

1. 4.2 - CLASS F2B - AEROBATIC MODEL AIRCRAFT

Note: The F2B Judges' Guide is at Annex 4B

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4.2.1 Introduction

- a) Ruling version:
In the event of any inconsistency between the original English language version of this text and any translation, the original English language version shall prevail.

- b) Terminology and wording:
In this text all the manoeuvre descriptions have been written from the **viewing point of the pilot, not of the judges**. And although it is known that control line model aircraft actually fly in hemispherical arcs, all of the following descriptions use "two dimensional" terms because when viewed by the pilot these arcs appear to be "straight line" flight paths. In addition, the following standardised wording and phraseology has been used throughout this text:

<u>Wording:</u>	<u>Definition:</u>
i) (M) manoeuvre:	means the full total of figures and segments necessary to complete the manoeuvre marked under a separate numbered heading with bold type. As example of this: the Take-off Manoeuvre (4.2.18) , the Three Consecutive Inside Loops Manoeuvre (4.2.20) , and The Single Four-Leaf Clover Manoeuvre (4.2.31) , are all referred to as a single whole manoeuvre throughout this text;
ii) figure:	means a shape, which makes up a separately recognisable complete part of a whole manoeuvre. As an example, the first loop of The Three Consecutive Inside Loops Manoeuvre (4.2.20) is referred to as a figure; but the first loop which makes the first half of the first complete figure eight in The Two Consecutive Overhead Eights Manoeuvre (4.2.30) is not referred to as a figure;
iii) segment:	means a specifically defined part of a figure (or of a whole manoeuvre) in which certain particular points are detailed. As an example, the first loop which makes the first half of the first complete figure eight in The Two Consecutive Overhead Eights Manoeuvre (4.2.30) is referred to as a segment;
iv) upright:	means the model aircraft flying in its "normal" upright attitude (that is: with its landing gear nearest to the ground);
v) inverted:	means the model aircraft flying in an attitude which is reversed from upright flight (colloquially, the model aircraft is "flying on it's back", is "flying upside-down", or is flying "inverted");
vi) "vertical":	means at right angles (perpendicular) to the ground over which the flying takes place. This word is marked with inverted commas (quotation marks) throughout this text to provide a constant reminder that the requirement is for model aircraft to fly at right angles to the ground, even if that ground has a perceptible slope;
vii) "horizontal":	means parallel to the ground over which the flying takes place. This word is marked with inverted commas throughout this text to provide a constant reminder that the requirement is for model aircraft to fly parallel to the ground, even if that ground has a perceptible slope;
viii) "straight line":	means the closest distance between two points as seen in two dimensions. These words are marked with inverted commas throughout to provide a constant reminder that the requirement (in all the square and triangular manoeuvres for example), is for a number of turns ("corners") which should be joined together with flight paths which appear to be straight lines when seen by the pilot;
ix) momentary (or momentarily):	are used throughout this text in their original dictionary definition sense (that is: something, which lasts only for a very brief period of time). So, for example, the very short period during which the model aircraft is required to be in a vertically-banked "knife-edge" attitude above the contestant's head during The Two Consecutive Overhead Eights Manoeuvre (4.2.30) is described in this text as "momentarily";
x) lateral reference:	means an imaginary line drawn upwards at right angles (90 degrees) from the ground over which flying takes place. As used in this text, this term should be used as the reference point when flying and scoring the size, positioning, symmetry, and the superimposing of various figures and manoeuvres. As

required by the respective manoeuvres, the text may refer to a lateral reference, to a lateral reference line, or to a lateral reference point. In this last case the text also defines the specific point (height) on that line where the lateral reference point should be located;

- xi) Wingover path: means the vertical climbing plus diving flight path defined as a segment of **The Single Reverse Wingover Manoeuvre (4.2.19)**.
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4.2.2 Model Aircraft Definition:

Powered control line aerobatic model aircraft in which all aerodynamic surfaces (except for the propeller plus that/those surface/s used to control the flight path) remain fixed during flight (refer to the FAI Sporting Code Section IV, Section 4C Model Aircraft, Part One, General Regulations, paragraph 1.3.2). The following limits and restrictions shall apply:

