

Scale  
C



Est. 1922

**BRITISH MODEL FLYING ASSOCIATION  
THE R/C ACHIEVEMENT SCHEME**

**TEST STANDARDS for CHIEF and CLUB  
EXAMINERS  
GUIDANCE for TEST CANDIDATES**

**THE 'C' CERTIFICATE  
(SCALE)**

**2023 ISSUE  
(Mar 2023)**

## Achievement Scheme Information & Communication

The BMFA Achievement Scheme provides every RC flyer the opportunity to set themselves an achievement target to aim for, and then have their progress assessed and confirmed by an examiner.

It is important that All those involved in training, examining and preparing for the tests, are well informed and up to date with all that the scheme has to offer. To this end, and to aid communication, important information regarding scheme developments, as well as details of all of the tests and their associated guidance documents, are made available to everyone via a number of sources, which include: -

- The Achievement Scheme website - <http://achievements.bmfa.org/>
- The BMFA website - <http://bmfa.org>
- The BMFA News
- The Achievement Scheme closed Facebook group

It's important to appreciate that **ALL** of the scheme documents are reviewed and updated on an annual basis. Whichever document you are using, you will know if you have the right one, simply by looking at the date on the front cover. If it's not dated with the current year, it's the wrong one!

Most BMFA Clubs have Club Instructors/Examiners who will be familiar with the scheme and what is expected of anyone thinking of participating. If your club does not have a club examiner then each BMFA Area has an Achievement Scheme Coordinator (contact details can usually be found on the BMFA Area website) who can usually help in coordinating tests, or answering queries about tests etc. All BMFA Areas have Area Chief Examiners who would normally undertake Club Examiner tests, but are also available to help out with club tests, if requested. Importantly, they are also very knowledgeable about the scheme and it's requirements. Area coordinators can often find an ACE that is close to your club, if you are having difficulty arranging for a test.

All BMFA Achievement Scheme & training documents are available to download from the BMFA Achievement Scheme website <http://achievements.bmfa.org/> . You can also register your email address with the Achievement Scheme website and receive email notification of any news flashes, notification of scheme events and updates to documentation etc. as soon as they are published.

The Achievement Scheme also has a closed Facebook group (you just have to apply to be included) where comment and queries can be posted and examiners/instructors and members of the Achievement Scheme Review Committee can answer questions, or offer clarification.

If you have any query about the scheme or constructive comment on the scheme you can contact the Power/Silent Flight Scheme Controller ([RCPAS@bmfa.org](mailto:RCPAS@bmfa.org)), or the Achievement Scheme Review Committee, via the BMFA Office.

### General

The Achievement Scheme is run by the BMFA as a National Scheme and it is open to all model flyers. Where a non-member wishes to participate in the achievement scheme the examiner who will be conducting the test must inform the BMFA office via email or telephone no later than the day prior to the test being carried out of the non-member's full name, address

and the date that the test will be conducted. This enables the BMFA to extend insurance at suitable levels for the day of the test. If this procedure is not followed the test will be invalid.

**PLEASE NOTE: When submitting a request for the Scale C certificate test, you must submit the details of the aircraft you wish to fly, as well as the optional manoeuvres you would like to fly. Your choice of model and manoeuvres will be reviewed to assess if they are deemed to represent what is considered 'scale flying'. The examiners may reject your choice if it is deemed 'not in the spirit' of the full-size aircraft flying characteristics.**

The examination for a 'C (Scale)' Certificate may be taken on application to your Area Achievement Scheme Co-ordinator. The examination will be carried out by either one Area Chief Examiner and one Club Examiner, both of whom must be Fixed Wing qualified, or two Chief Examiners, one of whom must be Fixed Wing qualified. The lead Chief Examiner involved in a test will be appointed by the PAS Controller.

The 'C(Sc)' Certificate has been designed to give a pilot who has already attained a 'B' Certificate an opportunity to take a further test to show more advanced skills. The 'C(Sc)' Certificate is not a substitute for the 'B' but is a personal achievement level that will be shown as an endorsement on the pilot's BMFA membership card. As the two Examiners involved, the level of competence and knowledge you should require from a candidate for the 'C(Sc)' Certificate should be significantly in advance of that required for a 'B'.

The 'C(Sc)' Certificate is not a 'show licence' but is a way to encourage the development of more advanced personal flying skills by meeting, and being tested to, a recognised national standard. A pilot wishing to take the 'C(Sc)' Certificate must already hold a 'B' certificate (FW). The candidate for the 'C' should have studied the BMFA Handbook 2017 (sections 8 through to 24 inclusive) and have a considerable depth of knowledge of model flying in general.

Alignment or track of the manoeuvres should be discussed and agreed before commencement of the test, taking into account the existing/forecast wind direction, position of the Sun on bright days and any site restrictions and/or no fly areas, plus taking into account any issues caused by shared airspace (e.g. Hang gliders and other full size aircraft).

## Legal Responsibilities

Only pilots with a suitable model that are operating legally are eligible to take the test.

There are clearly defined legal requirements for the operation of Small Unmanned Aircraft (model aircraft), from passing a CAA (or BMFA) legal & safety knowledge test before piloting a model, to registering with the CAA as an SUA Operator (can also be done via the BMFA) if the pilot is also the owner and operator of the model aircraft, then ensuring the SUA Operator identity number is appropriately attached to the model. There are also restrictions on where a model can be flown and the heights and distances from people, property, vehicles or structures that the model can be operated. Finally, there is a legal requirement to operate the model

safely e.g. ensuring the model is 'fit for safe flight' and the pilot is in a fit state to undertake that flight, as well as the site and weather conditions being suitable.

### **The Model**

The applicant may use any type of model that is clearly recognizable as a bona fide model of a full-size prototype. The applicant is not required to have built the model himself. However, it must be a genuine scale model capable of replicating the performance of the prototype. So, for example, grossly overpowered 'semi-scale' sports models are not acceptable and nor are lightweight park-flyer types. A nominal minimum weight limit of 1kg has been set to ensure that models presented possess sufficient inertia and presence to be a true test of scale flying ability. For reasons of practicality, large models over 25 Kg that are subject to CAA exemption are not considered appropriate for the test.

Examiners are not required to weigh models but should use their judgement to disallow the use of any model that they consider does not meet this specification. If the prototype modelled had retractable landing gear, the model used for the test must also have retracting landing gear but the speed and method of retraction does not necessarily have to replicate that of the prototype (unless this is chosen as one of the optional demonstrations).

The use of a gyro or autopilot is not allowed during the test. If any such system is fitted to the model it must be disabled during the test and you should check that this has been done.

### **Documentation**

'Competition standard' documentation is not required but the candidate will be expected to demonstrate an interest in the subject modelled and the fact that some research has been done. To achieve this he may provide drawings and/or photographs of the full size to help explain the model he's using. As a minimum he must state the scale of the model and be prepared to discuss and, if requested by the Examiners, provide documented evidence of the performance characteristics of the full size including the maximum or cruising speed and whether or not the full size was considered 'non-aerobatic'.

He will also be expected to describe the origins of the camouflage or paint scheme and markings of his model. If a specific aircraft is modelled then there should be knowledge of that aircraft. If the scheme is more generic, as with some ARTFs, then an effort should be made to explain the origins of the scheme and, as an example, explain that a scheme is incorrect and why it is incorrect.

### **Height, Speed & Prototype Capability**

All flying manoeuvres must be assessed 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. Examiners must not therefore confuse scale flying with aerobatic flying. The 'C(Sc)' certificate candidate should be a confident pilot and this should show in the height and speed at which they fly the test. 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. Figure Eight) should commence on a flight path that is about 60° elevation to the Examiners. Manoeuvres such as the Descending Circle and Spin should start at a higher elevation. Examiners should down mark manoeuvres as too high, too low, too far away, or too close if they consider the positioning to be so.

### **Continuity**

Although the manoeuvres can be flown as a continuous 'display' this is **ABSOLUTELY NOT** what is expected. After agreeing the options to be flown the examiner will decide on the order in which they are to be flown and inform the candidate which manoeuvre he wishes to see next. Positioning circuits are allowed between manoeuvres but the examiner should be watching any extra circuits just as carefully as the rest of the flight as they can tell you a lot about the competence of the flyer

The 'C(Sc)' certificate allows an intermediate landing. The exact wording of the rule is - 'The schedule must be completed in one flight. Exceptionally, at a pre-determined point in the flight an intermediate landing may be permitted for the sole purpose of either re-fuelling or the fitting of a freshly charged flight battery. This landing may only be made with the prior consent of the Examiners.

This potentially makes it easier to take the 'C(Sc)' with electric powered models although in exceptional circumstances it could apply to any model. You should be aware of the possibility of such an intermediate landing but under no circumstances must you allow an unscheduled landing to be passed under the rule. It must be applied exactly as written and any landing must take place at the point in the schedule agreed prior to the flight.

### **Trim**

It is expected that the candidate will start the test with a model that has been trimmed out previously. Any fine trimming carried out by the pilot during the flight should not be obvious to the Examiners.

### **Nerves**

Quiet competence is what you are looking for during the flight but some candidates will be nervous and you may make a minor allowance for this. If the flyer is very nervous you should seriously consider abandoning the test as they are obviously not ready to be tested to 'C' certificate level.

### **A Caller**

The candidate is allowed to have a caller to assist with starting and positioning the model prior to take off and retrieving it after landing. The caller may also stand with the pilot during the flight. However, no prompting of the pilot during manoeuvres is allowed and the caller may not discuss any matters with either the candidate or the Examiners during the flight. Failure to abide by this will mean that the candidate fails the test.

## Repeating Manoeuvres

At 'C' certificate level the candidate should be competent to fly the test with very few errors.

The range of manoeuvres available has been developed and proven in Scale competition to test flying ability evenly across a broad range of prototypes. 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 examiners' position or other datum.
- (3) The scale realism achieved relative to the subject aircraft.

It remains the responsibility of the examiners to decide upon the importance of each error, always taking into account the characteristics of the full size aircraft. Examiners should make a mental note of errors as they occur throughout each manoeuvre. A sum of more than 3 significant errors should constitute a failed manoeuvre. It may be, however, that the candidate will make a more critical mistake on a manoeuvre (typically falling out of a stall turn – to which some prototypes are prone) and if you are not fully satisfied with what you have seen you should consider asking for the manoeuvre to be repeated. Some judgement is called for on your part here. A major mistake is grounds for failing the candidate, especially if loss of control has occurred or a dangerous situation has arisen.

You should definitely **not** let them have two or three attempts at each manoeuvre until they get it right but you must give yourself the best chance of assessing the competence of the pilot you are testing. You should consider what you have seen the model do and if you think to yourself "could be better" then a request that the manoeuvre be repeated may be considered. Be extremely careful about using this option, however, as you could be degrading the worth of the test. It must not under any circumstances degenerate into a series of 'practice' manoeuvres.

## Repeating the Test

The rules allow two attempts at the test in a day. If the candidate fails the first of these you must consider their performance in deciding what to do next. Many failures are generally good pilots and the failure could be a borderline case. In these circumstances it might be appropriate to offer one or two coaching flights and then a repeat of the test. Remember that some of the candidates may be unfamiliar with flying under pressure and might do very well on the second test.

On the other hand, it will probably be obvious to you on many occasions that the pilot you are testing is simply not ready for the test they are taking. In this situation it is better that you tell them so quite clearly. Some may have a lack of understanding of the manoeuvres and positioning. The offer of a little coaching may be far more useful to everyone than simply telling the candidate that they have failed

## **Interruptions to the Test**

A possibility that may occur during a test is an engine failure part way through which could very well lead to a damaged model. If this is the case then the test obviously cannot continue and you should invoke the rule that the test should be performed in one flight and count the flight as one of the two attempts allowed during the day.

Genuine engine trouble or even engine-out situations during the test may be dealt with in one of three ways:

If the test was being generally flown in a satisfactory manner and the problem can be rectified quickly then the candidate may be allowed to continue the test from the start of the manoeuvre in which the problem occurred.

If the problem cannot be rectified quickly but you consider that it was a genuine unforeseen occurrence, you may annul the test and not count it as one of the two attempts.

