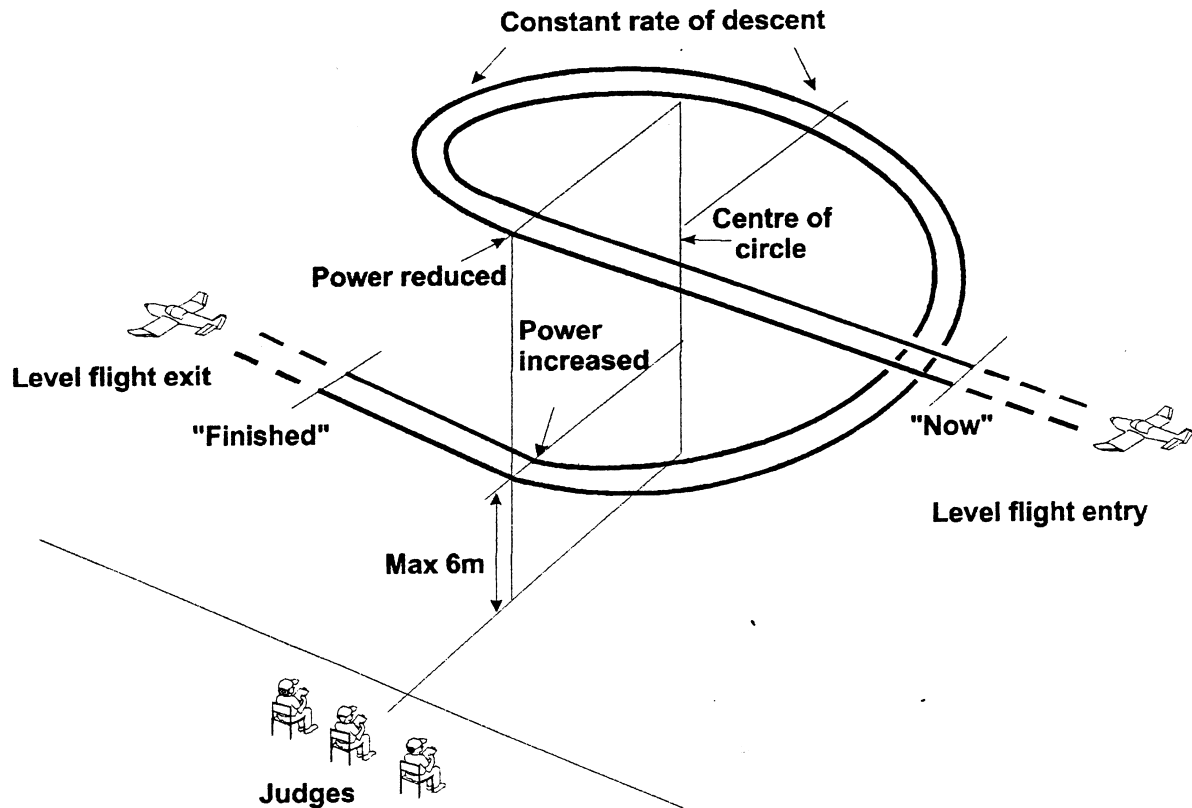


Errors:

1. Entry into first circle not at right angles to original flight path.
2. Circles unequal size.
3. Circles misshapen.
4. Constant height not maintained.
5. Intersection not centred on judges' position.
6. Entry and exit paths not on same line.
7. Entry and exit paths not parallel with judges' line.
8. Overall size of manoeuvre not realistic for prototype.
9. Model flight path not smooth and steady.
10. Too far away, too close, too high, too low.

6C.3.6.4. 360° Descending Circle at Constant Low Throttle Setting:

Commencing from straight and level flight, the model performs a gentle 360° descending circle over the landing area, in a direction away from the judges, at a constant low throttle setting. The manoeuvre terminates at a maximum height of 6 metres, resuming straight and level flight on the same path.



Errors:

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

6C.3.7. Optional Demonstrations:

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

- Aerobatic — Aircraft designed for aerobatic flight, examples of which are military fighters and fighter-bombers, training aircraft, purpose built aerobatic aircraft and some racing aircraft.
- Non-acrobatic — Aircraft designed with limited manoeuvrability where the original prototypes of which were restricted by the manufacturer or licensing government agency. Examples are touring aircraft, passenger and cargo aircraft and heavy military transports and bombers.

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

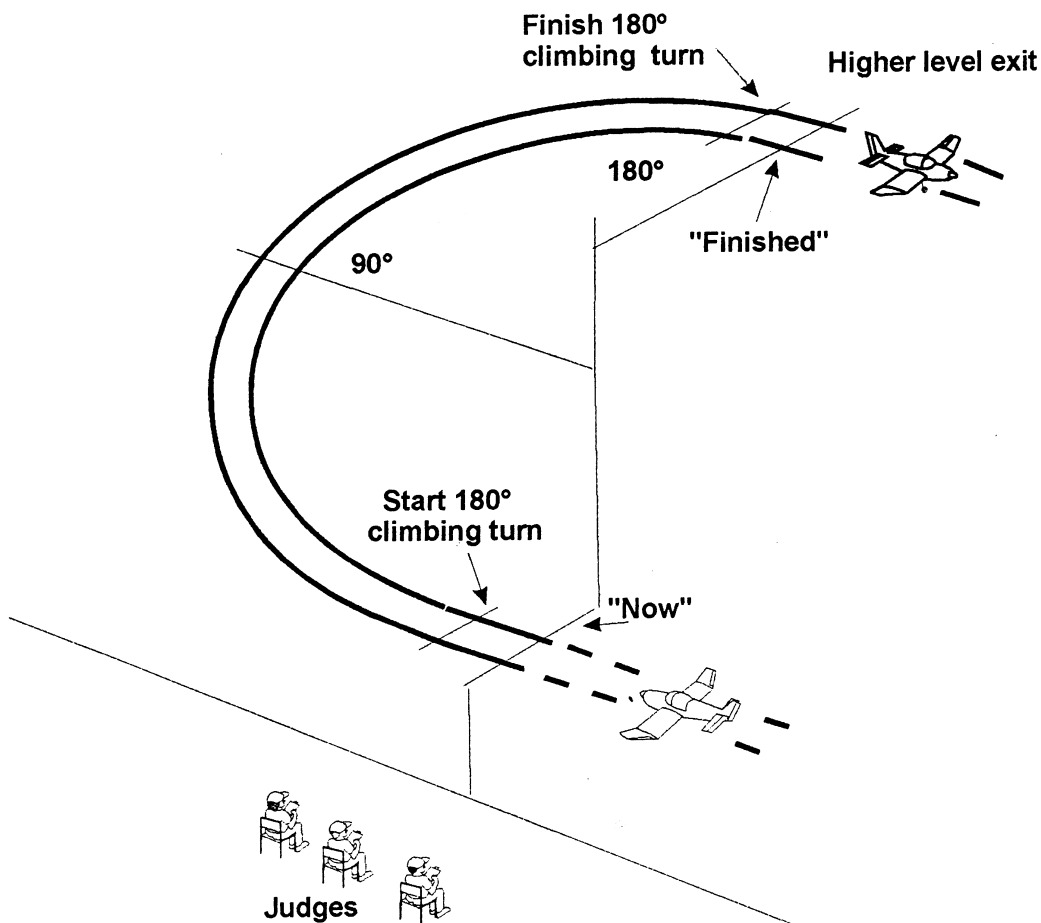
The competitor must be prepared, if required by the judges, to give evidence that the options selected are within the normal capabilities of the aircraft subject type modelled.

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

A	-	Chandelle
N	-	Overshoot
R	-	Flight in triangular circuit
S	-	Flight in rectangular circuit
T	-	Flight in a straight line at constant height
W	-	Wingover

A. Chandelle:

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

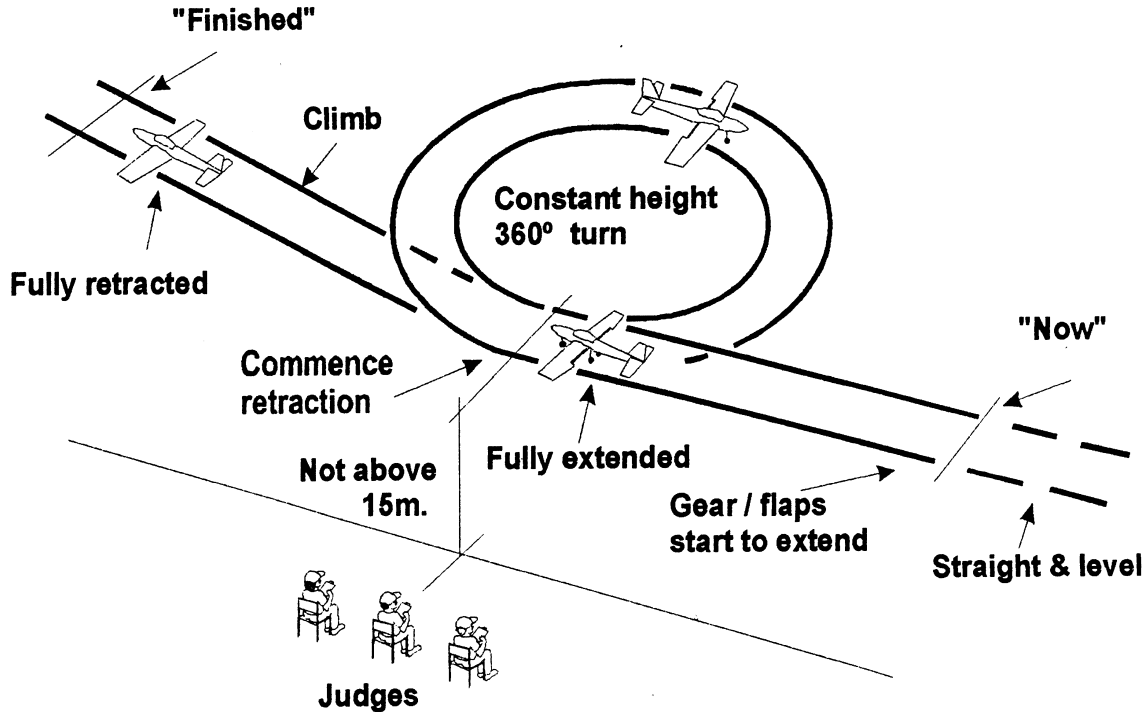


Errors:

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

B. Extend and Retract Landing Gear:**C. Extend and Refract Flaps:** (Diagram and errors applicable to both manoeuvres unless stated)

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

**Errors:**

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

D. Dropping of Bombs or Fuel Tanks:

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

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

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

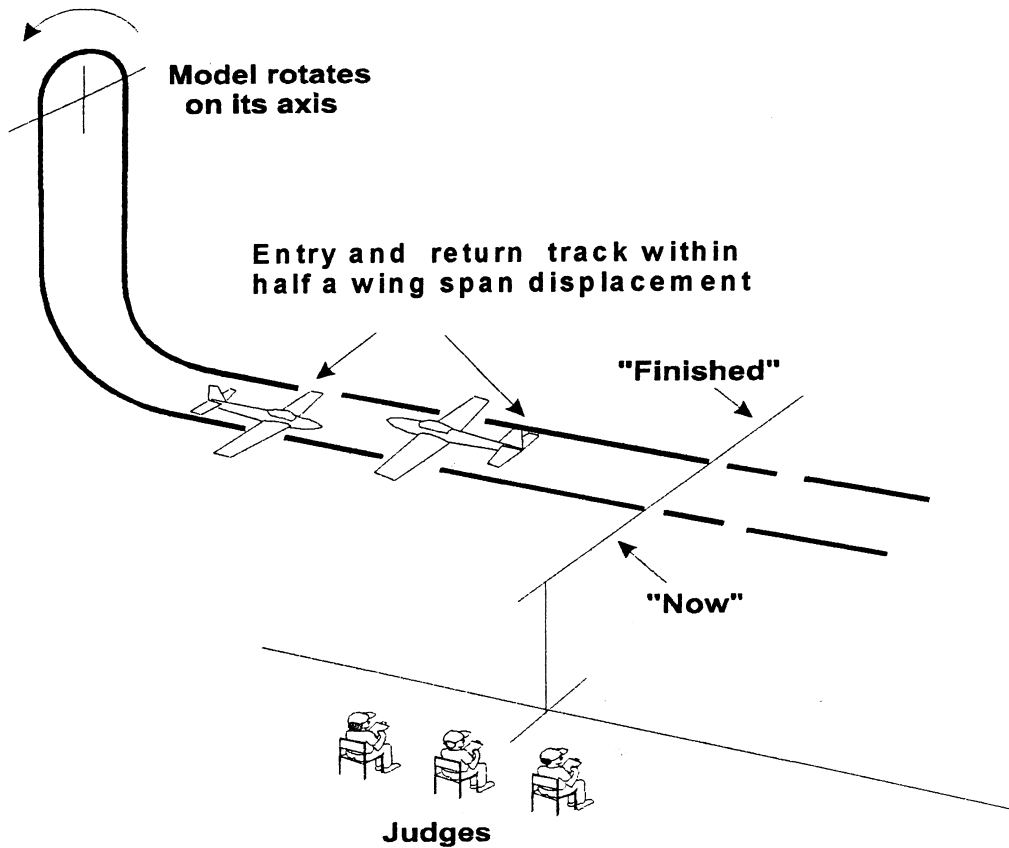
Any special features of the manoeuvre should be declared to the judges beforehand.

Errors:

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

E. Stall Turn:

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

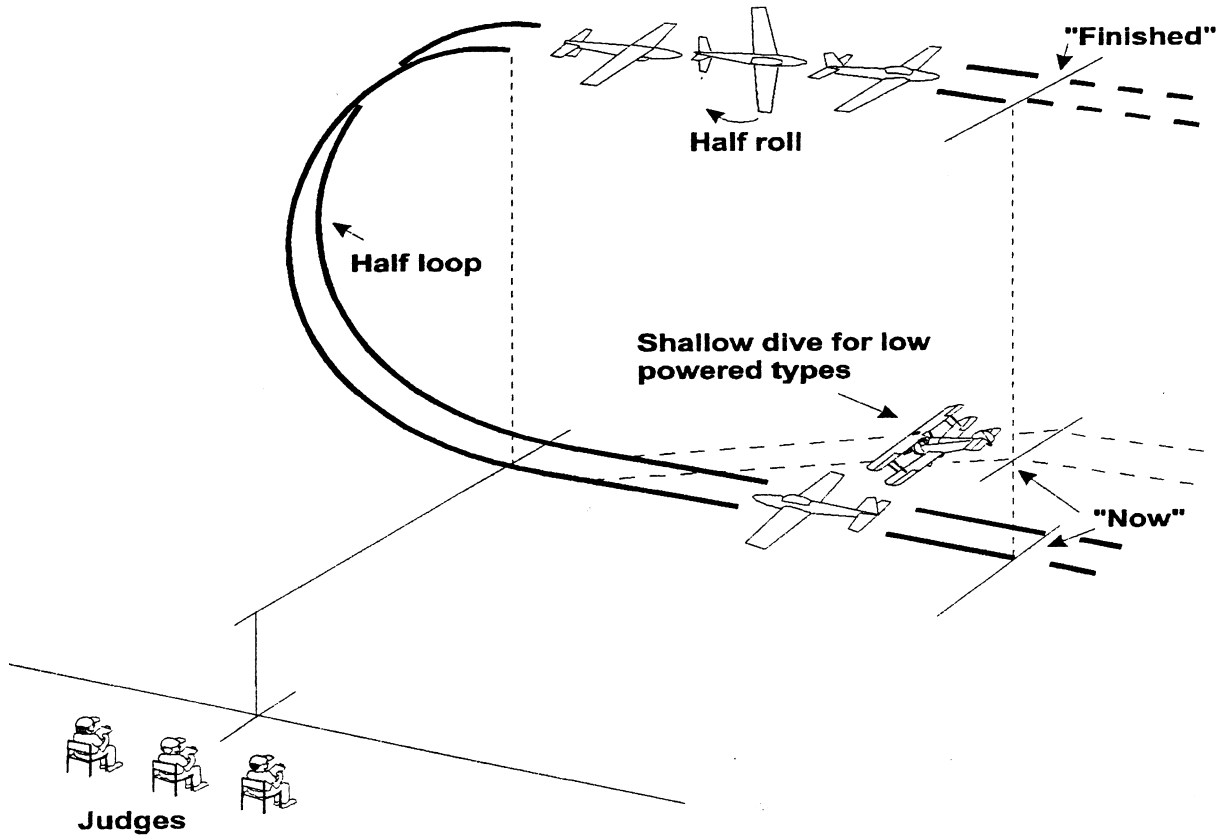


Errors:

1. Start & 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.
6. Model does not turn within half its wingspan and around its axis.
7. Competitor does not specify or achieve nominated left / right turn.
8. Entry and exit paths are not at same height.
9. Model 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.

F. Immelmann Turn:

From a 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.