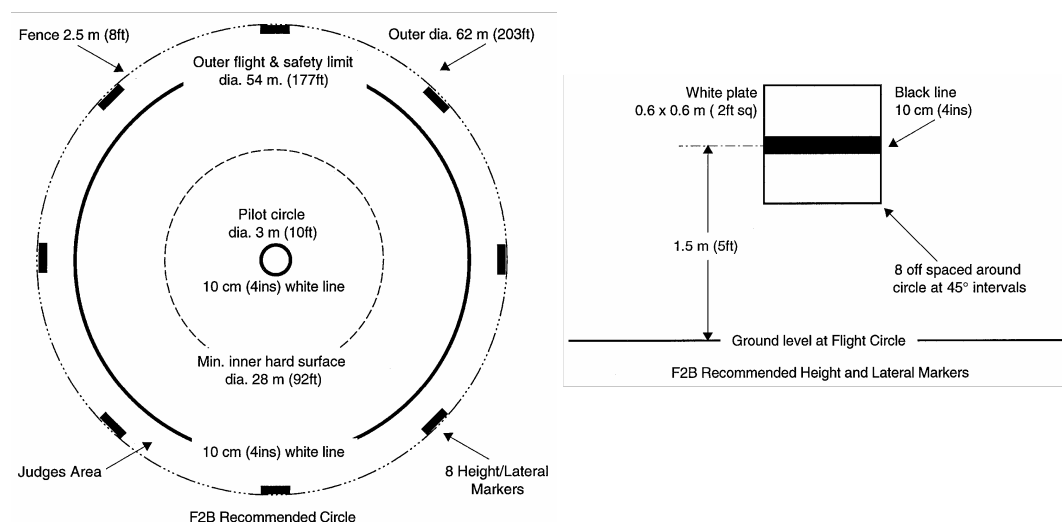
- a) Maximum total flying weight (excluding fuel) 3.5 kg.
- b) Maximum wingspan, overall, 2.0 metres .
- c) Maximum length, overall, 2.0 metres.
- d) Permitted power source/s shall include any power except rocket motors. Piston engine/s shall be subject to a total swept volume limitation of 15 cc. Electric power shall be limited to a maximum no-load voltage of 42 volts. Gas turbine engines shall be limited to 10 N static thrust.
- e) Controls 1: - General:
Wireless remote control (electrical, optical, or any other) of any control function of, and/or of any system in the model aircraft, whether operated by the pilot or by any other person, shall **not** be permitted.
- f) Controls 2: - Primary Control Function:
Control of the model aircraft's flight path shall be performed by manually activated and mechanically linked flight control elements. This function must be manually controlled by a hand-held control handle manipulated by the pilot located on the ground at the centre of the model aircraft's flight circle. **No** automatic control of the model aircraft's flight path shall be allowed.
- g) Controls 3: - Secondary Control Function/s:
May include, but are not limited to: landing gear operation, built-in engine starters. Such functions may be controlled by the pilot only (via wires/cables but **not** via any form of remote control), or may function completely automatically. The frequency of any electromagnetic pulses transmitted through wires/cables to the model aircraft shall not exceed 30 kHz.
- h) Controls 4: - Control of Powerplant 1 - Piston Engines (including "Wankel" rotary types):
No outside control of the engine/s in-flight power output shall be permitted, either by the pilot or by any other person, whether or not such control is direct to the engine/s or via propeller/s with variable pitch. For the purposes of this paragraph, the term "in-flight" shall mean the time between the release of the model aircraft for the Take-off Manoeuvre and the end of the Landing Manoeuvre. Active or dynamic automatic power output control based on flight parameters such as, but not limited to: model aircraft speed; angular speed; centrifugal force; line pull; flying height; or any combination or derivation thereof; shall also **not** be permitted. However, if **not** used for the purpose of active power and/or throttle control, the following shall be permitted:
 - i) Passive or static devices controlling rate of fuel flow or fuel pressure (for example "uniflow" fuel tanks);
 - ii) Passive or static exhaust systems (for example tuned-length exhaust pipes to control engine rpm);
 - iii) Provided they are used only to end a flight, the use of engine/s shut-off systems, either operated by the pilot or functioning fully automatically, shall be permitted, **subject to the restriction at paragraph e) above.**
- i) Controls 5: - Control of Powerplant 2 – Other than piston engines:
Engine power controlling systems, whether pilot-operated or automatic, shall be permitted, **subject to the restriction at paragraph e) above.**
- j) The minimum length of control lines shall be 15.0 metres, the maximum length 21.5 metres, to be measured from the centre-line of the grip of the control handle to the centre-line of the propeller. Where model aircraft with multiple power sources are used the longitudinal (fore and aft) centre line of the model

aircraft shall be taken as the reference for measurement. Control lines shall be checked in accordance with 4.2.7 during all contests.

- k) The noise limit set out at paragraph 4.2.8 c) shall apply to all power sources.
- l) Paragraph B3.1 of the FAI Sporting Code Section IV, Volume ABR, Section 4B, (the builder of the model aircraft rule) shall not apply to Class F2B.
- m) The sentence in paragraph 1.3.2 of the FAI Sporting Code Section IV, Volume ABR, Section 4C, "No other means of controlling the model aircraft or the engine may be employed during the takeoff and flight except that exercised by the pilot through the line or lines" shall not apply to Class F2B.

4.2.3 Flying Sites

- a) Contest organisers shall provide a site with 1 or more Contest Flight Circle/s that are horizontal within plus/minus 50 cm across the entire diameter of each circle. Contest Flight Circles shall also be flat and have smooth and ridge-free surfaces. If surfaced in asphalt, concrete, or similar hard material, the surface should be dust-free (that is: not packed gravel or sand, nor paved or tiled with openings between the paving material). Hard surfaces should, as a minimum, provide sufficient hard area to include at least the whole of the pilot's circle plus a "ring" for model aircraft to use during Take-off and Landing (see diagram below). During contest flying all grass, soil, etc, lying between these 2 areas shall be kept short enough and level so as not to interfere with control lines when model aircraft are Taking-off and Landing.
- b) If Contest Flight Circle/s are wholly grass (or similar), the same requirements as in paragraph a) above shall apply, and also, the centre (pilot's) circle and Take-off and Landing area should have an underlying surface which is free from any bumps and/or holes. The standard required shall be better than that of a typical local sports field (a football field for example), and should be as close as possible to a high quality, level, well-tended and well-drained domestic lawn. The length of grass shall be kept to a maximum of 2.5 cm over the complete Contest Flight Circle during contest flying.
- c) The diagrams below show the recommended dimensions for Contest Flight Circles and also show markers erected to display every $\frac{1}{8}$ th of a lap interval, plus the normal level flight height (together with their related upper and lower height tolerances). As a minimum standard all Contest Flight Circle/s shall have the centre (pilot's) circle and outer diameter circle clearly marked with lines of 10cm width. At sites that lack fixed terrain reference points the erection of markers such as those shown below is highly recommended. The erection of a safety fence (or other suitable barrier) around the outside of all Contest Flight Circles as shown below is also highly recommended.



- d) Where the contest site allows, the use of "Ready Box"/es is recommended at all contests. These should be clearly marked, segregated from general access by barriers, and be large enough to contain a model aircraft with full-length lines attached. Ideally 2 or 3 such Ready Boxes should be provided if the site is large enough. If the contest site is large enough, it is also recommended that 1 "Exit Box" is also provided. This should be positioned on the opposite side of the Contest Flight Circle to the Ready Box/es, of a similar size to the Ready Box/es, and similarly marked and segregated. Refer also to the FAI Sporting Code Section IV, Volume F2, Annex 4E, Control Line Organisers Guide, 6.2.1 (page 59); and 6.5.2 (page 60); and Appendix 1 (page 66).