If the test up to the point of failure was not satisfactory, you have the option to cancel the rest of the test and count the flight as one of the two attempts allowed during the day.

Obviously, you will have to use your judgement on this matter as there will rarely be black and white situations but how they handled the emergency should be of great interest to you when you come to review the candidate's overall standard of flying.

## **Standards of Examining**

The main point of judging will be that all the manoeuvres flown should be recognisable and flown within the criteria laid down in this Standards booklet. Accuracy, safety and realism will be a requirement and the opinions of the two Examiners involved, based on their experience, will be the main factor in the decision to pass or fail the candidate.

They will expect to see a controlled, accurate, safe and well thought out flight with considerable piloting skill on display. Unsafe or 'flashy' flying will not impress – cool judgement and smooth flying will.

## **Helpers for Disabled Candidates, Young Candidates and Others Who have Requested Help During the Test**

When disabled or young candidates present themselves for the test it may be that they will not physically be able to perform all the actions that most candidates can. At times, other candidates may also request help with certain physical aspects during the test (they may, for instance, have an injured finger). There will be times when you, as an Examiner, will think 'how much can I relax the test requirements for this person'.

Some Examiners make the decision to make no allowances at all but this effectively bars many people from attempting the tests. If we think of the achievement scheme as a true national scheme then we must consider how we can accommodate candidates, not how we can stop them from participating.

The answer, of course, is that you, as an Examiner, must make on-the-spot decisions about what you will allow during the test and, in such cases, you are within your authority to take such decisions. The guidelines set out below may help but at all times the two items at the end of this section must take precedence. They are not negotiable and mean that, whoever the candidate is, they have to convince you that they know what they are doing or what is happening for the full duration of the test.

For instance, a disabled flyer may have difficulty handling the model and may not be able to carry it out to the strip or retrieve it after the flight. The sensible use of a helper is certainly allowable in such cases but it is essential that they only do what the candidate asks them to do. Pre-flight checks and engine starting may be another problem area that can be overcome by a helper but you should expect the candidate to do as much of the work as possible themselves and they should be able to talk you through anything that the helper does for them. Be sure to discuss all this with the candidate before starting the test.

All of these comments can apply to younger flyers too but there is an added complication with engine starting. Many parents are very unhappy about letting their children near a running engine and will not allow them to start their own engines. This is a perfectly valid view and, again, is a case where a helper can be used. If this situation does occur with the younger candidates, however, you should insist that they do all the pre-flight and preparation work themselves, up to applying the starter to the engine. If they cannot do this then they should not pass.

After engine start, the helper can adjust engine controls and carry the model but only on the instructions of the candidate.

### **In all cases:**

**(1) If, at any time, the helper takes over the decision making process from the candidate then the candidate must fail.**

**(2) You can make no allowances whatsoever for anyone during the flying of the test. The candidate can either perform the flight manoeuvres as specified or they can't. If they can't then they must not be passed.**

Make sure in your briefing that both the candidate and the helper are fully aware of both of these points.



## **Conduct of the Flight**

The Examiners should agree with the candidate in advance which manoeuvres are to be flown and after each completed manoeuvre instruct the candidate which one is to be flown next. The candidate is to announce the start of the manoeuvre by calling the word "NOW" and, upon completion, by the word "FINISHED".

The Examiners will sit or stand alongside the candidate in a line parallel with the circuit direction which will generally be dictated by the prevailing wind direction. This axis will be referred to as the "Examiners' line". All manoeuvres must be performed parallel with the Examiners' line such that if any part of the manoeuvre is performed behind the Examiners' line it will constitute a failed manoeuvre.

Exceptions from this rule are Take-off, Landing and Touch and Go. These manoeuvres may be performed directly into wind as long as they do not overfly a designated area behind the Examiners' line laid out for the protection of spectators, other club members or helpers.

If in the opinion of the Examiners a model is unsafe, or being flown in an unsafe manner, they must instruct the pilot to land.

## The Test

For reasons of economy, the following diagrams are taken from the Scale Contest Rule Book. In all cases, the word 'Judges' should be interpreted as 'Examiners'. In addition to the Take Off and Landing, the Figure 8 and Descending Circle are mandatory manoeuvres. The remaining 6 manoeuvres may be selected by the pilot but must be indicated on the Examination form and agreed with the Examiners prior to the start of the flight.

### **(a) Carry out pre-flight checks as required by the BMFA safety codes and demonstrate an understanding of 'SWEETS'.**

The candidate must demonstrate their understanding of risk assessing a site for flying by talking through SWEETS as described in the Member's Handbook. A candidate must be expected to be able to demonstrate how they have come to the decision it is safe to fly at the location, which must still be applied even if the site is an established flying site.

The candidate must demonstrate the model's failsafe, which as a minimum should be set as 'throttle to idle' upon loss of control signal. The candidate must ensure this is done safely following the guidance in the Member's Handbook. A candidate must be failed immediately if the candidate does not make the model 'safe' by means of either a suitable restraint or removing components that might spin uncontrollably such as propellers or blades.

**If the failsafe does not work when tested for any reason, then the test must be considered a failure.**

The pre-flight checks are laid out clearly in the BMFA handbook. Ask the candidate to go through their checks as if the test flight was their first flight of the day. Particular attention should be given to airframe, propeller, control linkages and surfaces.

Points to look for are that the candidate has a steady and regular ground routine, especially when starting and tuning the engine. However, especially for large scale models, holding the model nose up during the full power check is at the pilot's discretion. Nothing less than a competent performance is acceptable, the candidate must be fully in control of what they are doing when preparing their aircraft for flight.

A neat and safe ground layout is essential and is to be expected from 'C' certificate candidates.

A poor performance in this area is grounds for failing the candidate. However, you should be making mental notes of all aspects of the candidate's competence; even a good performance may have some faults and this might have an effect on a 'borderline' case in other areas.

Pay particular attention to the way the candidate uses the local frequency control system and make sure that they fully understand it and use the correct sequence appropriate to their model. For 35 MHz, this is usually 'get the peg, Tx on, Rx on'. For 2.4 GHz, the candidate should be aware of any local transmitter usage limitations and if a flight peg is required, it must be obtained before the usual Tx on, Rx on sequence. Some radio equipment and, occasionally, a specific model requirement requires that the Rx be switched on first and, if this is the case, the candidate should explain this clearly to you.

With electric powered models, take note that the candidate is aware that the model is 'live' as soon as the flight battery is plugged in and that they take appropriate safety precautions. If a separate receiver battery is fitted, the candidate should have the opportunity to check the operation of the radio equipment before the flight battery is plugged in.

Watch carefully and take note that the transmitter controls, trims and switches are checked by the pilot.

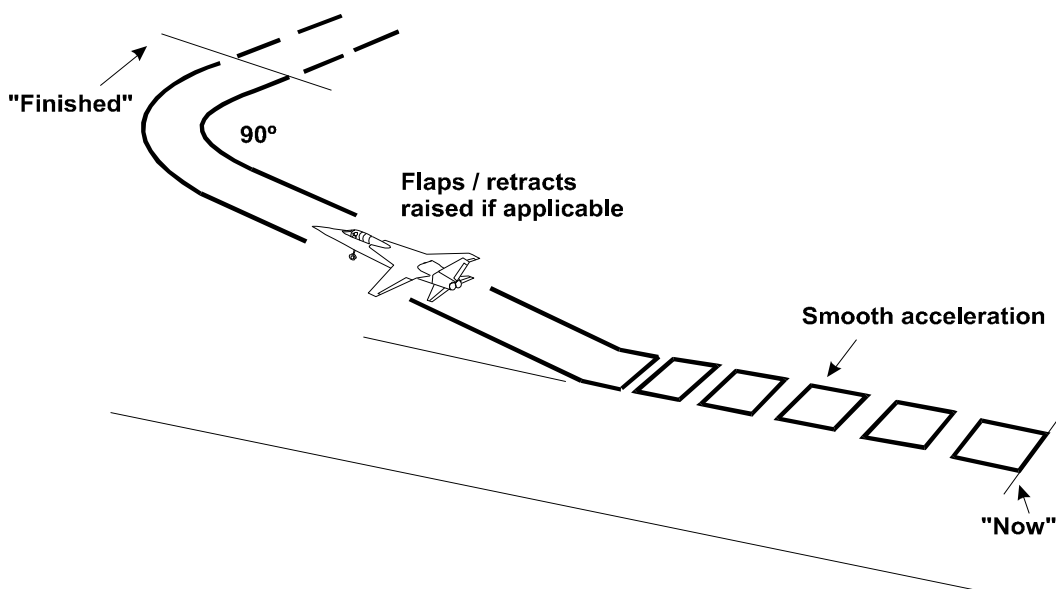
All candidates are required to be aware of the local the frequency control system and anyone who is required to use it but switches their radio on before doing so should be failed on the spot.

**(b) Take-Off and join the circuit in whichever direction is appropriate for the conditions.**

The model may taxi out from a safe position in front of the pits/pilots' area or be carried out to the takeoff point by a helper (after gaining appropriate clearance). **Taxying out of the pits is an instant fail.** The model should stand still on the ground with the motor running without being held by the pilot or helper and then take-off into wind, or as required by the candidate to make best use of the take-off distance available (jet subjects). For 'tail dragger' models (particularly biplanes that are prone to ground-looping) the pilot may, subject to prior agreement with the Examiners and local club rules, elect to start the take-off manoeuvre from behind the model but must return to the 'pilot's box' as soon as the model is airborne.

If the engine stops or the model is touched after the candidate calls "Now" he may be allowed to re-start but if this happens more than once it may call into question his preparedness to take the test. 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 candidate's judgement taking into account the wind strength. Any flapless take-off due to wind must be nominated to the Examiners before take-off. Flaps should be raised during the climb out after take-off. If applicable, the landing gear should be retracted during the climb out.



**Errors:**

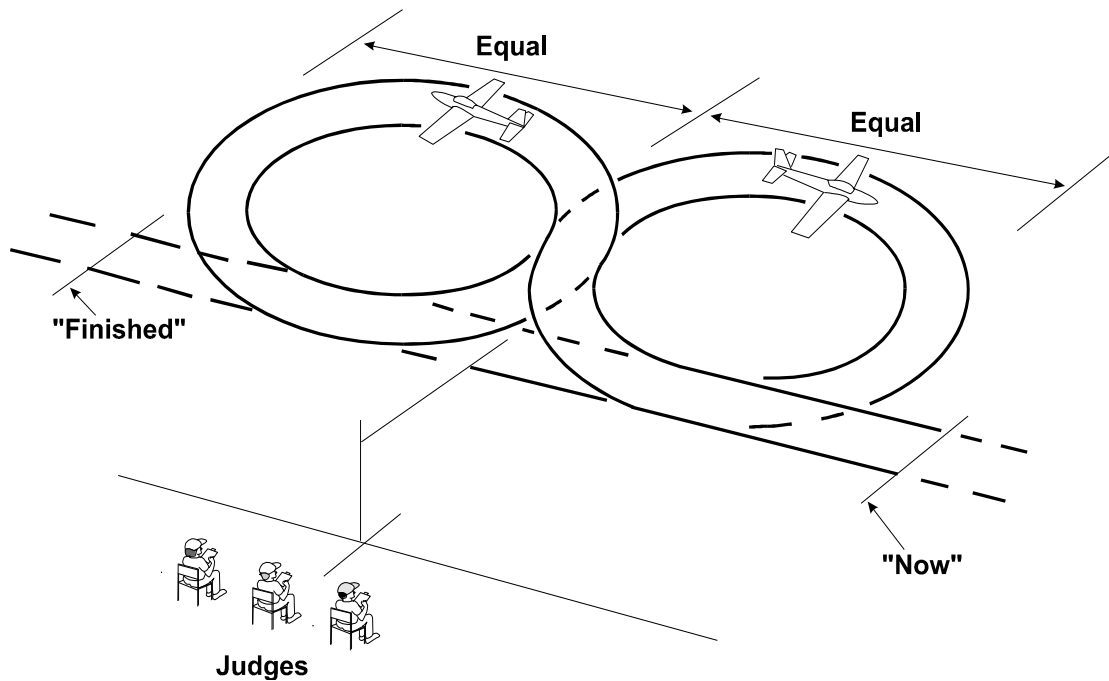
- (1) Model touched after calling "Now".
- (2) Swings on Take-off (a slight swing with other than a tricycle undercarriage is acceptable as the aircraft tail is raised).
- (3) Take-off run too long or too short.
- (4) Unrealistic speed / too rapid acceleration.
- (5) Inappropriate attitude at lift-off 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.