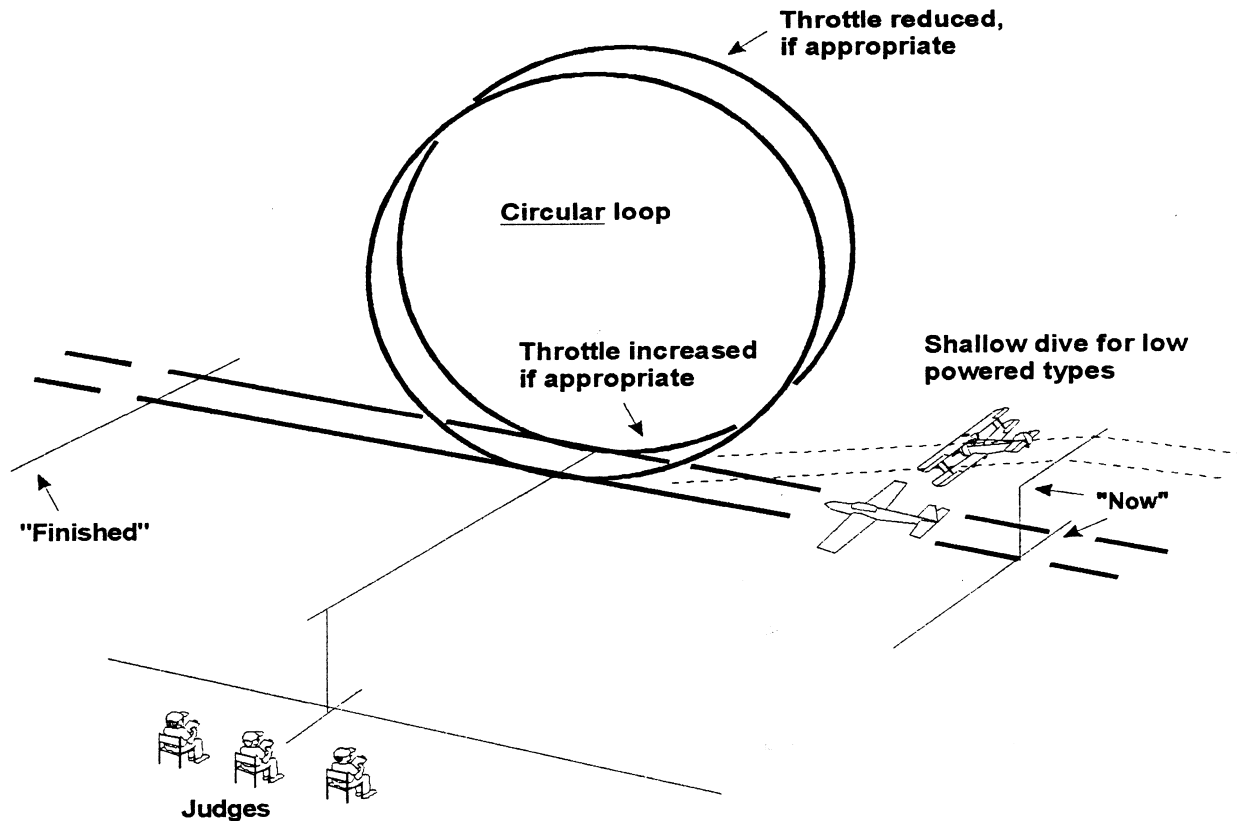
Errors:

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

G. Loop:

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

Note: Whilst the loop is intended to be a circular manoeuvre, the ability of a low powered aircraft to achieve a perfect circle will be significantly less than that of a jet or high powered 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. This also applies to other options involving looping manoeuvres.

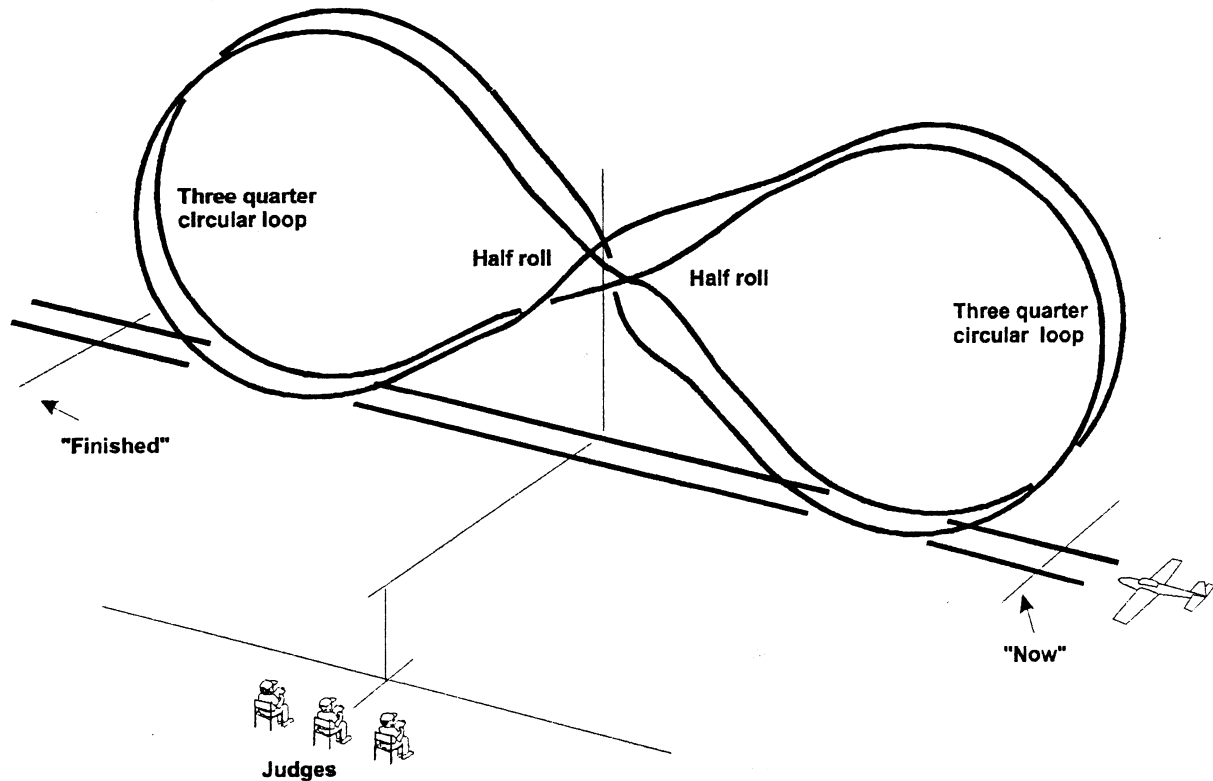


Errors:

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

H. Cuban Eight:

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

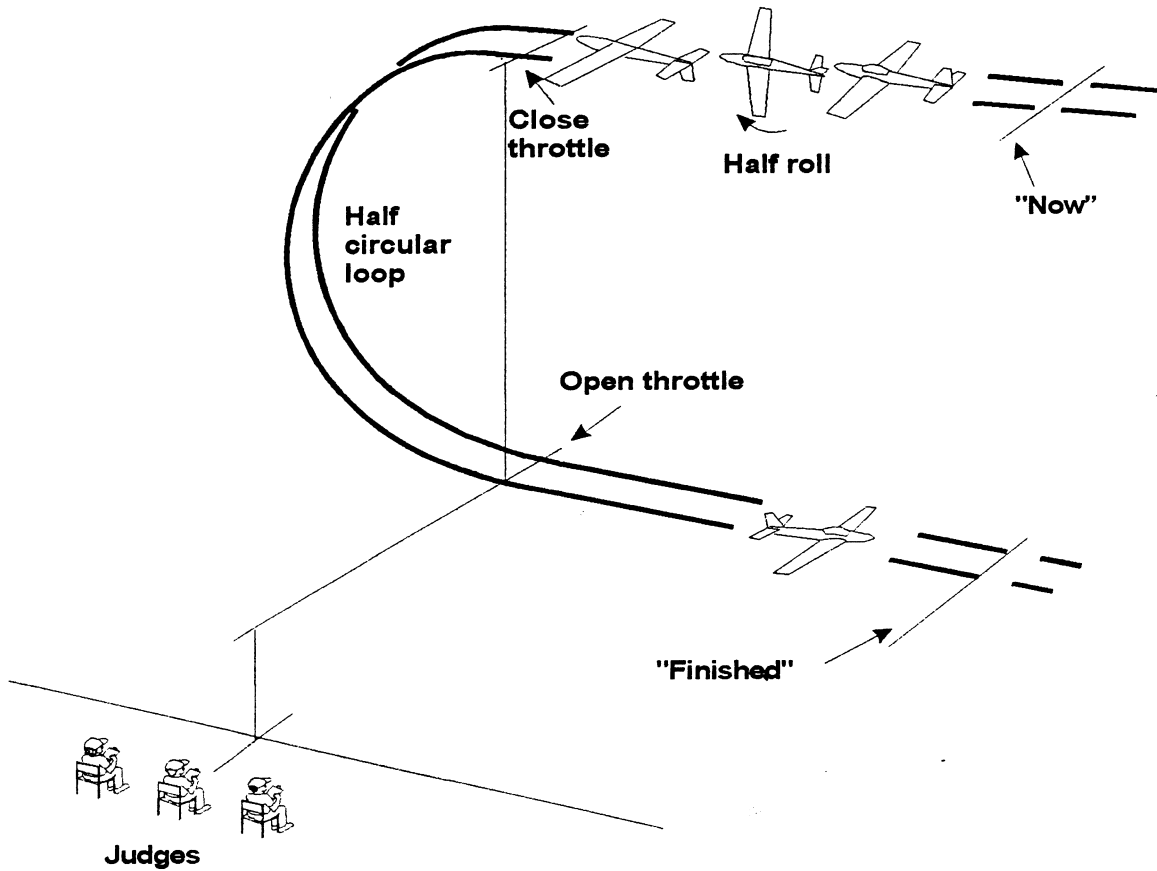


Errors:

1. Manoeuvre not performed in a constant vertical plane that is parallel with the judges' line.
2. Loops are not circular.
3. Loops are not the same size.
4. Half rolls are not centred on the judges' position.
5. 45° descent paths not achieved.
6. Model 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 prototype.
10. Too far away / too close / too high / too low.