- e) At World and Continental Championships and other limited international contests, organisers shall also provide Practice Circle/s. Ideally these shall be located at the contest site itself, but in any event shall not require more than 30 minutes of normal travelling time to reach from the contest site. Organisers should ideally provide a minimum of 1 Practice Circle for every 50 registered contestants. All Practice Circles shall be freely open and available for use by all contestants for at least the duration of the contest, plus ideally, also for a suitable time before the start of the contest. All Practice Circles should be as close as possible to the standard and maintenance conditions set out at paragraphs a) and/or b) above; but except for the marking of the centre of the circle (pilot's circle) and the outside diameter circle, the marking of circles as described at paragraph c) above shall not be required. However if the Practice Circle/s site is open to public access then organisers shall also erect suitable safety barrier/s and warning signs in the local language.

4.2.4 Contest Staff

- a) At World and Continental Championships and other limited international contests, contest organisers shall appoint the number of Judges required as per paragraph 4.2.11 c); an F2B Contest Director (hereafter "CD"); 1 or more Circle Marshall/s; a Head Judge; 1 or more persons to check control line lengths and conduct pull tests ("Pull Testers"); staff for classifying and ranking contestants ("Scores Tabulator/s"); and staff for checking the characteristics of the model aircraft of every registered contestant ("Model Processor/s"). Subject to the number of staff available and the times at which the various duties are to be performed, organisers may combine the above functions amongst the available staff. In such cases organisers shall ensure that duties are combined in such a way that all tasks can be performed at the time/s needed to allow the contest to proceed as required. In all cases contest organisers shall be responsible for ensuring that the appointed staff have the necessary skill, training, and experience to carry out their appointed function/s, as set out in the following paragraphs:
- b) The F2B CD shall have overall responsibility for the running of the F2B contest in accordance with the rules. He shall have overall responsibility during set up and break down of the contest site and shall be directly responsible to the FAI Jury for all matters relating to the F2B portion of the contest whilst they are at the contest site. The F2B CD shall also be responsible for ensuring that the contest organiser has communicated the required detail to the FAI at the correct times, both before and after the contest, as set out in the FAI Sporting Code and the Control Line Organisers Guide (references: FAI Sporting Code Section IV, General Section, Volume ABR, Section 4B; and Section IV, Volume F2, Annex 4E, including Appendix 1). The F2B CD shall be responsible for the overall safety of the F2B contest; for ensuring that Contest Weather conditions are observed (4.2.6); for arranging and observing official noise measurement test/s (4.2.8); for arranging Re-Flights (4.2.10, paragraphs e), f), g), or h), as applicable); and in general terms, for the accuracy of Official Timing (4.2.14). He shall also be present at every random draw for flying order conducted by the contest organiser (4.2.12, paragraphs f) and g).
- c) The Circle Marshall/s shall be Official Timekeeper for each Contest Flight Circle (4.2.14), and shall also be responsible for the smooth running of the contest in terms of ensuring that the contestants' flying order is published and distributed as quickly as possible; for ensuring that control line testing is performed within the time limit required by 4.2.7, paragraph b); that Ready Boxes (where available) are kept filled with contestants preparing to fly; or where no Ready Boxes are available, that sufficient contestants are prepared and ready to enter the Contest Flight Circle when Officially Called. The Circle Marshall shall be the contest official responsible for ensuring that contestants are Officially Called to enter the Contest Flight Circle (4.2.14), and for ensuring that each contestant leaves the Contest Flight Circle immediately after completing his Contest Flight (unless an Attempt occurs and the contestant has elected to make his second Attempt immediately, as per 4.2.10, paragraph e). The Circle Marshall shall also act as Official Timekeeper during Contest Flights, including providing the judges panel with visual indications of elapsed times, as detailed at 4.2.14.
- d) The Head Judge shall be responsible for ensuring that all judges for the contest perform their duties in accordance with 4.2.5 and 4.2.16. Also, the Head Judge shall himself be part of the judging panel/s, and shall himself score Official Flights as per 4.2.5 and 4.2.16. In addition, the Head Judge shall act as the single spokesman for all judges when communicating with the F2B CD in matters such as, but not limited to: general F2B organisation and safety; Contest Weather (4.2.6); Re-Flights (4.2.10, paragraph h); and any questions which arise regarding Timing (4.2.14), or scoring of 0 (zero) points (4.2.16, paragraphs c), d), and e). The Head Judge shall also be present at every random draw for flying order conducted by the contest organiser (4.2.12, paragraphs f), and g). At contests where 2 or more Contest Flight Circles are used the Head Judge shall appoint Deputy/ies in accordance with 4.2.11, paragraph f) who shall perform the above duties at the Contest Flight Circle/s where the Head Judge himself is not judging.
- e) Scores Tabulator/s shall be responsible for processing the Score Sheets (4.2.13) and for the classification and ranking of contestants (4.2.17).
- f) Pull Tester/s shall test control lines (4.2.7).

- g) Model Processor/s shall be responsible for checking and marking all model aircraft at World and Continental Championships and other limited international contests in accordance with the FAI Sporting Code Section IV, Volume ABR, Section 4B, paragraph B13; and Section IV, Section 4C, paragraph 2.3. Apart from the testing of control lines (4.2.7), the processing of model aircraft at other contests shall be optional and left to the discretion of respective contest organiser.

4.2.5 Judges' Duties

- a) The duty of all judges is to carefully observe each manoeuvre flown by each contestant during every Official Flight (4.2.10, paragraph a), and while being flown, to compare the execution of each such manoeuvre with the respective manoeuvre description, as set out at 4.2.18 to 4.2.32 inclusive.
- b) Each judge shall award points for each manoeuvre flown and the points which each judge awards shall be based solely upon the observation of each individual judge using his own opinion of the extent by which each flown manoeuvre has deviated from the respective manoeuvre description (4.2.18 to 4.2.32); and/or has deviated from the requirements of 4.2.14, 4.2.15, and 4.2.16.
- c) At the end of each manoeuvre the points so awarded shall be legibly written by each judge on the Score Sheet forms provided by the contest organiser (4.2.13).
- d) Judges shall also generally observe the conduct of the whole F2B contest for conformity with these rules (Volume F2, Section 4.2 of Section IV of the FAI Sporting Code), and all other relevant parts of Section IV of the FAI Sporting Code.
- e) If the contest organiser has not already done so, the complete judging panel/s at a contest shall jointly nominate one of their number to be Head Judge for the duration of the contest.
- f) In cases where a judging panel is uncertain and cannot reach a common decision on a particular matter (such as when the number of figures flown in a manoeuvre may have been mis-counted; or when the number of intervening laps flown may have been mis-counted), then the Head Judge (or his Deputy/ies if more than 1 Contest Flight Circle is being used) shall be responsible for making a final decision and for ensuring that the respective contestant's Score Sheets are marked accordingly by all members of the judging panel.