### (c) Figure Eight

The model approaches in straight and level flight on a line parallel with the Examiners' line, and then a one-quarter circle turn is made in a direction away from the Examiners' 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 should be on a line that is at right angles to the direction of entry and passes through the centre of the Examiners' line.

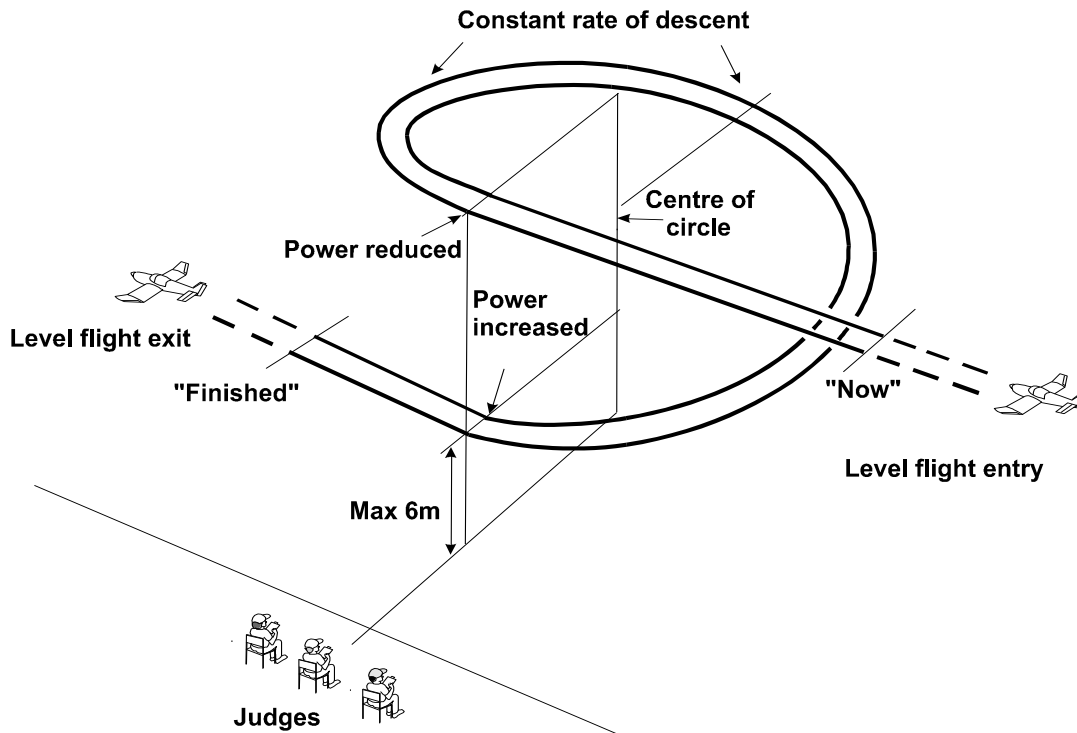


#### Errors

- (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 Examiners' position.
- (6) Entry and exit paths not on same line.
- (7) Entry and exit paths not parallel with Examiners' 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.

#### (d) 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 Examiners, 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 Examiners' 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.

### (e) Optional Demonstrations:

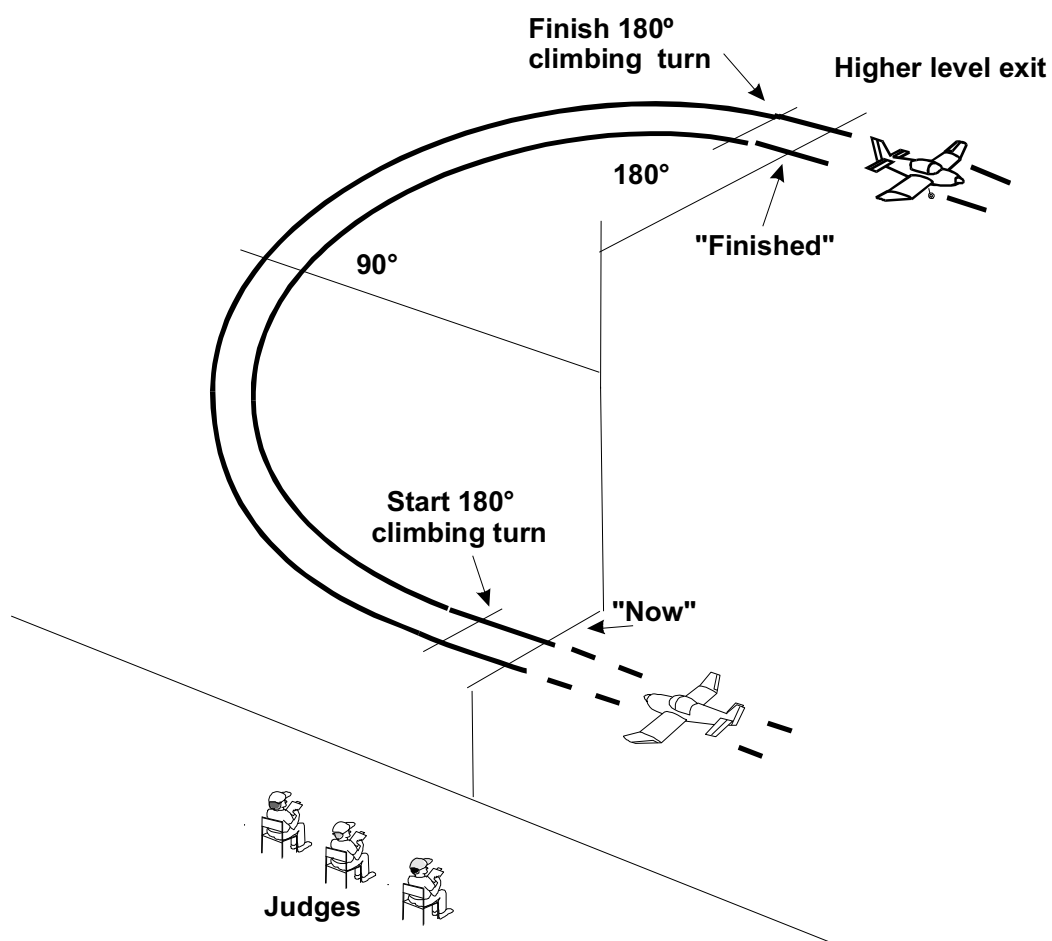
The candidate must select a further 6 optional manoeuvres from the following list. **These should demonstrate the fullest possible capabilities of the aircraft subject type modelled.** Unlike the Scale competition schedule, there is no formal distinction made between aerobatic and non-aerobatic prototypes. However, Examiners and candidates should bear in mind the sentence emphasised above when agreeing an appropriate range of manoeuvres for the model presented. Whilst any of the options may be chosen, models of prototypes deemed to be aerobatic will be expected to demonstrate some aerobatic capability. The selection of manoeuvres must be agreed with the Examiners and the order in which they are to be flown shown on the Examination Sheet.

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

Note also that some procedural manoeuvres that are part of the schedule (eg rectangular and triangular circuits) could not be flown at some of the smaller club sites without infringing club or general safety rules.

#### A Chandelle

From a straight and level flight the model passes the Examiners and then performs a 180° climbing turn in a direction away from the Examiners, resuming straight and level flight on the opposite track. The rate of climb should be commensurate with that of the prototype.





### **Errors**

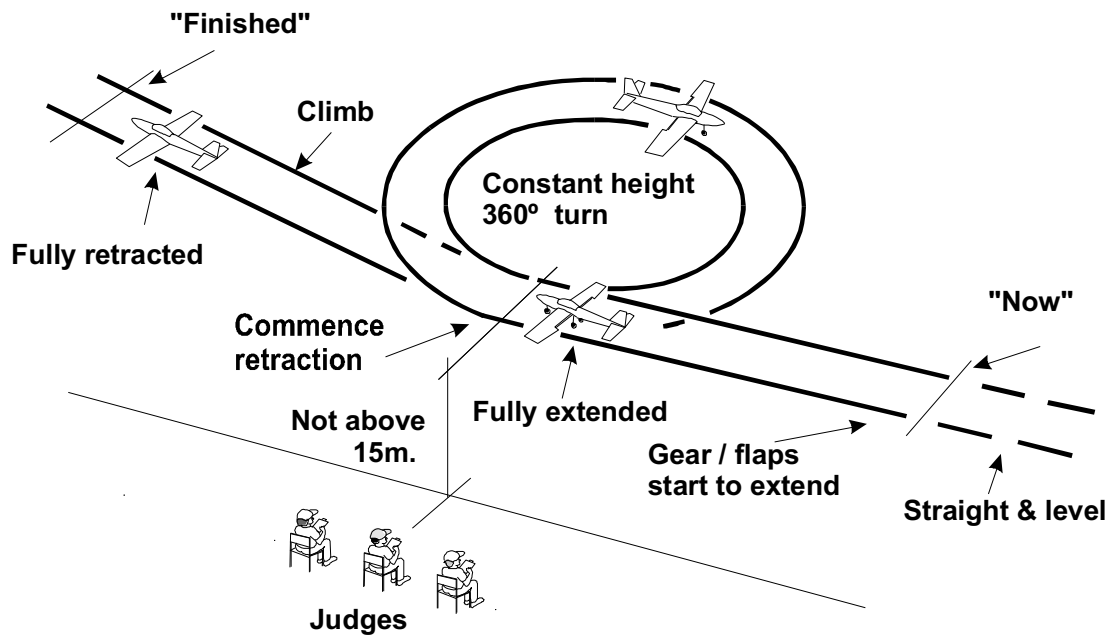
- (1) Turn not smooth and continuous.
- (2) Climb not smooth and continuous.
- (3) Half height gain not at 90° position.
- (4) Excessive/unrealistic engine power used to achieve the climb.
- (5) Insignificant height gain.
- (6) Start & finish not centred on judges' position.
- (7) Entry and exit paths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

## B Extend and Retract Landing Gear

## C Extend and Retract Flaps

(Diagram and errors applicable to both manoeuvres unless stated)

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

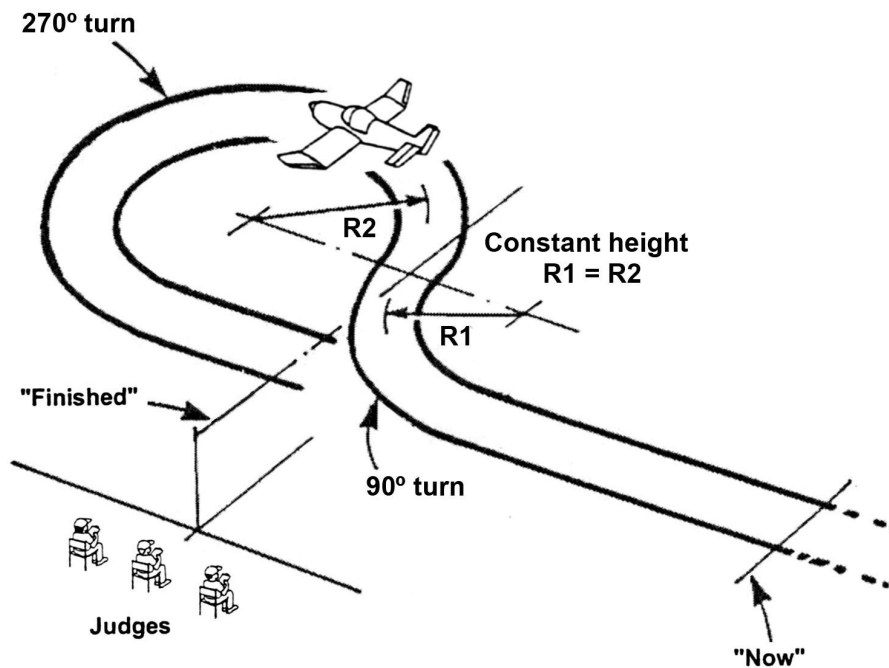


### Errors

- (1) Model speed too high for landing gear / flap lowering.
- (2) Gear / flaps not extended in full view of Examiners.
- (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 Examiners' position.
- (8) Retraction not commenced abeam Examiners.
- (9) Entry and exit paths not parallel with the Examiners' line.
- (10) Entry and exit tracks not the same.
- (11) Unscale-like climb out.
- (12) Too far away or too close.