I. Split S (Reversal):

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.

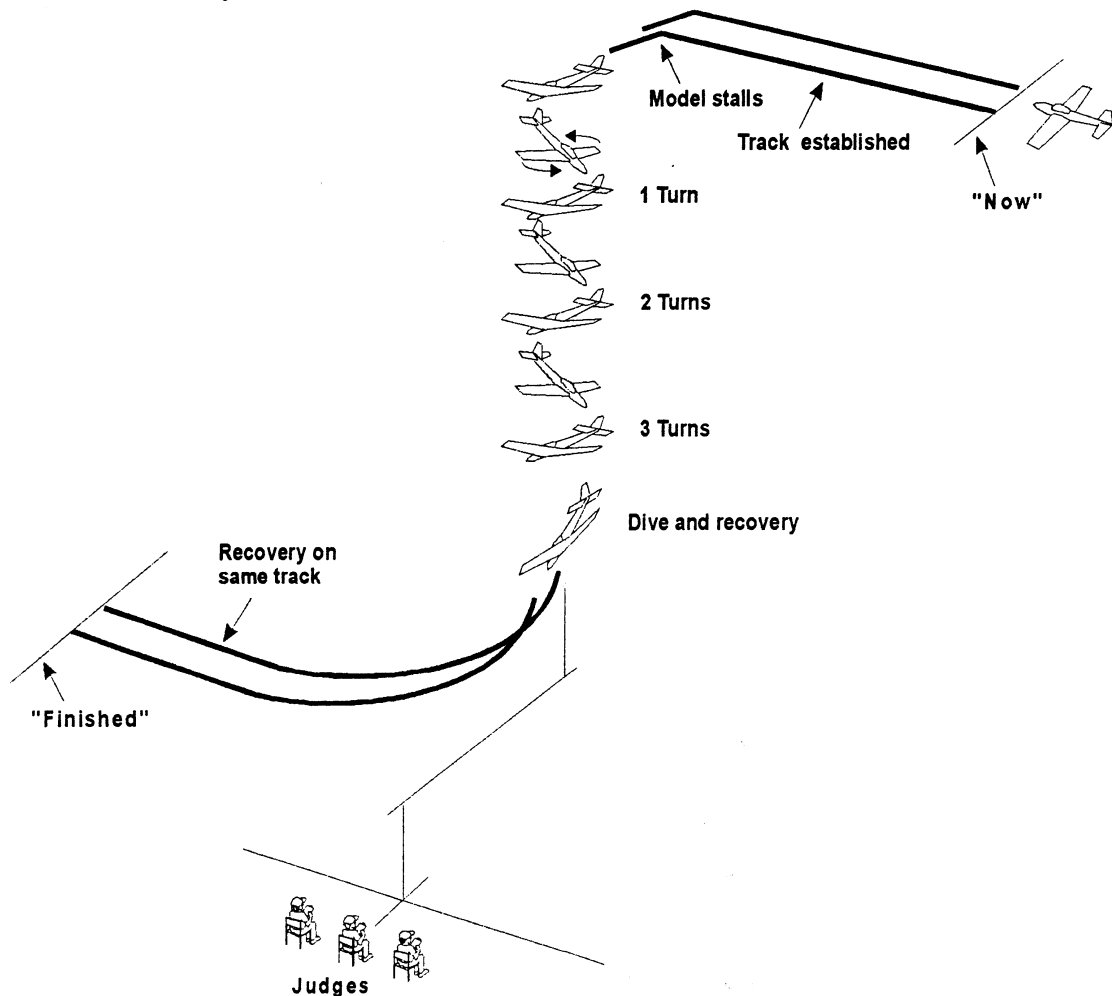


Errors:

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. Too fast or too tight a half loop.
7. Does not resume straight and level flight on opposite track to entry.
8. Half loop not centred on judges' position.
9. Manoeuvre not flown parallel with the judges' line.
10. Too far away / too close / too high / too low.

J. Spin Three Turns:

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

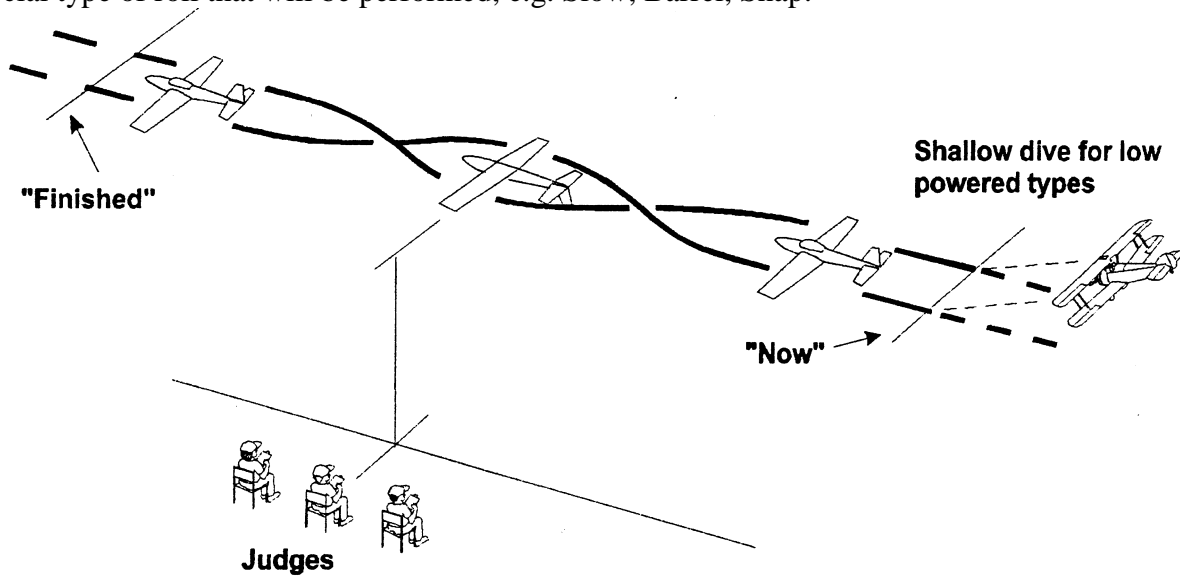


Errors:

1. Engine not throttled back at point of stall.
2. Entry into spin not clean and positive.
3. Not a true spin but merely a spiral dive (which should score zero).
Note: In a true spin descent path will be close to C of G of model. A spiral dive is a tight vertical barrel roll.
4. Not three complete turns.
5. Start of spin not centred on judges' position.
6. Model does not resume straight and level flight on same track as entry.
7. Entry and exit paths not parallel with judges' line.
8. Entry and exit not in level flight
9. Too far away / too close / too high / too low.

K. Roll:

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

**Errors:**

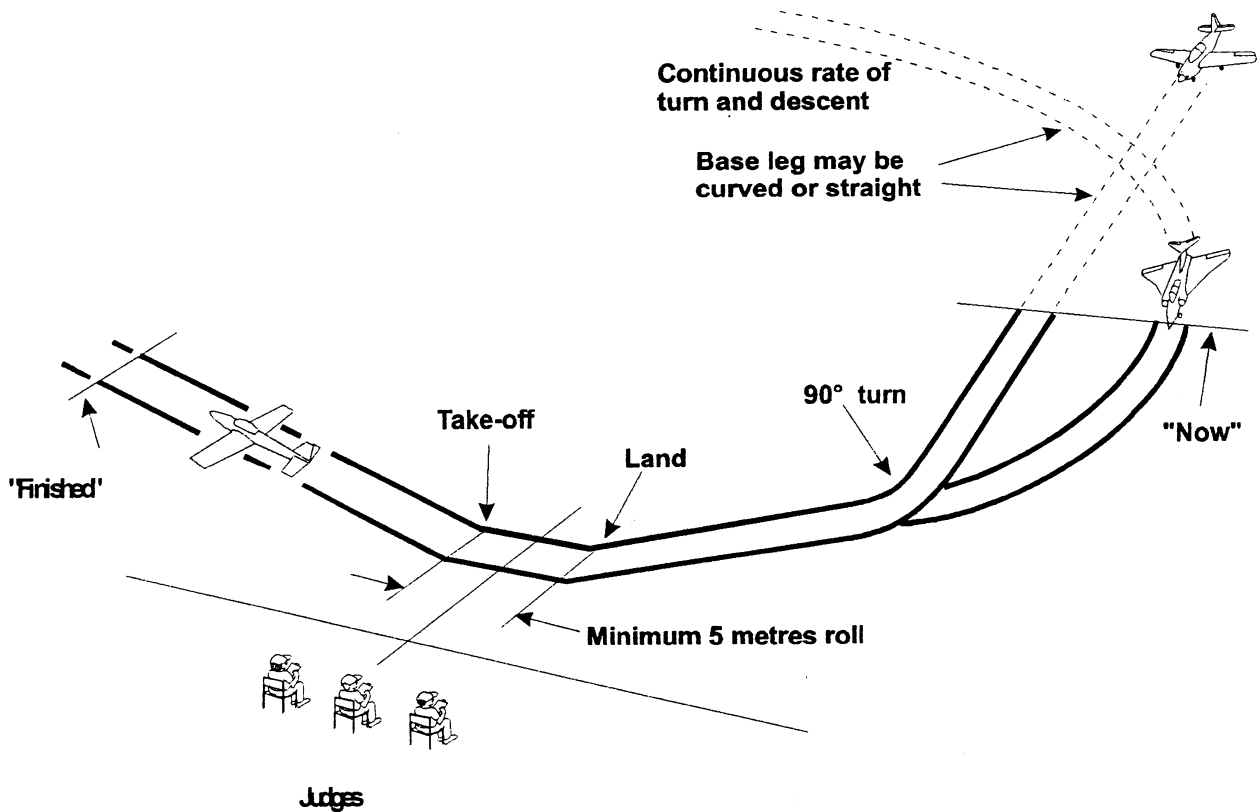
1. Rate of roll is not constant.
2. Style of roll not typical to prototype.
3. Roll not centred on judges' position.
4. Entry and exit at different heights.
5. Entry and exit at different speeds.
6. Entry and exit tracks and line of roll not parallel with judges' line.
7. Does not resume straight and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

L. Parachute:

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

M. Touch and Go:

The model commences 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. Flaps will be used if applicable.