4.2.6 Contest Weather

- a) No Contest Flight (4.2.10, paragraph a) shall be started when the wind speed is equal to or greater than 9 metres per second for a continuous period of 30 seconds, as measured from the height of a person standing on the ground holding the measuring instrument overhead at arms-length. In the event of such conditions occurring the F2B CD and Head Judge shall agree a suitable delay to the contest timetable and shall inform all contestants and contest officials as soon as is practicable.
- b) For safety reasons any contestant whose Contest Flight is in progress during local electrical storm activity (thunder and/or lightning) shall be offered a Re-Flight as per 4.2.10, paragraph h). No Contest Flight shall be started when an electrical storm appears to be imminent, and if such conditions do occur the F2B CD and Head Judge shall agree a suitable delay to the contest timetable and shall inform all contestants and contest officials as soon as is practicable.

4.2.7 Testing Control Lines

- a) The length of every set of control lines to be used by each contestant, as specified at 4.2.2, paragraph j), shall be checked before every Contest Flight (4.2.10, paragraph a).
- b) Not less than 20 minutes before every Contest Flight a test load of 10 times the total weight of the model aircraft without fuel shall be evenly and smoothly applied to the assembled control handle, lines, and model aircraft. The load used in this test shall be applied once only to the control handle in such a way that the test load is equally distributed between both flight lines/cables during the whole pull test.
- c) If the control lines are disconnected from a contestant's model aircraft after a pull test was performed but before making the respective Contest Flight then that contestant's control lines and model aircraft shall again pass the above lines length check and pull test before making the respective Contest Flight.

4.2.8 Noise Testing

- a) The noise level of any contestant's model aircraft shall be officially measured if requested by: the F2B CD; or the Head Judge; or an FAI jury member present at the contest site. Such requests shall

only be made if in the opinion of the official requesting the noise test the model aircraft concerned seems to have a noise level higher than specified at paragraph c) below during an Official Flight. All requests for an official noise test shall be made only to the F2B CD.

- b) If an official noise measurement test is requested the F2B CD shall arrange this. At the same time the F2B CD shall also immediately retrieve from the Head Judge all Score Sheets for the respective contestant's Contest Flight in which the request for official noise test was made. If not performing the noise test himself the F2B CD shall officially observe the test.
- c) The official noise test procedure shall be for a noise meter to be positioned at 3.0 metres from the longitudinal (fore and aft) centre line of the model aircraft, with the model aircraft placed on the ground (ideally over a concrete or asphalt surface) adjacent to the Contest Flight Circle, and with the inboard wingtip of the model aircraft facing towards the wind (when the model aircraft is set up to fly anti-clockwise). With the motor running at its normal Take-off power setting, measurement shall be taken at 90 degrees to the flight path of the model aircraft, from the side of the model aircraft which is towards the outside of the model aircraft's flight path, and with the noise meter microphone placed on a stand 30 cm above the ground and in line with the motor/s. No noise-reflecting object shall be nearer than 3.0 metres from the model aircraft or from the noise meter microphone when measurement is taking place. If performed on a concrete or asphalt surface the maximum permitted noise level shall be **96 dB(A)**. If a hard surface is not available then the noise measurement may be taken over grass but in this case the grass shall not exceed 2.5 cm in length. When measuring noise over grass the maximum permitted noise level shall be **94 dB(A)**.
- d) The official noise test shall be carried out within the shortest practicable time after the model aircraft has landed from the Official Flight during which the request for noise test was made, and apart from refuelling, no change or adjustment or modification of any kind shall be made to the model aircraft before performing the official noise test.
- e) If the model aircraft fails the first official noise test then the contestant shall be informed immediately and the model aircraft shall be impounded by the F2B CD until a second noise meter is brought to the Contest Flight Circle area. The model aircraft shall then be officially re-tested using the second noise meter and using the same procedure as at paragraph c) above.
- f) If passing the second official noise test the model aircraft shall be considered to have passed the official noise measurement test and the F2B CD shall issue the respective Score Sheets to the Scores Processor/s so that the scores which were awarded for the Official Flight in which the request for noise test was made are processed as normal, in accordance with 4.2.17.
- g) If failing the second official noise test the F2B CD shall return the model aircraft to the contestant for modification/adjustment and shall also mark the respective Score Sheets with the remark "N, Score 0" (zero points). The Score Sheets shall then be issued to the Scores Processor/s who shall then record a score of 0 (zero) points against the respective contestant's name on Results Sheet for that Round.
- h) Any contestant may, if he wishes, ask the F2B CD to arrange an unofficial noise measurement test of his own model aircraft. This shall be performed as soon as is convenient, and in accordance with the procedure set out at paragraph c) above.

4.2.9 Number of Model Aircraft; Number of Helpers; Registration of Contestants and Helpers

- a) At all contests every contestant shall be entitled to enter a maximum of 2 model aircraft to be used for the duration of the contest, and shall be entitled to use a maximum of 2 helpers for each Contest Flight. At World and Continental Championships and at other limited international contests all helpers shall be officially registered with the contest organiser, either as a National Team supporter or as a separate contestant in his own right.
- b) At World and Continental Championships and other limited international contests each contestant shall be registered individually plus also registered as a member of his respective National Team. National Teams shall normally be restricted to a maximum of 3 members but in some cases 4 members shall be permitted, as provided by the FAI Sporting Code, Section IV, Volume ABR, Section 4B, paragraph B.3.5, page 28. As also provided therein, a defending World or Continental champion may also be registered, either as an individual entrant only, or also as a member of his respective National Team, but **not** as both (see also 4.2.17, Notes i), and ii).