## D Procedure Turn

The model approaches in straight and level flight on a line parallel with the Examiners' line, and then a one-quarter circle turn is made in a direction away from the Examiners' line. This is followed by a 270-degree turn in the opposite direction, completing the manoeuvre on the reciprocal track on the original approach line. The manoeuvre must be commenced so as to place the point where the model changes from the 90° turn to the 270° on a line which is at a right angle to the direction of entry and passes through the centre of the Examiners' line.

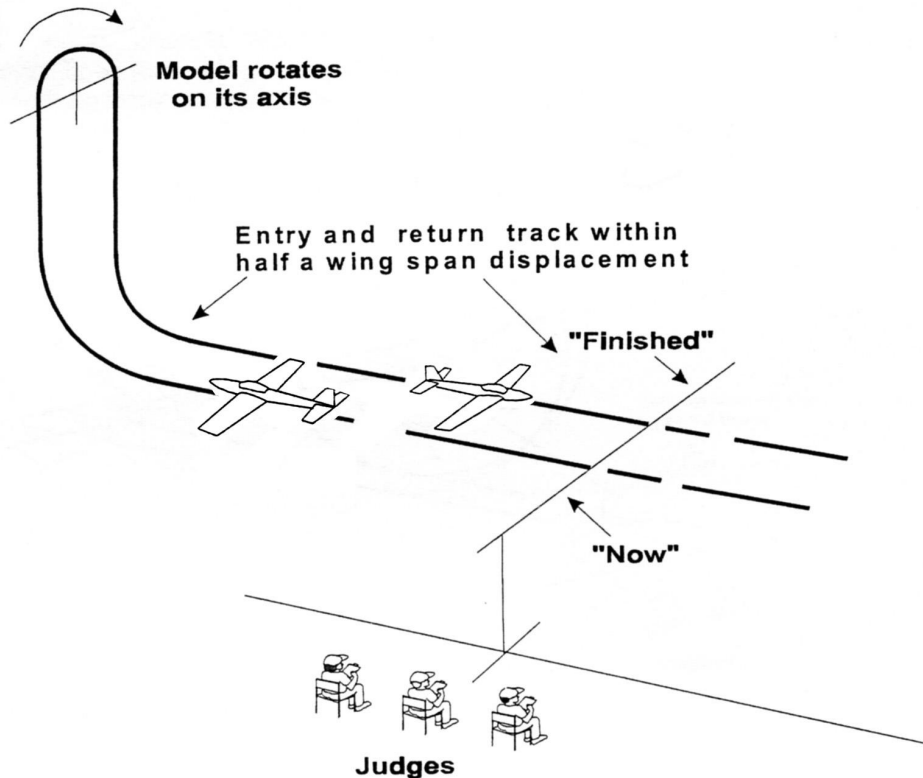


### Errors

- (1) Rate of turn is not constant.
- (2) Radius of turn is not constant.
- (3) Constant height not maintained.
- (4) Entry and exit paths not on same line
- (5) Entry and exit paths not parallel with Examiners' line.
- (6) Change from 90° to 270° turn not at right angles to original flight path.
- (7) Change from 90° to 270° turn not centred on Examiners' position.
- (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.

## 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° in a direction away from the Examiners, then dives vertically 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 candidate 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. The manoeuvre may be flown either upwind or downwind as appropriate.

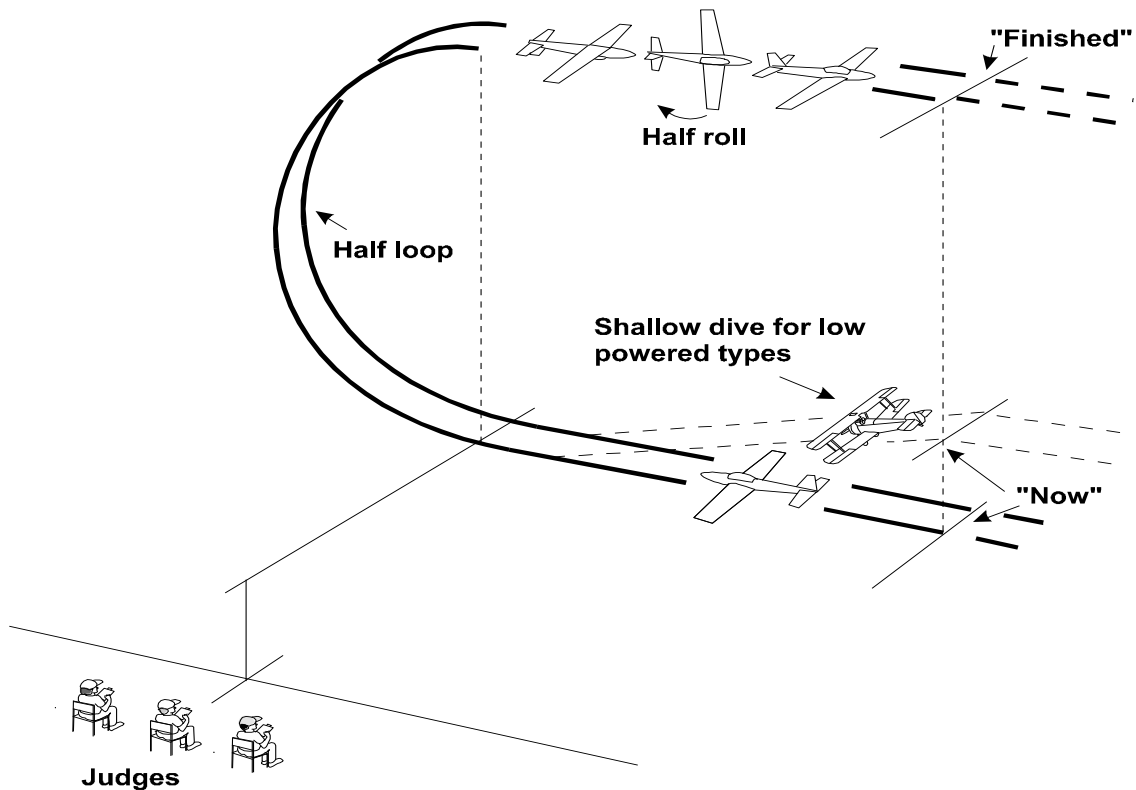


### Errors

- (1) Start & finish not parallel with Examiners' line.
- (2) Pull up not positioned to give best view to Examiners.
- (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) Candidate 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 Examiners' line.
- (11) Too far away / too close / too high / too low.
- (12) Model rotates towards the examiners.

## F Immelman 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.



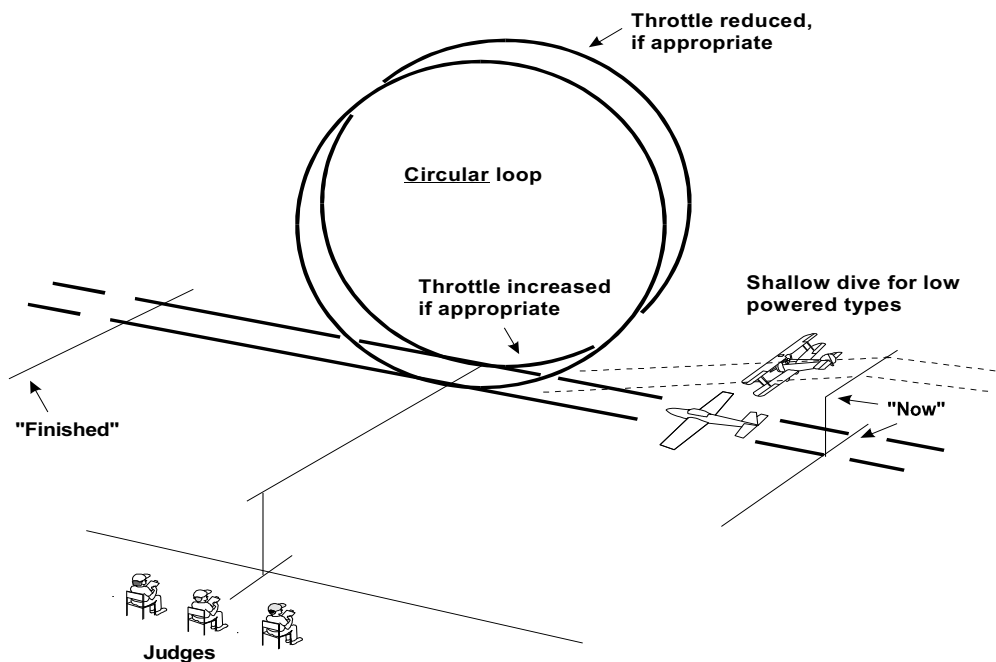
### Errors

- (1) Track of the half loop not vertical.
- (2) Half loop not centred on Examiners' 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 Examiners' 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 track 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.

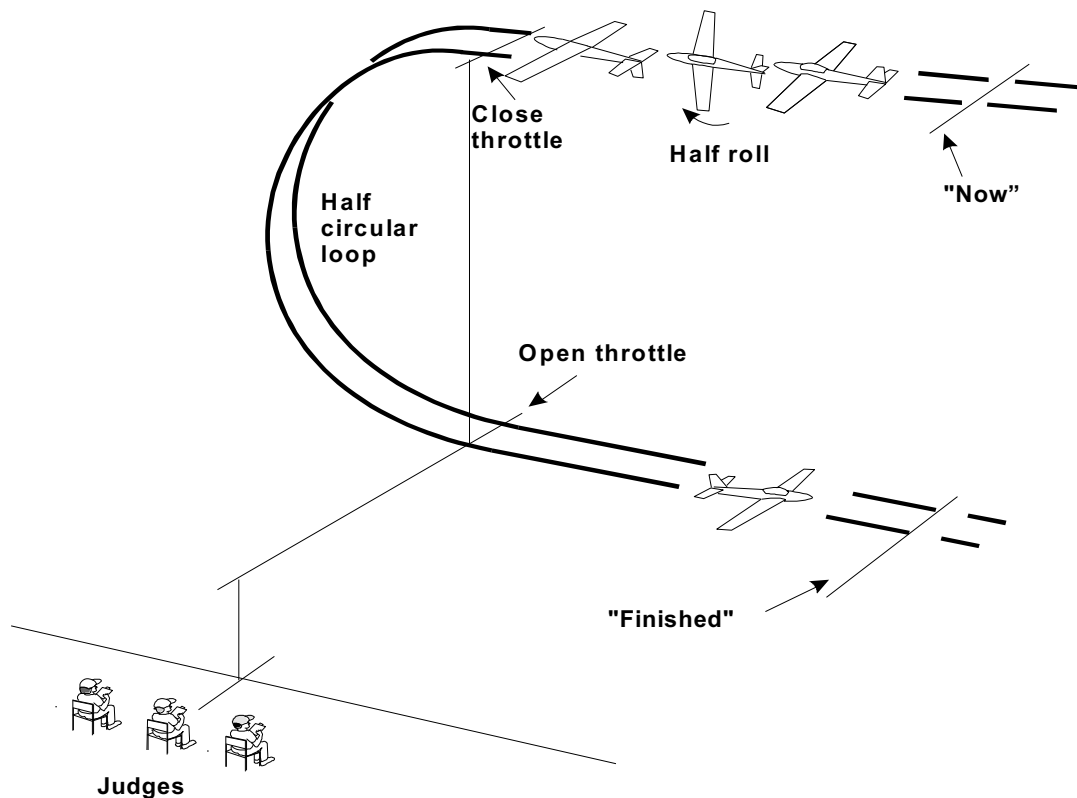


### Errors

- (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 Examiners' position.
- (6) Does not resume straight and level flight on same track and height as entry.
- (7) Manoeuvre not flown parallel with Examiners' line.
- (8) Too far away / too close / too high / too low.