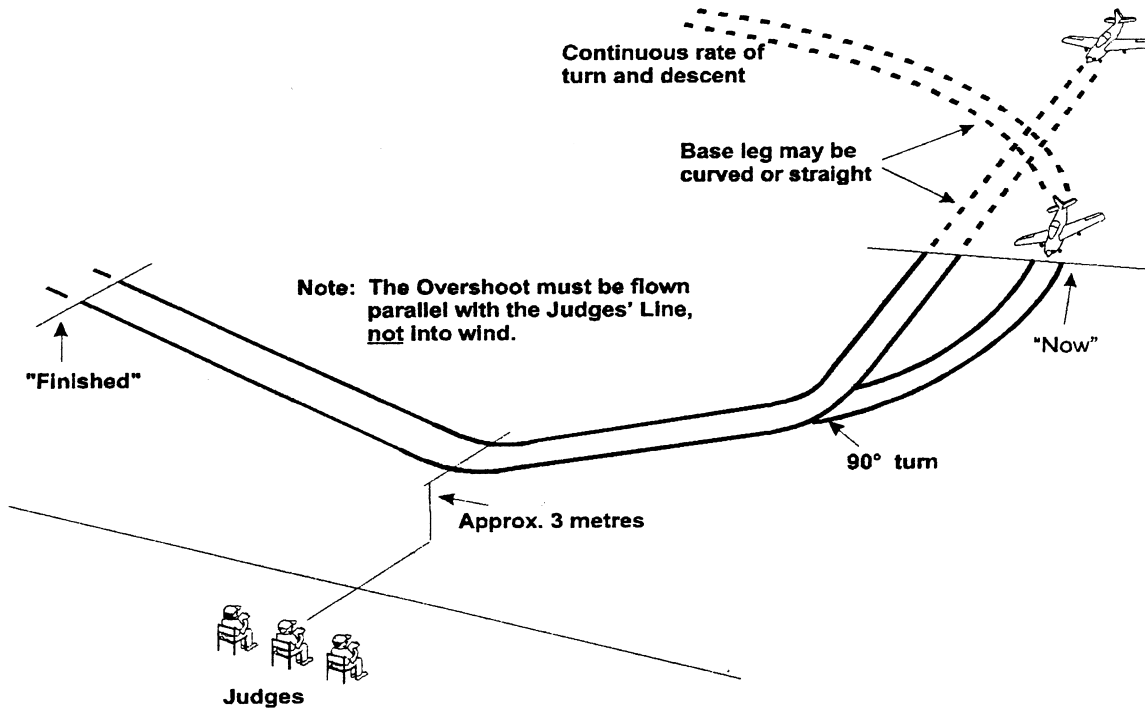


Errors:

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
Note: if prototype has two main wheels then both wheels must roll on ground for minimum 5 metres.
6. Model bounces on landing.
7. Inappropriate use of flaps.
8. Climb out not smooth or realistic.
9. Approach and climb out tracks not the same.
10. Does not make best use of landing space available for wind direction.

N. Overshoot:

The model commences 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 higher than normal landing approach on low throttle, using flaps if applicable. On reaching the centre of the landing area at a height of approximately 3 metres, power is applied to check the descent. After normal flying speed and attitude are attained the model climbs straight ahead. The aim of the manoeuvre is to simulate an aborted landing due to a higher than normal landing approach. This option may only be nominated for non-aerobatic aircraft.

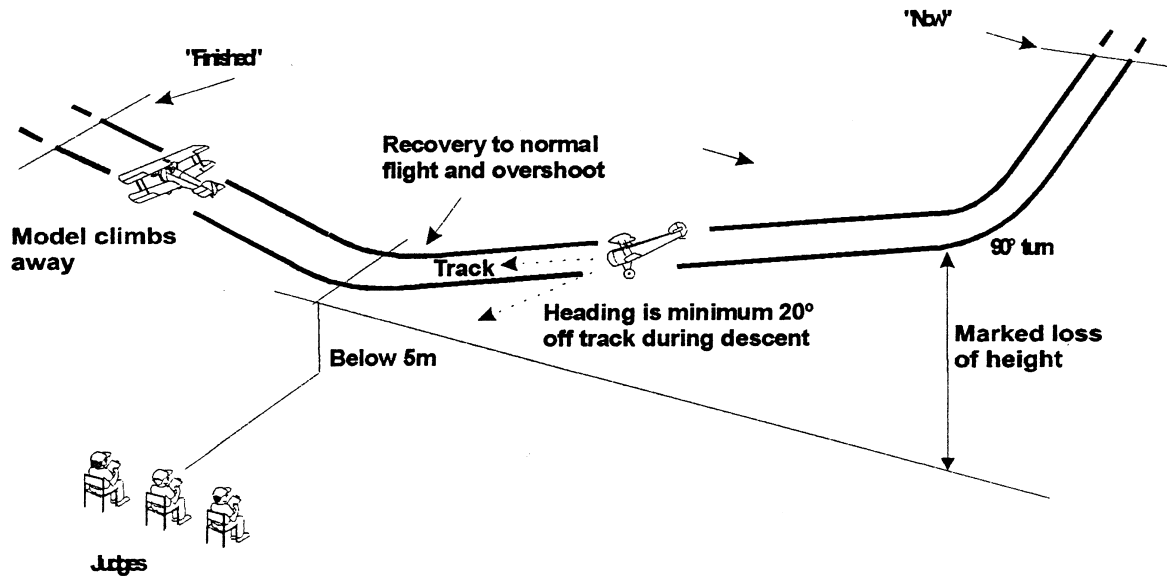


Errors:

1. Manoeuvre does not commence on base leg.
2. Turn onto final approach not smooth and continuous or not 90°.
3. Model 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.
7. Lowest point of manoeuvre not achieved in front of judges.
8. Not smooth transition of speed & attitude from approach, through descent check to climb-out.
9. Inappropriate use of flap and/or gear.
10. Model could have landed from approach.
11. Model does not climb away smoothly.
12. Approach and climb out tracks not the same.
13. Too close or too far away.

O Side Slip:

The model commences the manoeuvre in level flight by reducing power on base leg, and then turns onto a higher than normal final approach that is parallel with the judges' line. As the model enters the turn it starts a Sideslip by the application of opposite rudder to the direction of turn, achieving a yaw of at least 20° off track. A marked loss of height must be apparent whilst maintaining final approach speed. The aim of the Sideslip, if continued, would be to effect a landing in front of the judges. Before reaching the judges' position however, the Sideslip is corrected, normal flight is resumed and the model carries out an overshoot from below 5 metres before climbing away. The purpose of this manoeuvre is to demonstrate a marked loss of height on final approach without an excessive build up of speed or the use of flap. This manoeuvre may be nominated by all types of models.



Errors:

1. Model does not smoothly enter Sideslip upon turning 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 or not flown parallel with judges' line.
7. The Sideslip is not corrected before passing the judges.
8. Overshoot is not below 5 metres.
9. Not a smooth transition during return to normal flight and climbout.
10. Too far away / too close / too high / too low.