4.2.10 Contest Flights; Associated Definitions and Procedures

- a) Every flight made by a registered contestant which is intended to record a score in the contest shall be referred to as a Contest Flight. A Contest Flight shall become an Official Flight at the moment the model aircraft is released to start the Take-off Manoeuvre. All Official Flights shall

result in a score being recorded against the respective contestant's name, except in the case of a Re-Flight being awarded and accepted, as provided at paragraph h) below.

- b) All contests shall be organised on the basis of Rounds, a Round being defined as complete when all registered contestants have completed 1 Official Flight (or have made 1 Attempt followed by an Official Flight; or have made 2 Attempts; as defined at paragraphs d), e), f), and g) below). At contests which include a Fly-off as per 4.2.12, paragraph i) or l), all Rounds flown before the Fly-off Rounds shall be referred to as Elimination Rounds and all Rounds flown after completion of the Elimination Rounds shall be referred to as Fly-off Rounds.
- c) All Rounds which cannot be completed within 1 day shall be continued on the next day of the contest and shall be flown on the same Contest Flight Circle and before the same judging panel as scheduled for the beginning (previous day) of that Round.
- d) Every registered contestant shall be permitted 2 Attempts to make an Official Flight. An Attempt shall have occurred when:
 - i) the contestant did not pass through the entrance to the Contest Flight Circle within 2 minutes of being Officially Called to perform a Contest Flight, as required by 4.2.14, paragraph a), or;
 - ii) the contestant did enter the Contest Flight Circle as required by 4.2.14, paragraph a), but then did not release the model aircraft for the Take-off Manoeuvre within 3 minutes of the start of official timing of the 7 minutes period; or;
 - iii) if the contestant himself declares an Attempt.

In all of the above cases the judges shall all record an Attempt against the respective contestant's name by marking an "A" on his Score Sheet (4.2.13).

- e) After making a first Attempt the contestant may choose to remain in the Contest Flight Circle, in which case he shall make his second Attempt immediately, continuing immediately with the procedure detailed at 4.2.14, from paragraph b) onwards. In such cases the judges shall retain the respective Score Sheets and use them for the second Attempt.
- f) Alternatively the contestant may choose to leave the Contest Flight Circle after his first Attempt, in which case he shall then be Officially Called to make a second Attempt at the same Contest Flight Circle after 30 minutes of leaving the Contest Flight Circle after his first Attempt. This 30-minute rule shall apply even if the contestant's first Attempt occurred at or near the end of the respective Round. In such cases the Score Sheets shall be returned to the contest organiser and then be re-issued to the judging panel in time for the respective contestant's second Attempt.
- g) If, when making his second Attempt for the respective Round, any of the following occurs:
 - i) the contestant did not pass through the entrance to the Contest Flight Circle within 2 minutes of being Officially Called, or;
 - ii) the contestant did enter the Contest Flight Circle as required by 4.2.14, paragraph a), but then did not release the model aircraft for the Take-off Manoeuvre within 3 minutes of the start of official timing of the 7 minutes period, or;
 - iii) the contestant himself declares an Attempt;

Then in all of the above cases all judges shall record this second Attempt against the respective contestant's name by marking "2A" plus "0" (zero) points on his Score Sheets, and with the respective Score Sheets then being returned to the contest organiser for the Tabulators to mark the zero score against the respective contestants name on the Results List for the that Round.

- h) A Re-Flight shall be offered to a contestant if:
 - i) wind conditions as specified at 4.2.6, paragraph a) occur during a Contest Flight, or;
 - ii) an electrical storm occurs during a Contest Flight (4.2.6, paragraph b), or;
 - iii) in the opinion of the Head Judge and F2B CD, and due solely to Contest Flight Circle ground conditions, a contestant's propeller has struck the ground causing the motor/s to stop running, or to run in such a way that it would be dangerous to fly as required by 4.2.18 to 4.2.32 inclusive, or;
 - iv) in the opinion of the Head Judge and the F2B CD, a safety-related incident which is outside the contestant's control occurs during an Official Flight, and if said incident has impaired the

respective contestant's ability to fly as required by 4.2.18 to 4.2.32 inclusive. For the purposes of illustration only, such a safety-related incident could be, but shall not be limited to: an un-supervised child or animal wandering into the Contest Flight Circle during an Official Flight.

In all of the above cases the contestant shall **not** have the respective Official Flight automatically marked as an Attempt and shall **not** be scored 0 (zero points). Instead the judges shall retain the original Score Sheets and the Head Judge (or his Deputy/ies at contests with more than 1 Contest Flight Circle in operation) shall, together with the F2B CD, offer the contestant a Re-Flight. In making the offer of a Re-Flight the marks awarded during the Official Flight in which the incident took place shall not be disclosed to the contestant. Therefore all contestants accepting a Re-Flight do so on the understanding that the scores awarded during the Official Flight in which the incident took place shall be deleted and replaced by whatever scores are awarded during the Re-Flight. If a Re-Flight is accepted, then this shall be performed as soon as possible after the contestant has accepted the Re-Flight, and on the same Contest Flight Circle and before the same judging panel as the Official Flight during which the incident took place.