## H 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 Examiners' position.
- (9) Manoeuvre not flown parallel with the Examiners' line.
- (10) Too far away / too close / too high / too low.

## I Cuban Eight

Model pulls up into a circular inside loop until 45 degrees nose down. The 45 degree inverted flight is held until a half roll when abeam the Examiners, 45 degree 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.

This option has four variations as detailed below; the candidate must specify on the examination sheet which variation will be flown.

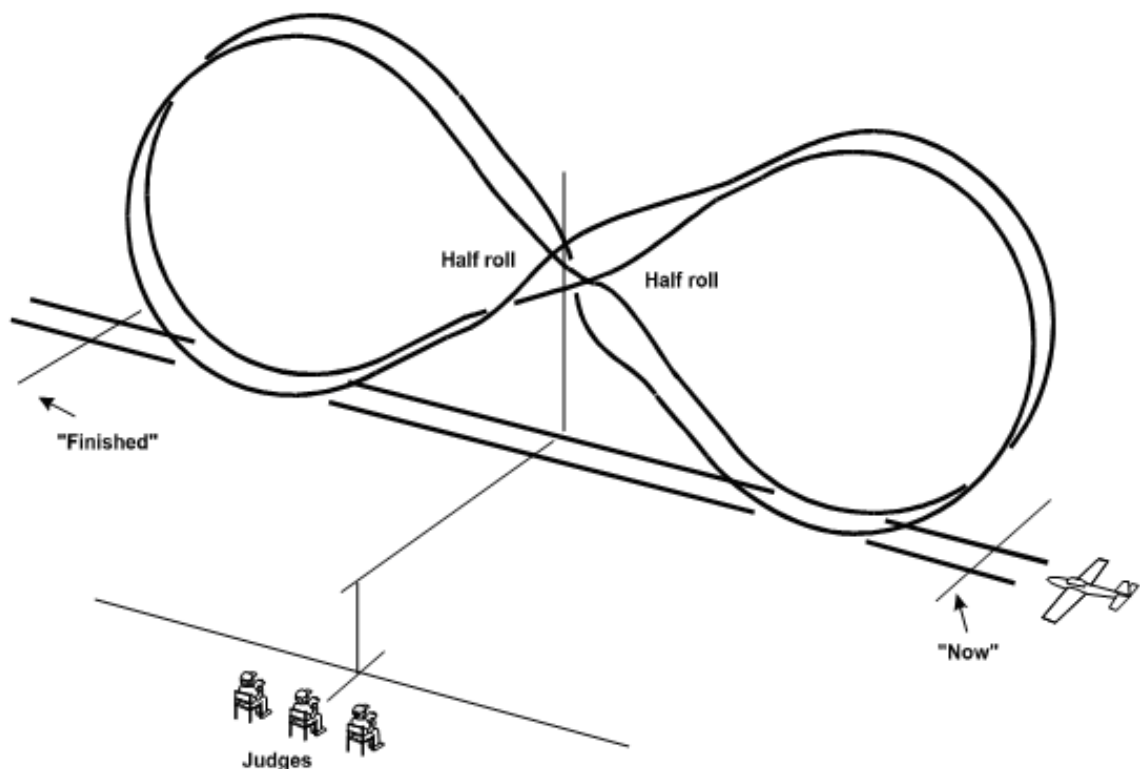
**Normal Cuban Eight** – Model pulls up into a circular inside loop until 45° nose down. The 45° inverted flight is held until a half roll when abeam the judges, the model then commences a similar circular inside loop with the bottom of this loop at the original entry height, followed by a half roll to repeat the manoeuvre in the opposite direction. Straight and level recovery is to be at the same height as the original entry.

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

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

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

Throttle may be closed at the top of each loop, as appropriate to subject type, and reopened during each descent. A low powered aircraft would be expected to execute a shallow dive at full throttle in order to pick up speed before commencing the manoeuvre.





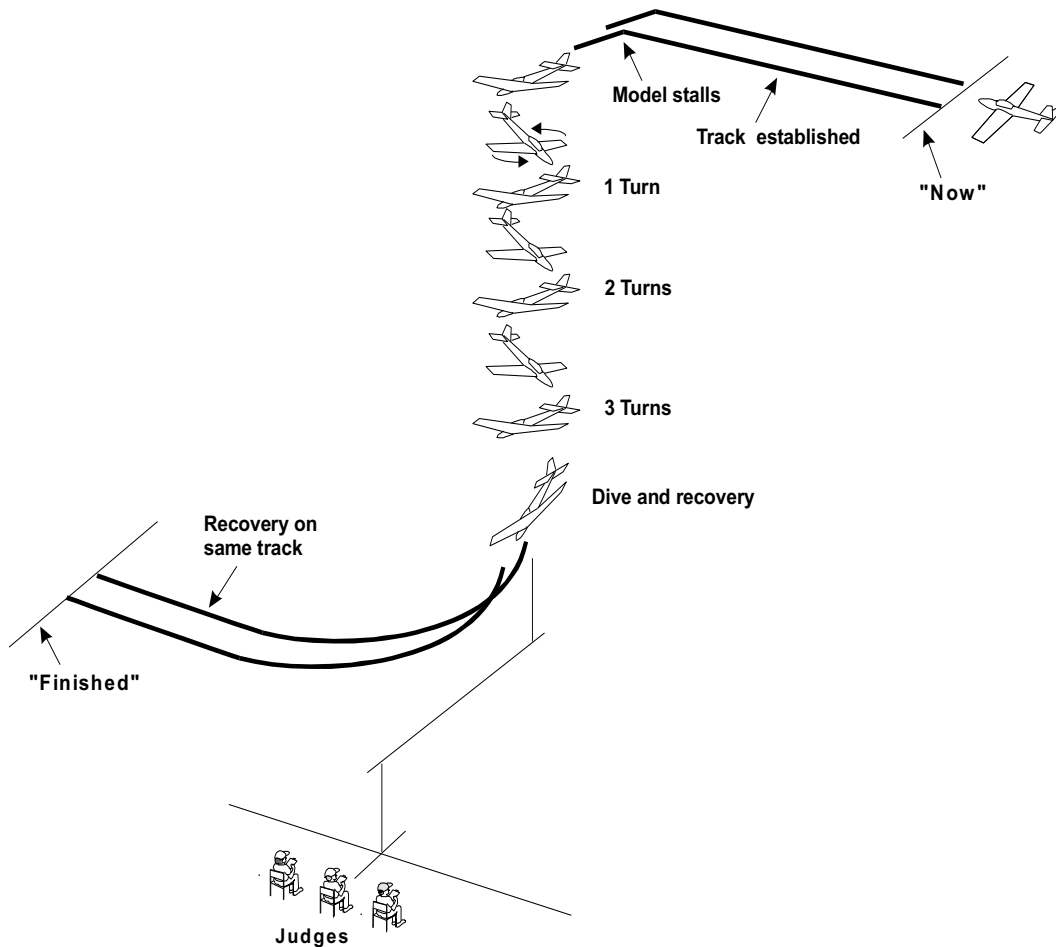
### **Errors**

- (1) Manoeuvre not performed in a constant vertical plane that is parallel with the Examiners' line.
- (2) Loops are not circular.
- (3) Loops are not the same size.
- (4) Half rolls are not centred on the Examiners' 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.

## 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

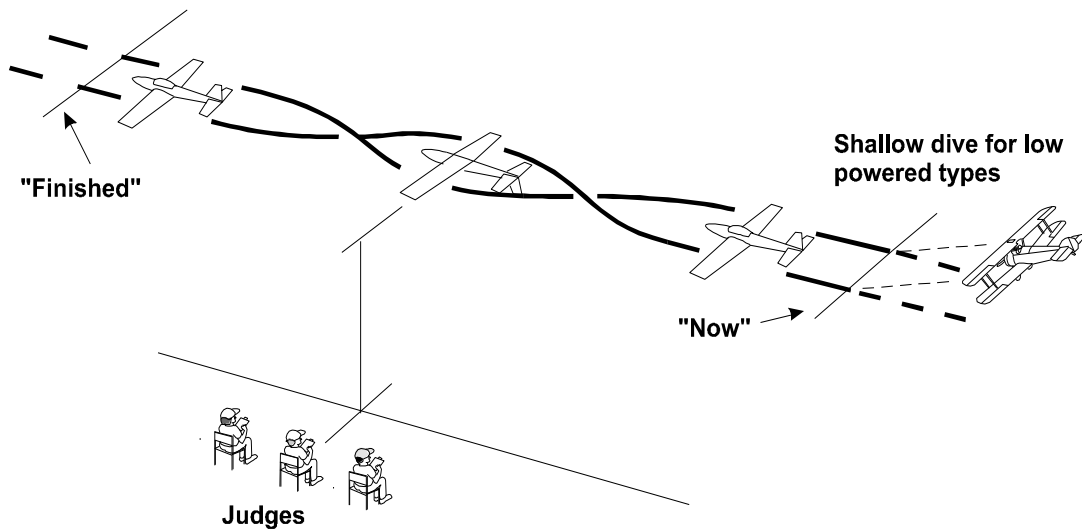
- (1) Engine not throttled back at point of stall.
- (2) Entry into spin not clean and positive.
- (3) Not a true spin but merely a spiral dive (which should score zero).

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 Examiners' position.
- (6) Model does not resume straight and level flight on same track as entry.
- (7) Entry and exit paths not parallel with Examiners' 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.

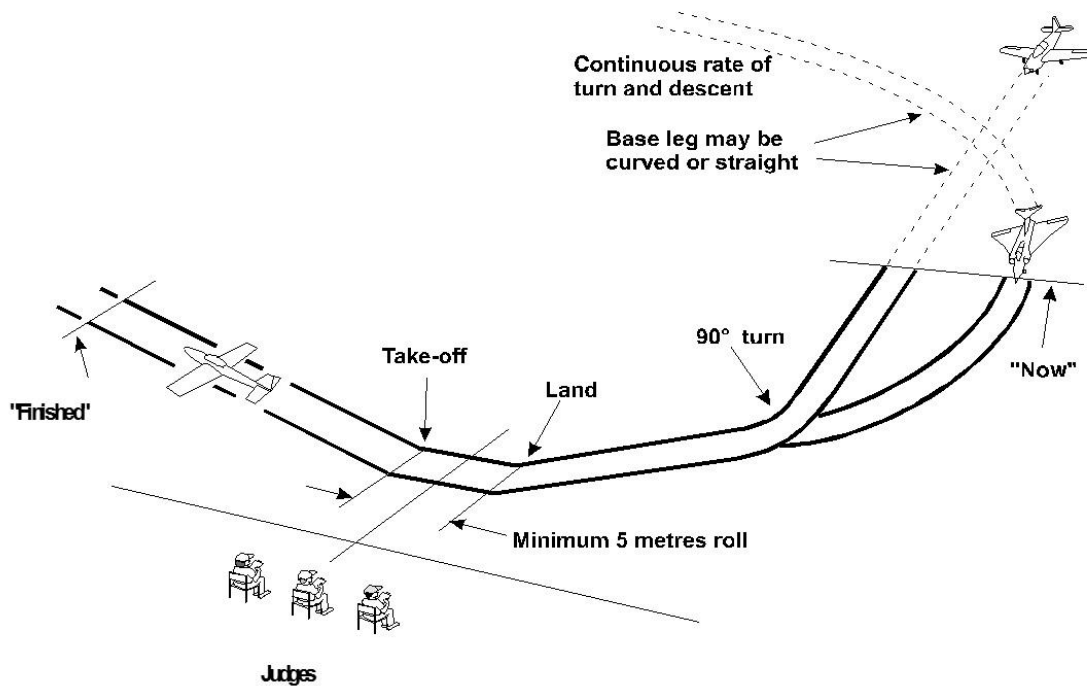


### Errors

- (1) Rate of roll is not constant.
- (2) Style of roll not typical to prototype.
- (3) Roll not centred on Examiners' 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 Examiners' 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 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 degrees 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.