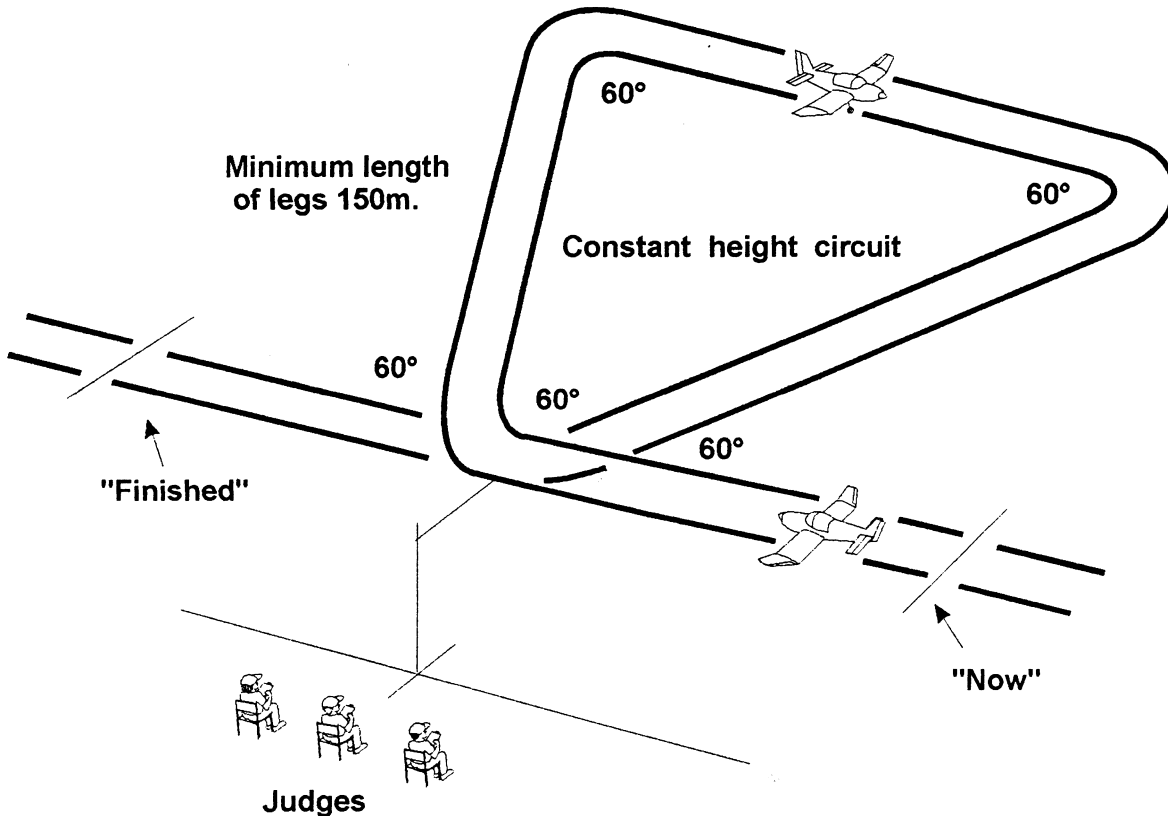
P and Q. Flight Function(s) Performed by Prototype Aircraft:

A competitor may demonstrate up to two different flight functions of his own choice but must indicate to the flight judges the nature of the demonstration(s) before going to the flight line. The competitor must be prepared to supply evidence that the aircraft performed this function subject type modelled, e.g. crop spraying, outside loop etc.

Procedural flying manoeuvres such as procedure turn, climbing turn, descending turn, etc. are not acceptable. Mechanical options, which could be equally performed on the ground (e.g. switching on and off lights), are also not allowed.

R. Flight in Triangular Circuit:

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

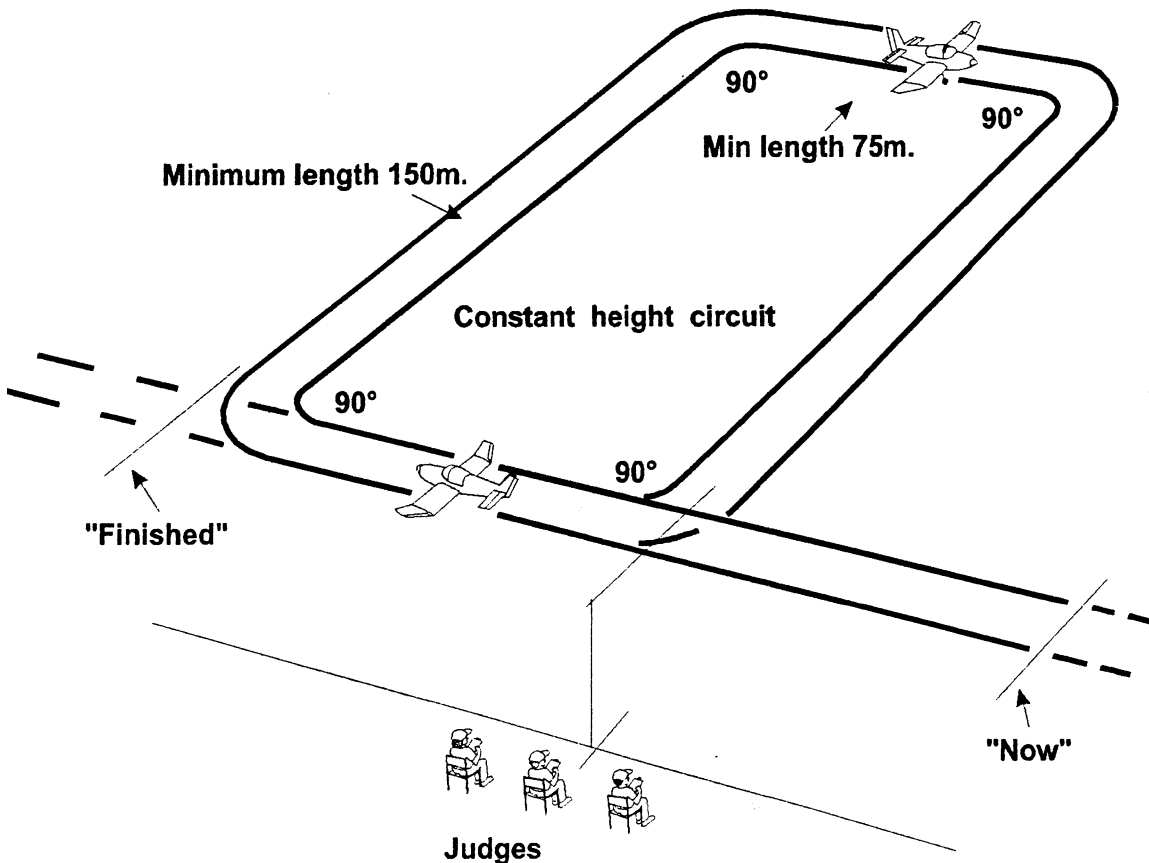


Errors:

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.

S. Flight in Rectangular Circuit:

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

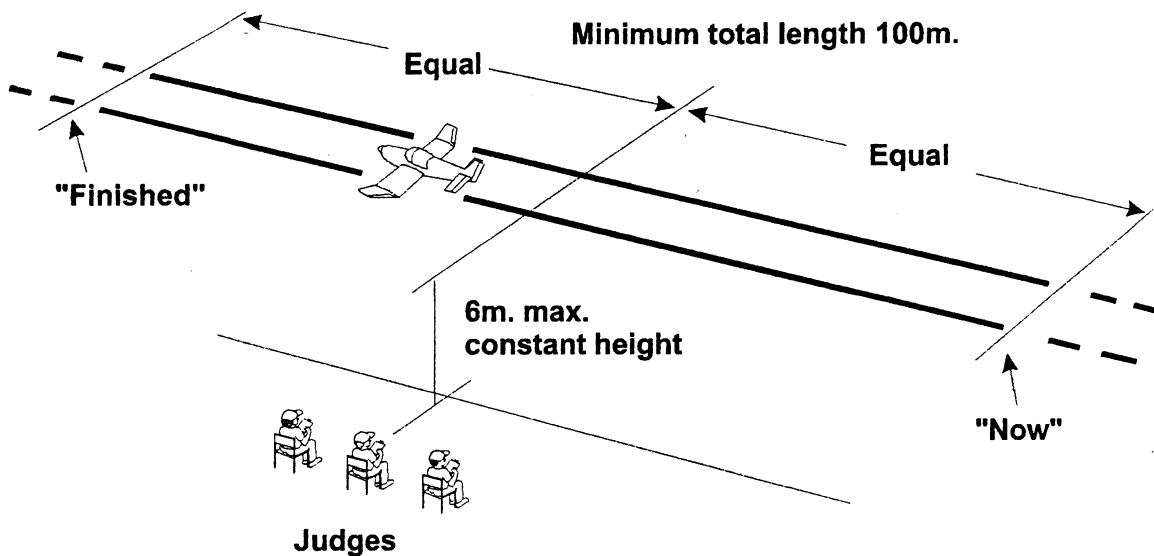


Errors:

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

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

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

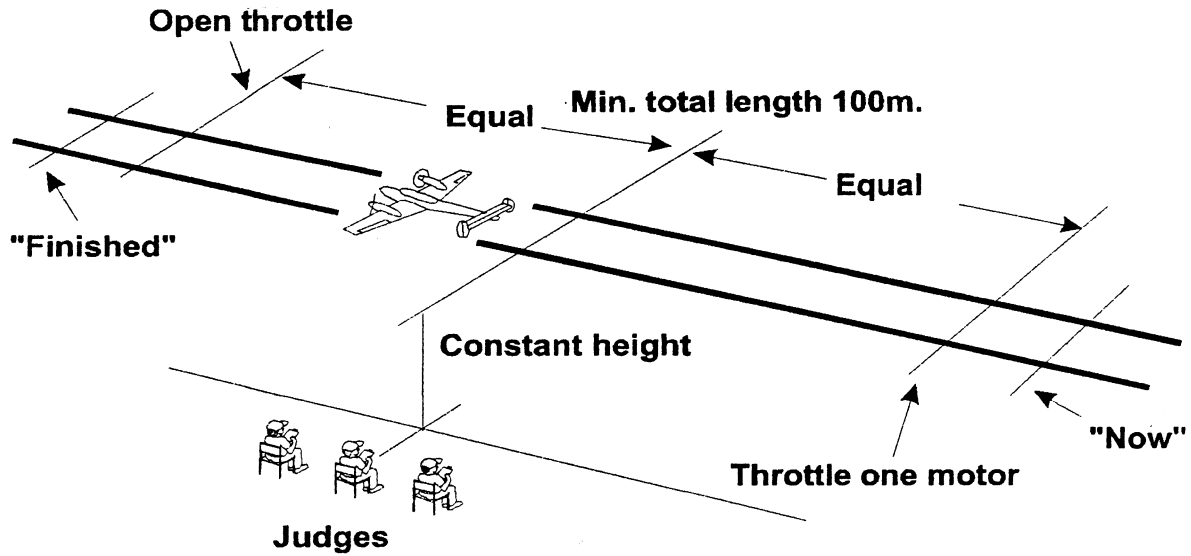


Errors:

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

U. Flight in a Straight Line With One Motor Throttled:

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



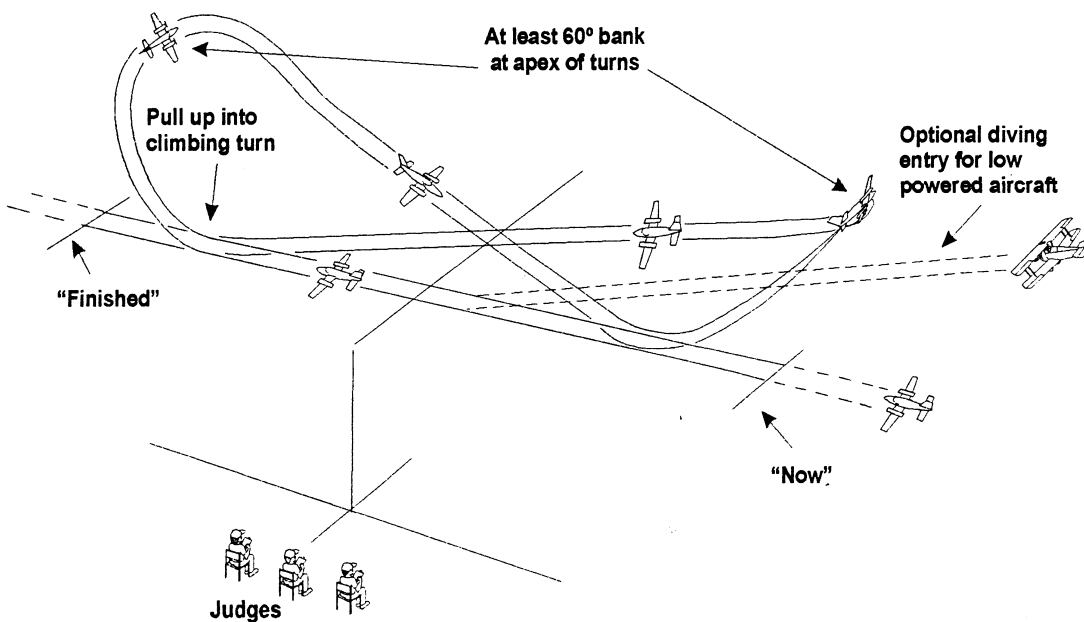
Errors:

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.

V. Lazy Eight:

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

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



Errors:

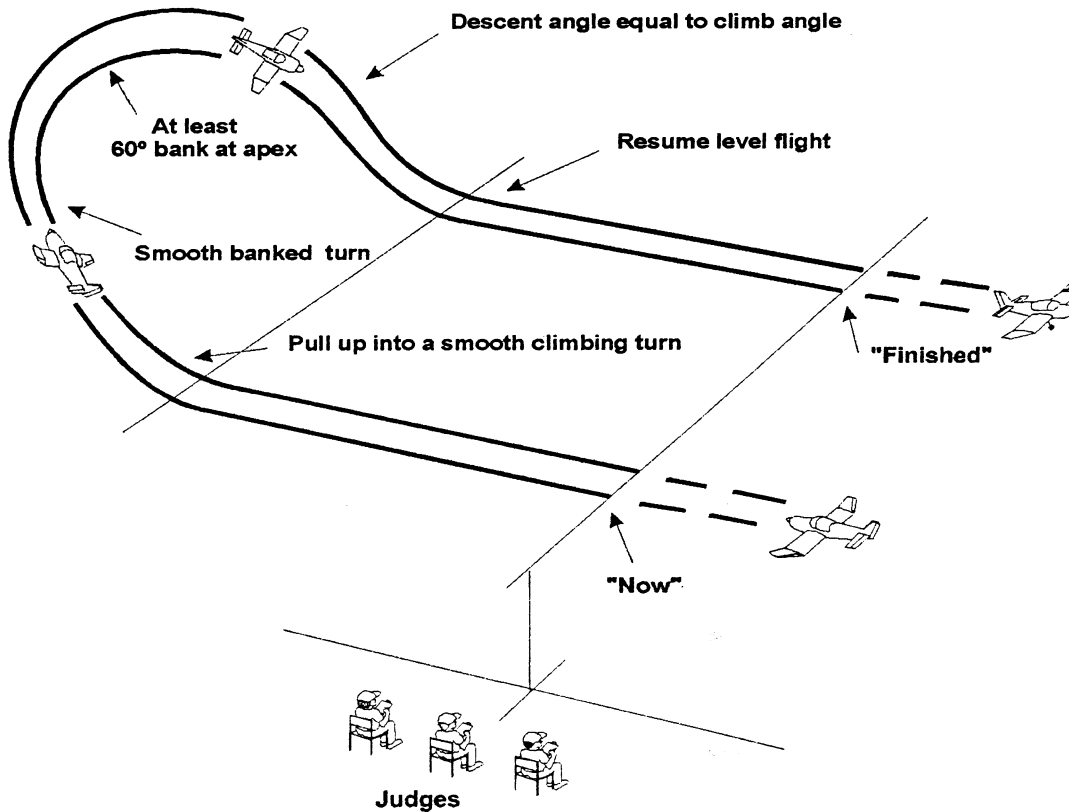
1. Entry and exit paths not parallel with judges' line.
2. Insufficient climb achieved.
3. Insufficient bank achieved.
4. Climb and descent angles not equal throughout manoeuvre.
5. Manoeuvre not symmetrical about judges' position.
6. Arcs misshapen.
7. Start and finish positions not as indicated.
8.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

W. Wingover:

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

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

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

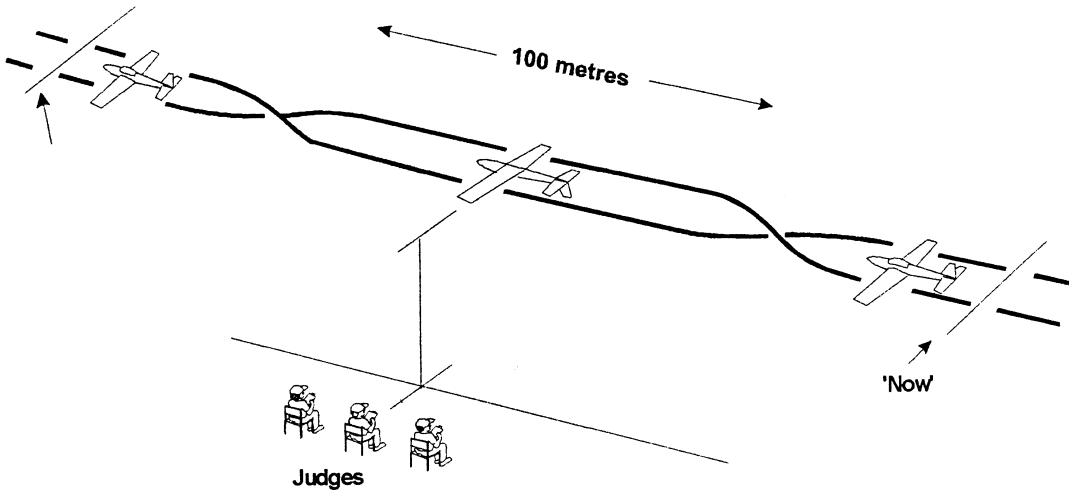


Errors:

1. Start and finish positions not as indicated.
2. Insufficient climb achieved.
3. Insufficient bank achieved
4. Climb and descent angles not equal throughout manoeuvre.
5. Model 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.