4.2.11 Contest Formats and Judging Requirements

- a) Contests may be held either at sites with 1 Contest Flight Circle available (hereafter a "Single Circle" format contest), or at sites with 2 or more Contest Flight Circles available (hereafter a "Multi-Circles" format contest).
- b) At all Single-Circle format contests organisers shall schedule the contest so that all registered contestants fly a minimum of 3 Rounds (3 Elimination Rounds at contests where a Fly-off is to be included). At Multi-Circle format contests organisers shall schedule the contest so that all registered contestants fly a minimum of 2 Rounds per Contest Circle to be used (2 Elimination Rounds per Contest Circle to be used at contests where a Fly-off is included).
- c) At Single-Circle format contests Contest Flights shall be judged by a minimum of 3 judges (a minimum of 5 judges at World and Continental Championships and other limited international contests). At Multi-Circle format contests that do not include a Fly-off all Contest Flights shall be judged by a minimum of 3 judges. At Multi-Circle format contests which include a Fly-off (including at World and Continental Championships and other limited international contests) all Elimination Round Contest Flights shall be judged by a minimum of 3 judges and all Fly-off Contest Flights shall be judged by a minimum of 5 judges.
- d) All judges shall be permanently appointed to judge at a specific Contest Flight Circle for the duration of the contest, except at contests which include a Fly-off. At contests which include a Fly-off judges shall be appointed to a specific Contest Flight Circle for the duration of all Elimination Rounds and after completion of the Elimination Rounds shall then be re-appointed to judge at the single Contest Flight Circle to be used for the Fly-off Rounds, as provided at 4.2.12 paragraph k).
- e) At World and Continental Championships, at other limited international contests, and at F2B World Cup qualifying contests, every member of the judging panel appointed to each Contest Flight Circle shall be CIAM listed and approved, and shall be of a different nationality. However, at all such Single-Circle format contests 1 judge may come from the host nation and at all such Multi-Circle format contests 1 member of each judging panel appointed to each Contest Flight Circle may come from the host nation.
- f) At all Multi-Circle format contests the Head Judge shall appoint a Deputy for all the other Contest Flight Circles to be used. The appointed Deputy/ies shall act in accordance with 4.2.5, paragraph e) but in any case of doubt the respective Deputy shall confer with the Head Judge before proceeding.
- g) All the individual judges appointed to the judging panel assigned to each Contest Flight Circle shall judge every Contest Flight scheduled for their respective Contest Flight Circle. But this requirement may be relaxed in exceptional circumstances, such as, but not limited to: a judge becoming sick during a contest. In such event the F2B CD and the Head Judge shall confer (also together with an FAI Jury member if on site at the contest) regarding the replacement of the missing judge for the remainder of the contest.
- h) Organisers of World and Continental Championships and other limited entry international contests shall schedule at least 1 Judges' Calibration Flight per contest day at each Contest Flight Circle to be used. All such Judges' Calibration Flights shall take place before any Contest Flights are scheduled. All Judges' Calibration Flights shall include sufficient time for a judges' briefing before and judges' debriefing after each Judges' Calibration Flight. Said briefing and debriefing shall include the complete panel/s of judges and shall be held privately, with no contest organiser, official, or contestant present. The provision of Judges' Calibration Flights at other contests shall be optional but is strongly recommended.

- i) At all contests no judge shall be scheduled to judge more than 50 Contest Flights or perform a total of more than 10 hours of judging duty (whichever is the longer) within any single contest day. This shall include the above Judges' Calibration Flight/s (if applicable).
- j) All contest organisers shall arrange at least 1 judges' meal break per single contest day. If the judging panel/s request it, extra time shall also be scheduled for additional judges' breaks (for example: breaks of approximately 10 minutes duration at approximately 2 hourly intervals throughout each Round).

4.2.12 Contest Organisation

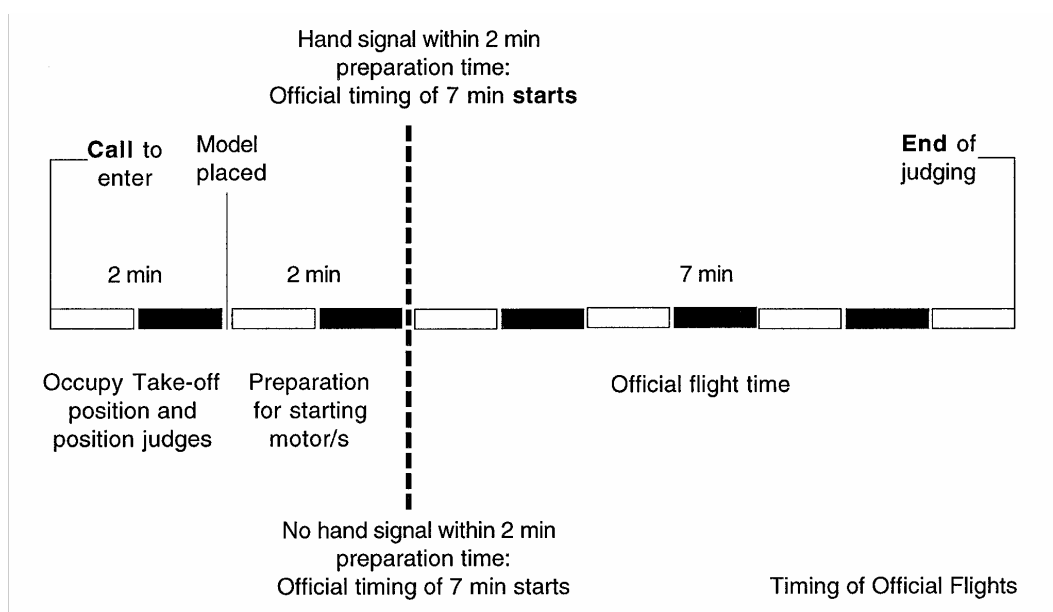
- a) Before any Contest Flights are flown at World and Continental Championships and other limited entry international contests using a Single-Circle format, organisers shall make the Contest Flight Circle available for Official Practice. At World and Continental Championships and other limited entry international contests using a Multi-Circles format, all of the Contest Flight Circles to be used for the contest shall be used for Official Practice.
- b) Official Practice at World and Continental Championships and other limited entry international contests shall consist of a single period of 10 minutes per registered contestant and the flying order for Official Practice shall be scheduled so that National Teams practice together. Once all registered contestants have completed 1 Official Practice Flight no registered contestant shall perform any further practice flying at all on any Contest Flight Circle to be used in the contest at any time during the contest. Organisers shall not however be obliged to organise flying rosters for the use of Practice Circle/s (refer to 4.2.3, paragraph e).
- c) All contest organisers shall provide a judging panel for each Contest Flight Circle to be used, as required by 4.2.11, paragraph c); and Pull Tester/s to check control lines in accordance with 4.2.7 at each Contest Flight Circle to be used.
- d) Organisers of World and Continental Championships and other limited international contests shall also provide a Circle Marshall/s to perform the duties at 4.2.4 paragraph c) at each Contest Flight Circle to be used; and Model Processor/s to check and mark model aircraft in accordance with 4.2.4, paragraph g).
- e) Before any Contest Flights or Judges' Calibration Flights begin at World and Continental Championships and other limited entry international contests, it is strongly recommended that the contest organiser arrange for the individual members of the judging panel/s to meet together at a suitable venue (privately, away from contestants) so that they can hold their own Judges' Pre-contest Briefing meeting.
- f) Contest organisers shall use a random draw to select a separate contestant to fly the Judges' Calibration Flight/s required by 4.2.11, paragraph h). This draw shall be conducted before the start of the first Round. However, contestants so drawn shall have the right to refuse to fly a Judges' Calibration Flight, in which case the organiser shall continue drawing until sufficient contestants who do agree to fly Judges' Calibration Flights have been selected. Alternatively, contest organisers may call on the services of a suitably experienced flier who is not registered as an F2B contestant in the respective contest.
- g) At all contests organisers shall schedule the flying order of all registered contestants for every Round and every Contest Flight Circle used by means of random draw conducted by the organiser before the start of any Contest Flights (except at contests including a Fly-Off, when the draw for the flying order in all Fly-Off Rounds shall be conducted after the completion of all Elimination Rounds). At World and Continental Championships and other limited international contests, all members of any single National Team shall be separated in the flying order of every Round and at every Contest Flight Circle by at least one contestant from another nation. If 2 contestants from the same National Team are initially drawn to fly consecutively during any Round on any Contest Flight Circle then the contest organiser shall continue to draw the respective Round but shall re-draw (and if necessary, continue to re-draw) the affected contestant/s to ensure that this separation requirement is met.
- h) At Multi-Circles format contests organisers shall schedule all contestants to fly each succeeding Round on the other Contest Flight Circle (when 2 Contest Flight circles are used), or consecutively on all other Contest Flight Circles to be used (if more than 2 Contest Flight Circles are used).
- i) At World and Continental Championships and other limited international contests, organisers shall also arrange an additional Fly-off amongst the 12 contestants holding the best scores (plus any contestants with scores tying for the 12th place) after calculating placings at the end of the last Elimination Round (4.2.17, paragraph d).