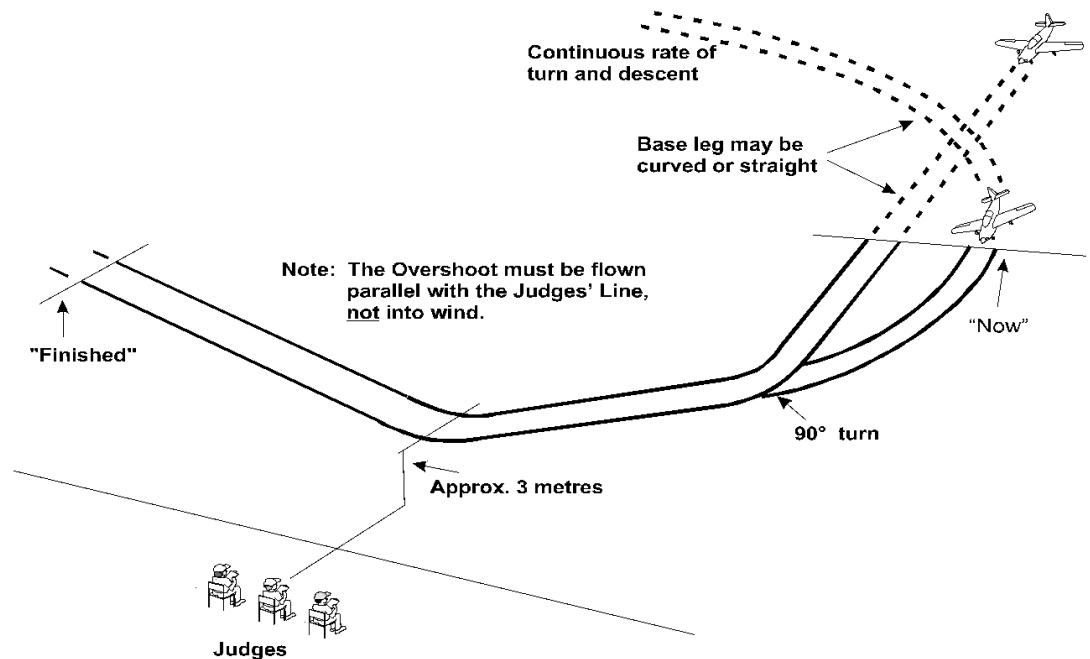


### Errors

- (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.

## M 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 degrees onto a higher than normal landing approach on low throttle, using flaps if applicable. On reaching the centre of the landing area at a height of approximately 3 metres, power is applied to check the descent. After normal flying speed and attitude are attained the model climbs straight ahead. The aim of the manoeuvre is to simulate an aborted landing due to a higher than normal landing approach.



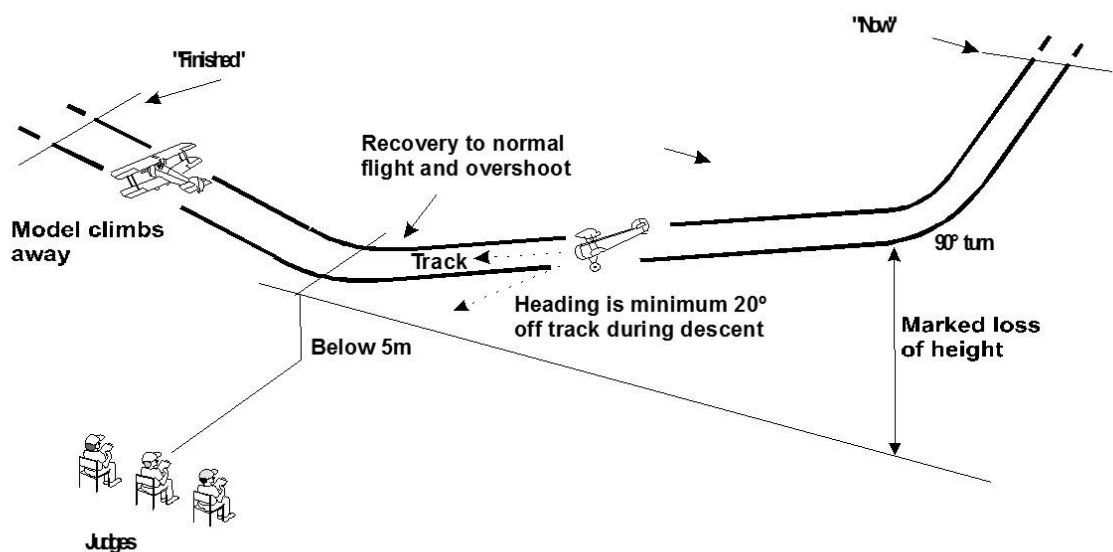
### Errors:

- (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 Examiners.
- (8) Not smooth transition of speed and 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.

## N

### 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 Examiners' 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  $20^\circ$  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 Examiners. Before reaching the Examiners' position however, the sideslip is corrected, normal flight is resumed and the model carries out an overshoot from below 5m. 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.



### Errors:

- (1) Model does not smoothly enter sideslip upon turning final approach.
- (2) Model is not yawed at least  $20^\circ$  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 Examiners' line.
- (7) The sideslip is not corrected before passing the Examiners.
- (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.

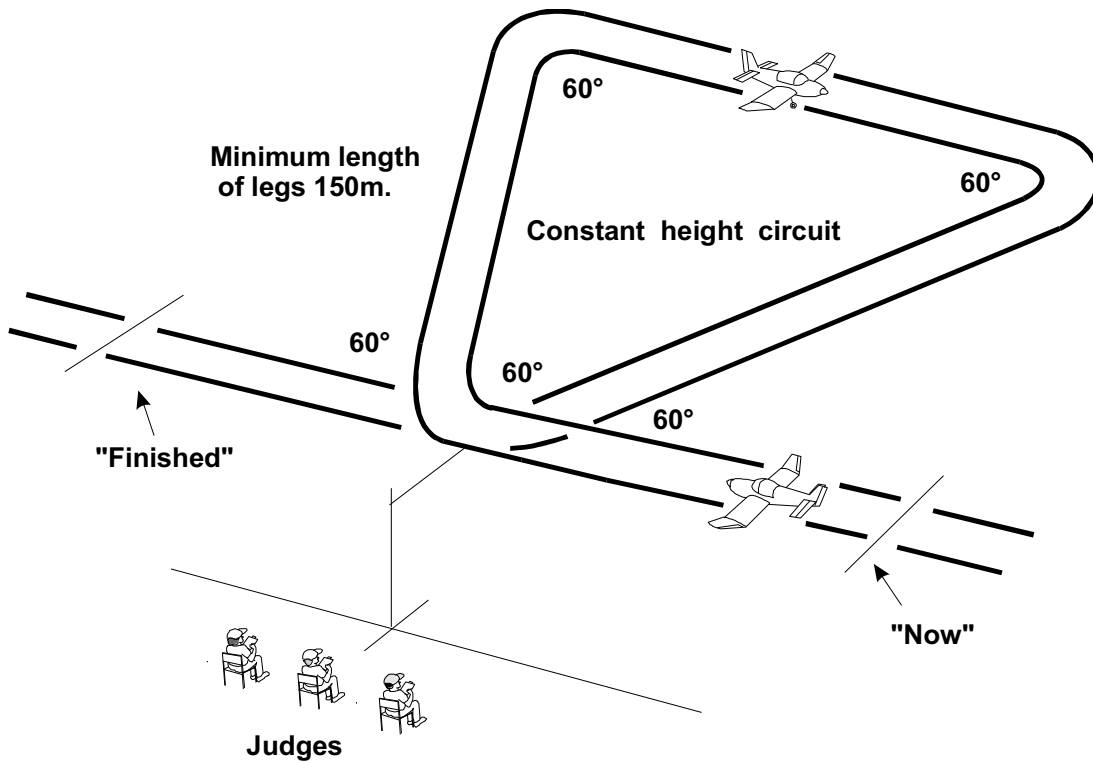
## **O & P Flight Function(s) Performed by Prototype Aircraft**

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

Procedural flying manoeuvres such as a 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.

**Q Flight in Triangular Circuit (Subject to site suitability)**

The model approaches in a straight and level flight to a point directly in front of the Examiners. It then turns away to track  $60^\circ$  away from the Examiners' line. It then flies straight and level for a minimum of 150 metres, turns to track parallel with the Examiners' line, flies a further minimum of 150 metres, then turns to track towards the Examiners 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  $60^\circ$ ), before making a final turn to intercept the original entry track.



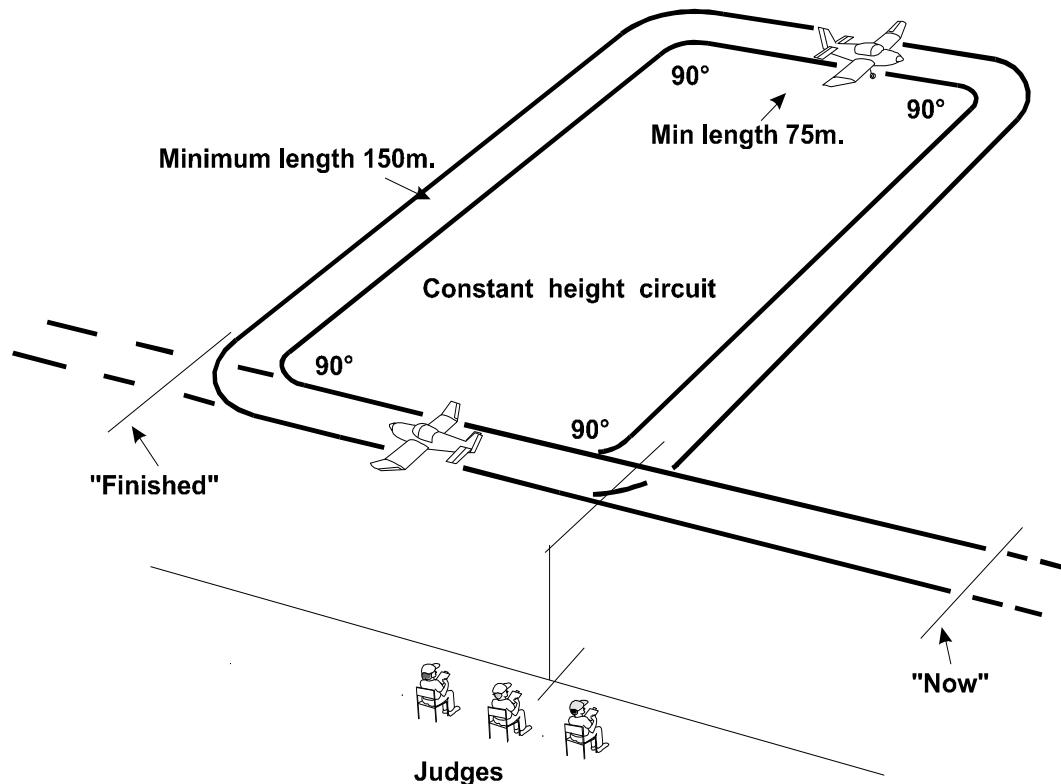
**Errors**

- (1) Not commenced and finished at points equidistant from the Examiners.
- (2) Model changes height.
- (3) Rate of turn at corners not constant or inside corners of triangle not  $60^\circ$ .
- (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 Examiners' position.
- (8) Correction for drift not properly made.
- (9) Start and finish tracks not the same.
- (10) Start and finish tracks not parallel with Examiners' line.
- (11) Too far away / too close / too high / too low.



## R Flight in Rectangular Circuit (*Subject to site suitability*)

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



### Errors

- (1) Not commenced and finished at points equidistant from the Examiners.
- (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 Examiners' position.
- (9) Start and finish tracks not the same.
- (10) Start and finish tracks not parallel with Examiners' line.
- (11) Too far away / too close / too high / too low.