X. Inverted Flight:

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

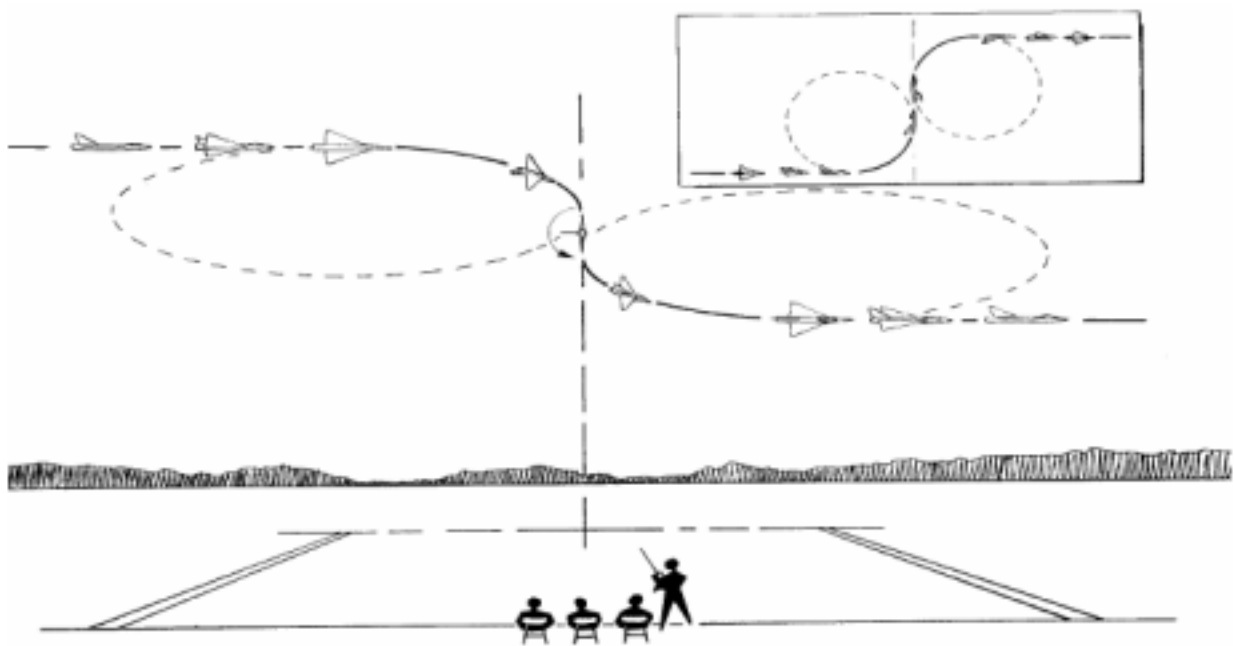


Errors:

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

Y. Derry Turn

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.



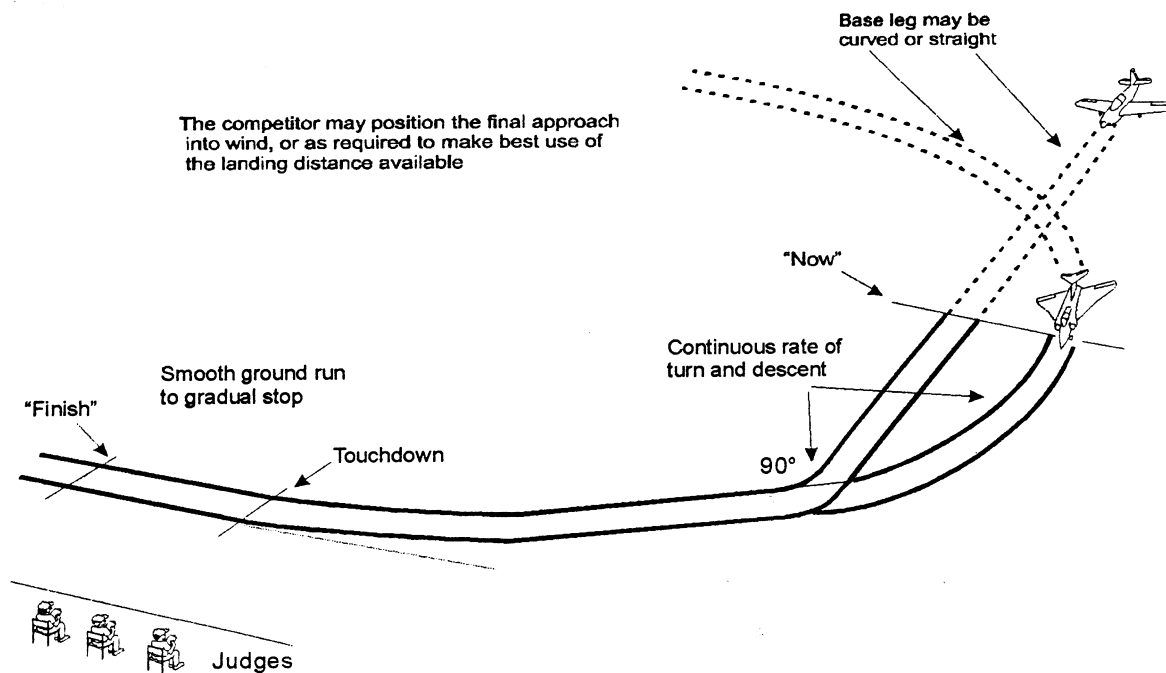
Errors:

- 1) Entry not in parallel with the judges 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.

6C.3.6.10 Approach and Landing:

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

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



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. Model bounces.
7. Drops a wing during landing.
8. Touches wing tip on ground.
9. Does not come to a gradual and smooth stop after landing.
10. Does not adopt landing attitude appropriate to subject type.
11. Model runs erratically or turns after landing.
12. Model noses over (note 30% penalty if only nose-down - zero if it over-turns).

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

If the nose down situation is solely the result of the model 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.

6C.3.6.11. Realism in Flight:

This should be discussed by all judges after completion of the flight and they should attempt to arrive at an agreed score for each item. Realism in Flight covers the entire flight performance including the way in which the model flies between manoeuvres.

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

- Engine sound (realistic tone & tuning).....K = 3

“Tone” relates to the character of the sound by comparison with the full size at all throttle settings. “Tuning” is the smoothness of operation of the engine at all throttle settings. The marks for engine noise should therefore be split equally between these two aspects.

- Speed of the modelK=7

This should be a subjective assessment of the scale speed of the model, based on the speed of the full size aircraft (as indicated on the score sheet and documentation) judged as if it were performing a public flying display. Model aircraft invariably fly faster than scale speed and marks should be deducted accordingly. For example, a model that appears to be flying at twice scale speed should score no more than half marks, a model flying at three times scale speed, or faster, should score zero.

- Smoothness of flightK=6

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

- Choice of options K=12

This final item should be discussed by all judges after completion of the flight in consultation with any claim for non-aerobatic eligibility made on the competitors declaration form and the guidelines detailed below.

The optional manoeuvres chosen should demonstrate the best possible flight profile of the original prototype as if it were performing at a full size air display.

Some original prototypes would have little or no aerobatic capability. These are aircraft designed with limited manoeuvrability where the original prototypes were restricted by the manufacturer or government licensing authority. Examples are touring aircraft, passenger and cargo aircraft and heavy military transports and bombers. The optional manoeuvres listed below are included under 6.3.7. to cater for such subjects. These aircraft should still be considered for high marks in this section if the performance of the original prototype genuinely limits them to such manoeuvres. Conversely, if aircraft with greater manoeuvrability and performance choose these options when the original prototype would be capable of much more, then low marks should be awarded in this section.

A.....Chandelle
 N.....Overshoot
 R.....Flight in triangular circuit
 S.....Flight in rectangular circuit
 T.....Flight in a straight line at constant height
 W.....Wingover

Judges should award a full 10 marks for those competitors who choose all 5 optional manoeuvres that are appropriate to the prototype, whether they are aerobatic or not. Should any of the optional manoeuvres be considered inappropriate they should deduct two marks for each and every manoeuvre that is considered to be so.

Notes:

1. Any model that flies a manoeuvre with two or more wheels down, whereas the prototype actually featured retractable landing gear the score shall be reduced by two points on that manoeuvre. If one wheel is down the score shall be reduced by one point. If one or more wheels are only sagging during the manoeuvre, the score shall be reduced by one half or one full point depending on the degree of sagging.
2. If the pilot of the prototype is visible from the front or from the side during flight, a dummy pilot of scale size and shape shall be equally visible during flight in the model. If such a pilot is not fitted, the total flight score shall be reduced by 10%.

---ooo000ooo---

FLIGHT SCORE SHEET

F4C / SOS/ Sport Scale 2006-

Competitor number:

Round:	
--------	--

Judge Number:

Competitor Name:	
------------------	--

Judge Signature:

Subject Aircraft:		
Aircraft type: (\surd)	Aerobic	Non-aerobic
Cruising / Maximum Speed		
Scale of Model:		

No.	MANOEUVRES	POINTS	K-factor	SCORE
1	Take-off		9	
2	Straight Flight		3	
3	Overhead Figure Eight		9	
4	Descending 360° Circle		9	
5	Option 1:		6	
6	Option 2:		6	
7	Option 3:		6	
8	Option 4:		6	
9	Option 5:		6	
10	Approach and Landing		12	
11	Realism in Flight	Engine noise (realistic Tone and tuning)	3	
		Speed of the model	7	
		Smoothness of flight	6	
		Choice of options	12	