- j) The Fly-Off shall consist of 3 separate Fly-Off Rounds, all to be flown on the same Contest Flight Circle, regardless of the number of Contest Flight Circles used for Elimination Rounds. Fly-Off Rounds shall be scheduled with a minimum of 15 minutes and a maximum of 60 minutes break between each. The flying order for each Fly-Off Round shall be established by separate random draws conducted by the contest organiser for each separate Fly-Off Round in accordance with the Team member separation provisions of paragraph g) above.
- k) At contests with a Single Circle format every Fly-Off Flight shall be judged and scored by all the available judges. At contests using a Multi-Circles format the organiser shall select only 1 of the Contest Flight Circles for all Fly-Off Flights and the Head Judge and Deputy Head Judge/s shall confer to select a minimum of 5 judges from the total number of available judges. Regardless of the number of judges selected for Fly-off judging, all selected judges shall judge all Fly-Off Flights.
- l) Subject to available time, number of entries, and any other relevant considerations (for example, a particularly large number of Junior contestants), organisers of other contests are also encouraged to arrange a Fly-Off (or Junior Fly-Off) which should be organised generally in accordance with the principles of paragraphs i), j) and k) above.

4.2.13 Contest Procedures

- a) As scheduled by the random draw conducted before the start of all Contest Flights (4.2.12, paragraph g), all contestants shall be Officially Called in the order drawn, with each contestant to be Officially Called a minimum of 20 minutes before the time scheduled for his Contest Flight.
- b) Contest organisers shall provide each judge with a Score Sheet form for each Contest Flight to be flown by each registered contestant. At Multi-Circles format contests this Score Sheet shall include an indication of the Contest Flight Circle on which the respective Contest Flight is to be flown as well as a flight number. If not issued in batches before the start of each Round then a Score Sheet shall be issued to each judge immediately before the start of every Contest Flight by every registered contestant. Contest organisers shall **not** however issue any Score Sheets to the judges for use during any Judges Calibration Flights (4.2.11, paragraph h).
- c) Said Score Sheets shall be legibly completed by each judge and unless retained by the judging panel/s as per 4.2.10, paragraphs f) or h), shall then be collected as soon as possible after the end of every Contest Flight. All completed Score Sheets shall then be immediately processed as described at 4.2.17.
- d) Contest organisers shall also provide each contestant with copies of the original Score Sheets that were completed by the judges for his Official Flight as soon as possible after the end of each Round. No copy Score Sheets shall include the names or distinguishing marks of the individual judges. At World and Continental championships and other limited international contests, organisers may issue said copies to the respective Team Manager or Assistant Team Manager instead of to individual contestants.

4.2.14 Timing, Positioning Model Aircraft, and Starting Motor/s



- a) From the moment that he is Officially Called to enter the Contest Flight Circle, each contestant shall be allowed 2 minutes to enter; to position the judging panel as he feels is appropriate; and to place his model aircraft on the ground at his selected Take-off position. Official Timing of this 2-minute period shall start from the moment the contestant steps onto the Contest Flight Circle itself (or if applicable, passes through the Contest Flight Circle entrance).
- b) Once the contestant has placed his model aircraft on the ground as per paragraph a) above the Official Timing of a 2-minute preparation period before starting motor/s shall start. The Official Timekeeper shall inform the contestant at the moment that Official Timing of this preparation period has been started and shall also signal the start of this period to the judging panel.
- c) A complete Official Flight (including motor/s starting plus all manoeuvres as listed at 4.2.18 to 4.2.32 inclusive) shall be completed within 7 minutes. The Official Timing of this period will normally start when the Official Timekeeper and judging panel acknowledge the contestant's clear hand signal given when ready to start but before actually starting his motor/s, as per paragraph d) below. But Official Timing shall in no case begin later than 2 minutes after the start of the preparation period detailed at paragraph b) above. If the contestant has given no clear hand signal to indicate ready for engine start once the 2-minute preparation period has expired, or if the contestant starts his motor/s without giving the hand signal and receiving acknowledgement, then the Official Timekeeper shall immediately inform the contestant and signal to the judging panel that Official Timing of this 7-minute period has started.
- d) The contestant shall give a clear hand signal prior to starting his motor/s and the Official Timekeeper and Head Judge must both have acknowledged this before the contestant proceeds. Official Timing shall therefore have started upon said acknowledgement.
- e) All judges shall award 10 bonus points if the model aircraft begins its ground roll for the Take-off Manoeuvre within 1 minute of giving the ready to start hand signal. Both manual and motor starting devices such as electric starters shall be permitted and the 10 bonus points shall be awarded if the above 1 minute condition is fulfilled, whatever the method of motor starting used. But no bonus points shall be given if:
 - i) no hand signal is given, or;
 - ii) the contestant starts his motor/s before his hand signal has been acknowledged, or;
 - iii) the Take-off ground roll begins more than 1 minute after his hand signal was acknowledged.
- f) The timing of an Official Flight shall stop at the moment when the model aircraft has come to a full stop at the end of the ground roll that completes the Landing Manoeuvre.