## **S 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.

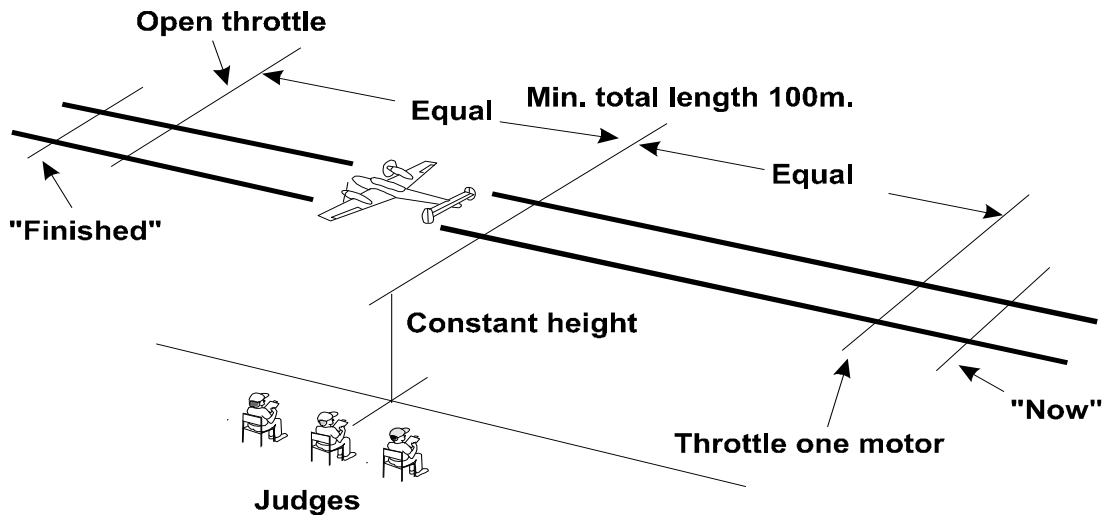
### **Errors**

- (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 Examiners' position.
- (6) Not parallel with the Examiners' 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.

T

### 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.)

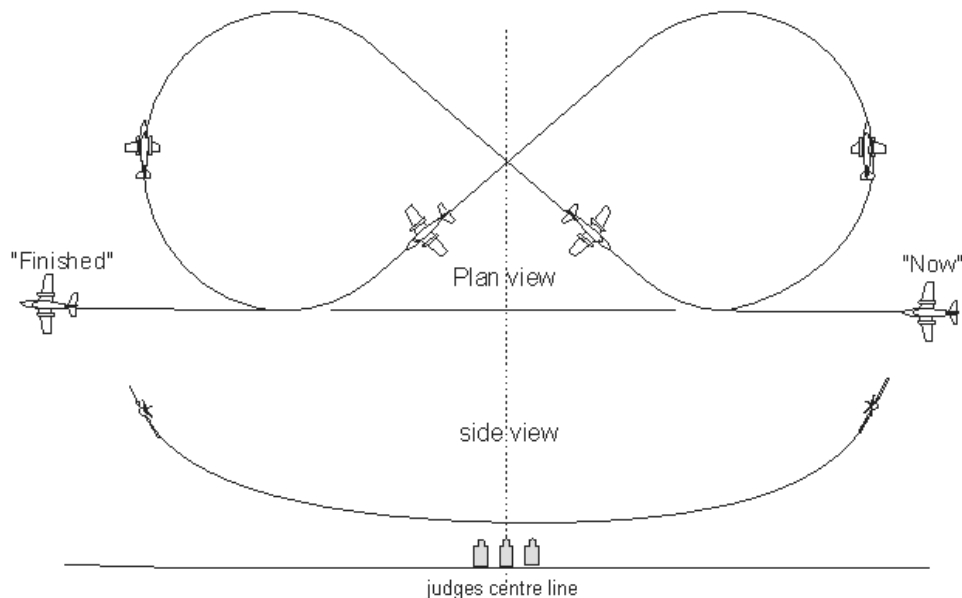


#### Errors

- (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 Examiners' position.
- (8) Not flown parallel with the Examiners' line
- (9) Too far away / too close / too high / too low.

## U Lazy Eight

The model approaches in straight and level flight on a line parallel with the Examiners' line. When the model is in line with the Examiners (the centre) a smooth curving climb is commenced which progresses to a smooth climbing turn of constant radius away from the Examiners. At the apex of the turn the bank should be at least 60 degree and the model shall be on a track of 90 degrees to the Examiners' line. The nose of the model then lowers and the bank comes off at the same rate as it went on. The turn is then continued beyond 180 degrees to intercept the centre with the wings level and at the same height as the entry height into the manoeuvre. At the centre another smooth climbing turn is immediately commenced away from the Examiners, the shape of which should be the same as the first turn. The second turn is then continued beyond 180 degrees to cross the centre with wings level and at the same height as the entry height into the manoeuvre. The Lazy Eight is completed by maintaining this height and track with wings level before turning to intercept the original approach track to exit the manoeuvre parallel to the Examiners' line in straight and level flight. A low powered aircraft would be expected to execute a shallow dive at full throttle in order to pick up speed before commencing the manoeuvre. The figure should be symmetrical each side of the Examiners' position.



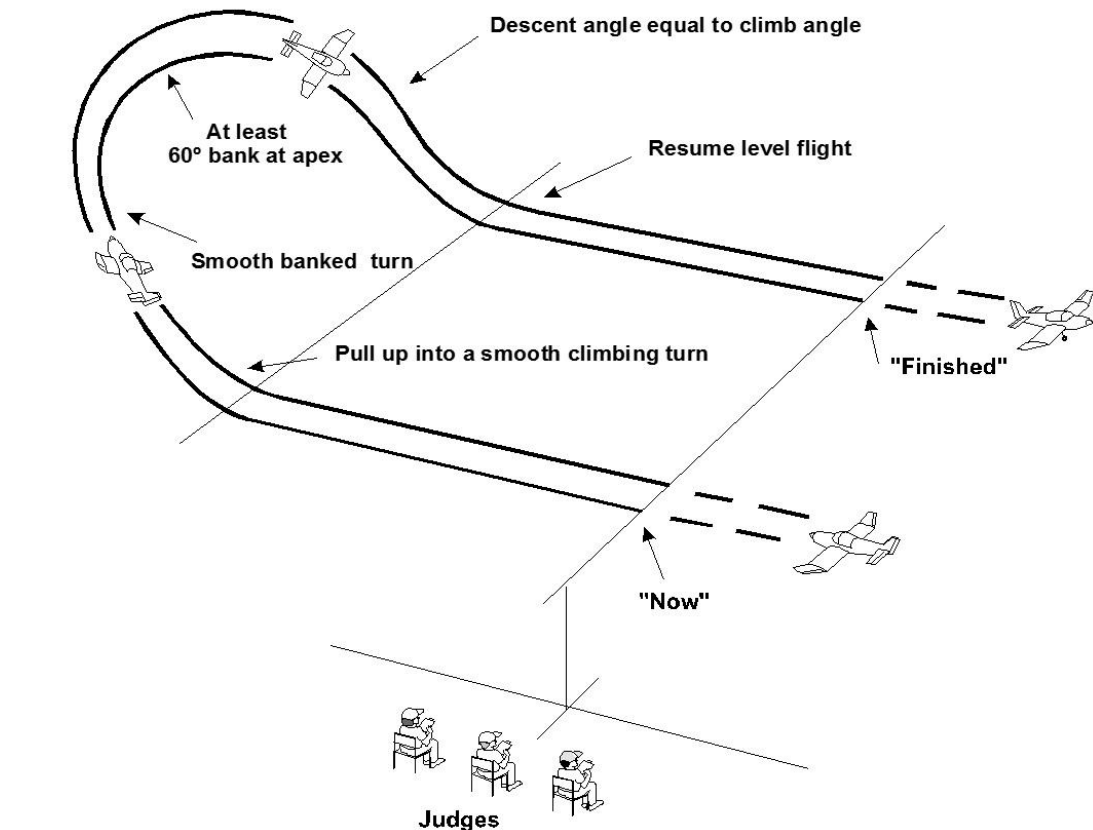
### Errors:

- (1) Entry and exit paths not parallel with Examiners' line.
- (2) Insufficient climb achieved.
- (3) Insufficient bank achieved.
- (4) Climb and descent curves not equal throughout manoeuvre.
- (5) Manoeuvre not symmetrical about Examiners' 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.
- (11) Apexes of turns not coincident with a model track of 90 degrees.

## V Wingover.

The model approaches in straight and level flight on a line parallel with the Examiners' line. After passing the Examiners' position a smooth climbing turn is commenced away from the Examiners. 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 track 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.

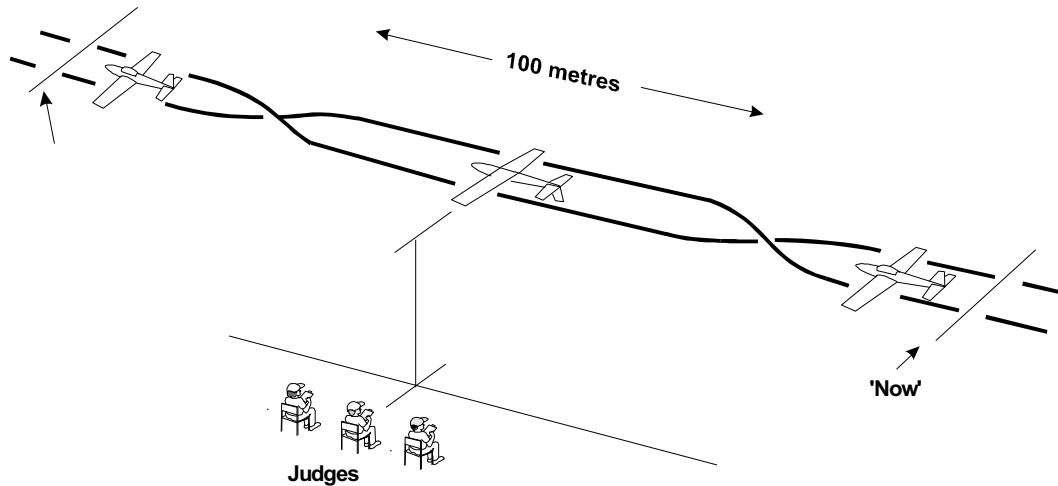


### Errors:

- (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 Examiners' 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.

## W Inverted Flight

Model half rolls into inverted attitude and makes a straight inverted flight of 100 metres in length, 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.

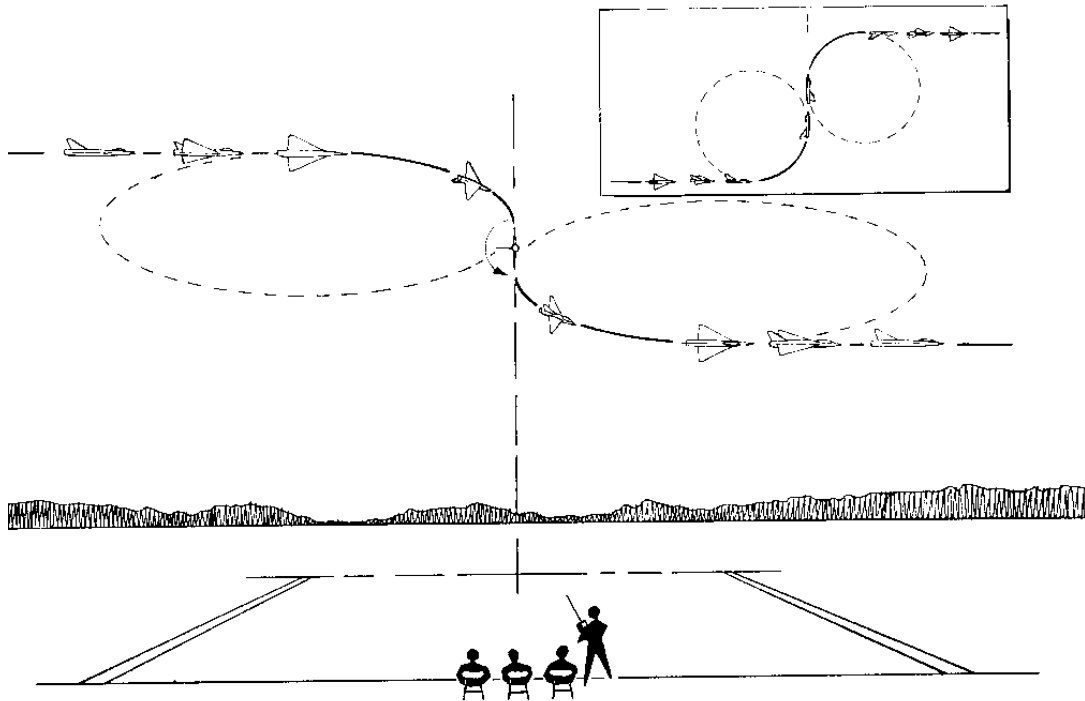


### Errors

- (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 Examiners' position.
- (6) Manoeuvre not flown parallel with Examiners' line.
- (7) Too far away / too close / too high / too low

## X 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  $60^\circ$  bank) one quarter circle turn in a direction away from the Examiners, without losing height. When centred in front of the Examiners 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

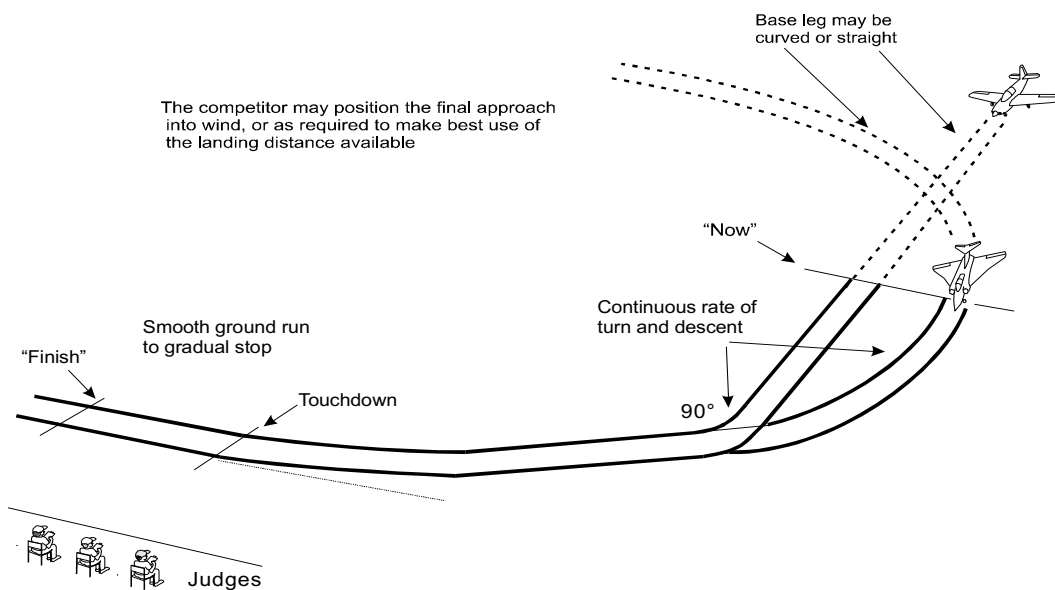
- (1) Entry not in parallel with the Examiners line.
- (2) The manoeuvre not centred in front of the Examiners.
- (3) The rolling manoeuvre in front of the Examiners not axial .
- (4) The roll in centre not in the same direction as the entry to the manoeuvre.
- (5) The roll not carried out on a line directly away from the Examiners.
- (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.

## (f) 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 candidate 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 degrees 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 nosewheel.

If the prototype used flaps and/or speed brakes for landing, then the model should also, but this may be subject to the candidate's judgement taking into account the wind strength. Flaps and/or speed brakes should be deployed at the appropriate point in the landing circuit up to and including the final approach. Any flapless landing due to the wind must be nominated at the time the landing manoeuvre is announced.



### 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 (significant error noted if only nose-down - fail if it over-turns).
- (13) Flaps and/or speed brakes not used if applicable.

**Note:**

A crash landing constitutes a failed manoeuvre but if the model makes a good landing and then stops nose down towards the end of the landing run, then this will constitute one significant error. 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 also record one significant error. All landings ending with the model on its back will be considered a crash landing.

After coming to a complete standstill the model should taxi in from the landing area, stopping a safe distance from the pits and other pilots, ready for recovery. **Any attempt to taxi close to other pilots or close to or into the pits is an instant fail.**

If the model will not taxi, the candidate or a helper may retrieve the model but the pilot should agree with the examiner beforehand whether they intend to take the transmitter with them when retrieving their model or choose to leave it with a competent person. The candidate must explain the safety considerations behind their decision, which must be agreed with the examiner. If the candidate elects not to take the transmitter and no one else is available to hold it then you should offer. When the model has been retrieved and returned to the pits area the transmitter should be returned to the pilot. Whatever process is agreed, it must also be in accordance with any relevant club rules, as appropriate. Generally, for 2.4GHz operations and with suitable consideration, candidates should be able to give a robust safety based argument for taking their Tx with them to recover the model, if it has landed on the normal landing/take-off area. Conversely, it is difficult to see how any such argument could be made for candidates using 35MHz or 27MHz equipment.

**(g) Complete post flight checks as required by the BMFA Safety Codes.**

The post flight checks are set out clearly in the handbook but the Examiner should watch particularly that the 'Rx off, Tx off, frequency system cleared' sequence is followed correctly. (See the notes on page 7 for information on possible variations)

**(h) Realism in Flight**

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

Examiners will evaluate Realism within the following aspects, always keeping in mind the likely characteristics of the full size subject:

**Engine sound (realistic tone & tuning).** 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.

**Speed of the model.** This should be an assessment of the scale speed of the model, calculated from the speed of the full size aircraft (as indicated on the Examination form) divided by the scale of the model. Models invariably fly faster than scale speed but this should not be excessive. In blustery conditions it is acceptable to fly slightly faster to ensure a smoother flight.

**Smoothness of flight.** The model should be well trimmed and show no signs of instability. Examiners 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.

If the overall assessment is that the flight was not sufficiently realistic – even if the individual manoeuvres are flown reasonably accurately – the candidate should be failed.

**Note:**

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 should be equally visible during flight in the model. If such a pilot is not fitted, this will constitute one significant error in realism.

**(i) The schedule must be completed in one flight. Exceptionally, at a pre-determined point in the flight an intermediate landing may be permitted for the sole purpose of either re-fuelling or the fitting of a freshly charged flight battery. This landing may only be made with the prior consent of the Examiners. The pre-determined point may be either after a specific manoeuvre or at a specific time of flight, whichever is requested by the candidate and agreed by the Examiners.**

Full pre and post flight checks are not normally required during an intermediate landing and take off unless the model suffered a hard landing. However, the candidate should give the model at least a quick visual examination whilst on the ground.

**(j) Two examination attempts will be allowed in any one day.**

## The Interview

**'The applicant will be interviewed by the Examiners and must display a satisfactory depth of knowledge of model flying in general and, in particular, of safety matters based on the BMFA Safety Codes for General Flying and Model Flying Displays.'**

If you are a Chief Examiner, you should already be familiar with the interview procedure that is expected when you test Examiner candidates (if you are a Club Examiner, you will have endured the procedure yourself at some time).

The questioning for the 'C' certificate should be approached in exactly the same manner and the depth of questioning and the level of the candidates responses should be about the same. However, you obviously won't be asking the 'C' certificate candidate questions about them testing Examiner candidates.

The whole point here is that a short list of questions such as you might have in mind for a 'B' certificate test is not sufficient. You can ask questions if you wish but the emphasis should be on a longer, more informal and deeper interview so that you can satisfy yourself that the candidate does have the required 'satisfactory depth of knowledge'.

Remember that on **no account** can a good performance in this section of the test make up for a flying test that you considered a failure. If you have failed the candidate's flying you should tell them at the end of the flying test. However, this does not mean that you shouldn't take them through at least part of the required interview and questioning. Your advice might help them prepare better for the flying test next time and the experience of being interviewed will probably make them less nervous about this aspect of the test in future.

On the other hand, it doesn't matter how well the candidate can fly, if they cannot satisfy you that they have the depth of knowledge of model flying and the BMFA Member's Handbook required, they should not pass. The achievement scheme is a test of both flying ability and, at 'C' certificate level, depth of knowledge.

How long you talk to the candidate and how many questions you actually ask will depend on the circumstances at the time. For instance, if the candidate has done a good flying test, gives you confident answers to your queries and obviously knows what they are talking about, the questioning need not be prolonged. An acceptable test but with some rough edges can be offset to an extent by the candidate performing well during your talk with him.

A candidate who has done a test which you found just acceptable and who is not confident in their knowledge of model flying and hesitates on any questions you may ask should be interviewed for a significantly longer time and, if you are not satisfied you should not hesitate to fail them.

There is no list of approved questions and this part of the test is strictly the business of the two Examiners involved. As an Examiner you should prepare yourself thoroughly for any testing that you do to this standard and, if you wish, you may sort out a list of sensible questions and, particularly, points of view to put to the candidate. Beware of being too rigid on this, however, as it's very easy to ask the same questions each time and word will pass from candidate to candidate.

Remember that if you ask questions based on the BMFA Safety Codes; the candidate is not expected to reply to them 'parrot fashion'. You are looking for a 'thinking' pilot and common sense points of view with regards to safety and flying in general are what you should be looking for. It's more important that the candidate knows and understands the reasoning behind BMFA safety recommendations rather than being able to repeat them word perfect.



# 'C' CERTIFICATE (SCALE) EXAMINATION SHEET



Name.....BMFA No.....Date.....

Aircraft.....Scale.....Cruise/Max Speed.....

Manoeuvres 1, 2, 3 and 10 are compulsory. Before commencing the test, candidates must nominate an additional SIX of the following manoeuvres, appropriate to the original aircraft. The Examiners will determine the order in which the manoeuvres are to be flown.

## SECTION 1

(Pass Mark 7 for each manoeuvre)

|    |  | Mark<br>(10) | P/F<br>(P/ X) | Remarks<br>(eg: Reasons for down-marking) |
|----|--|--------------|---------------|---|
| 1  | Take Off (including climb out and 90° turn)                            |              |               |   |
| 2  | Figure Eight (90° + 360° + 270°)                                       |              |               |   |
| 3  | Descending Circle (360°, descent below 6m)                             |              |               |   |
|    | Chandelle (180° Climbing turn)   |              |               |   |
|    | Extend and Retract Landing Gear * (360° turn, not above 15m)           |              |               |   |
|    | Extend and Retract Flaps * (360° turn, not above 15m)                  |              |               |   |
|    | Procedure Turn (90° + 270°)  |              |               |   |
|    | Stall Turn Left/Right (direction away from examiners)                  |              |               |   |
|    | Immelman Turn  |              |               |   |
|    | Inside Loop  |              |               |   |
|    | Split 'S' (Reversal)   |              |               |   |
|    | Cuban Eight (variation to be specified beforehand)                     |              |               |   |
|    | Normal Spin (Three Turn)   |              |               |   |
|    | Roll (any non-prototypical roll type to be nominated beforehand)       |              |               |   |
|    | Touch and Go (main wheels on ground for minimum of 5m)                 |              |               |   |
|    | Overshoot (at approx. 3m)  |              |               |   |
|    | Sideslip Left / Right (minimum yaw 20°, descent below 5m)              |              |               |   |
|    | 1st Flight Function performed by subject aircraft:                     |              |               |   |
|    | 2nd Flight Function performed by subject aircraft:                     |              |               |   |
|    | Flight in a Triangular Circuit   |              |               |   |
|    | Flight in a Rectangular Circuit  |              |               |   |
|    | Flight in a Straight Line at constant height (min.100m, max height 6m) |              |               |   |
|    | Flight in straight line with one engine throttled (min. 100m)          |              |               |   |
|    | Lazy Eight (direction away from examiners, minimum bank 60°)           |              |               |   |
|    | Wingover Left / Right (direction away from examiners, min bank 60°)    |              |               |   |
|    | Inverted Flight (1/2 roll - 100m - 1/2 roll)                           |              |               |   |
|    | Derry Turn   |              |               |   |
| 10 | Approach and Landing   |              |               |   |

\* Note: Candidate may not choose both landing gear and flap demonstrations

## SECTION 2

|    |  |  |  |  |
|----|--|--|--|--|
| 11 | Realism, (Engine Sound (Tone and Tuning), Speed of the Model & Smoothness of Flight) |  |  |  |
|----|--|--|--|--|

Any general remarks affecting flight:

|  |               |      |      |
|--|---------------|------|------|
|  | Flight Result | Pass | Fail |
|  |               |      |      |

**Examiner's Name (Print)**.....

**Examiner's  
Signature**.....

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