4.2.15 Executing Manoeuvres

- a) All manoeuvres must be executed in the order 4.2.18 to 4.2.32 inclusive.
- b) Every contestant shall leave at least 1¹/₄ laps plus the recommended Entry and Exit procedure detailed for each manoeuvre to create a pause period between the end of one manoeuvre and the start of the next. The 1¹/₄ intervening laps shall be flown at a height of between 1.0 and 3.0 metres. Judges shall not however officially observe any of these pause periods but instead shall use this time to enter the score awarded for the previous manoeuvre onto the contestant's Score Sheet before the next manoeuvre is started.

4.2.16 Judging, Scoring, and Marking Procedures

- a) Once an Official Flight has begun the judges may, of their own accord, change their original position (as may have been directed by the contestant before the start of his Contest Flight), but such position change shall not exceed a maximum of ¹/₈ of a lap ahead of or behind their original position as at the beginning of the respective Official Flight. Judges shall only change position during the 1¹/₄ intervening laps flown between manoeuvres and **not** while any manoeuvre is being flown.
- b) Every judge shall award points to every registered contestant during every Official Flight for every manoeuvre flown in the correct sequence 4.2.18 to 4.2.32 inclusive. Judges shall only score each contestant's first attempt at each manoeuvre. The awarding of points shall be in accordance with 4.2.5, paragraphs a), b), and c), and the number of points awarded may vary between 1 point and 10 points. All marks between the 1 point minimum and the 10 point maximum shall be awarded in increments of a minimum of one tenth of a point (0.1).
- c) All judges shall award a score of 0 (zero) points for:
 - i) all manoeuvres which are not attempted at all;
 - ii) all manoeuvres which are started but not completed;
 - iii) all manoeuvres with an incorrect number of repeat figures (either too few or too many);
 - iv) all manoeuvres flown out of the sequence 4.2.18 to 4.2.32 inclusive (but see also paragraph d) below);
 - v) every manoeuvre flown without a minimum of 1¹/₄ laps interval between each manoeuvre;
 - vi) the complete Landing Manoeuvre if any of the conditions set out at 4.2.32, paragraph e) occur;
 - vii) a second Attempt (4.2.10, paragraph g) when all judges shall mark the respective Score Sheets with "0" (zero) points plus "2A".
- d) All manoeuvres not attempted at all shall be scored 0 (zero) by all judges, as per paragraph c), item i) above. But provided that the remaining manoeuvres are attempted, and provided also that they are attempted in whatever remains of the sequence 4.2.18 to 4.2.32 inclusive, then the remaining manoeuvres shall be considered to be in the correct sequence and shall therefore be scored in accordance with paragraph b) above.
- e) If a crash interrupts an Official Flight then every judge shall score all completed manoeuvres in accordance with paragraph b) above, up to and including scoring the last whole manoeuvre that was completed before the crash occurred. All other manoeuvres still remaining in the sequence 4.2.18 to 4.2.32 inclusive after the crash occurred (plus the manoeuvre in which the crash itself occurred), shall all be scored 0 (zero) points.
- f) In cooperation with the F2B CD, the Head Judge (or if applicable, the Deputy Head Judge) shall ensure that all scores awarded to a contestant for the respective Official Flight shall be discarded and marked as 0 (zero points) if either of the following occur:
 - i) any part/s of the model aircraft become detached from the model aircraft (intentionally or otherwise) at any time from the moment of release for the Take-off Manoeuvre until the moment that the model aircraft first touches down from the Landing Manoeuvre;
 - ii) a model aircraft fails the second official noise test (4.2.8, paragraph g);
- g) In all of the manoeuvre descriptions in this document (4.2.18 to 4.2.32 inclusive), the first numbered paragraph, "a) Start of Manoeuvre", is also the point at which the judges shall start officially observing the manoeuvre in order to award points; and the last numbered paragraph "x) End of Manoeuvre" is also the point at which the judges shall stop officially observing the manoeuvre and stop awarding points.

- h) All the manoeuvre descriptions in this document (4.2.18 to 4.2.32 inclusive) also include un-numbered paragraphs marked "Recommended entry procedure" and "Recommended exit procedure". These are recommendations for use by the contestants only and judges shall not officially observe these procedures, nor shall they award any points at all for these procedures, regardless of whether performed in accordance with the recommendations or not.
- i) When performed after the completion of The Single Four-Leaf Clover Manoeuvre (4.2.31) but before the start of The Landing Manoeuvre (4.2.32), other manoeuvring shall be permitted. All such manoeuvring shall not be officially observed nor scored by the judges.

4.2.17 Classifying and Ranking Contestants

- a) At all contests the Scores Tabulator/s shall check each incoming batch of Score Sheets for legibility and completeness (including the Contest Flight Circle Number/Identifier if applicable). If necessary any Score Sheets with queries shall be retained before processing until a convenient point in the contest allows direct clarification with the judge/s concerned. At all contests the scores awarded by the judges shall be processed as follows:

- b) The marks awarded by each judge for each manoeuvre shall be multiplied by the following K-Factors:

Manoeuvre	K-Factor
Starting	1
Take-off	2
Reverse Wing Over	8
3 Inside Loops	6
Inverted Flight	2
3 Outside Loops	6
2 Inside Square Loops	12
2 Outside Square Loops	12
2 Inside Triangular Loops	14
2 Horizontal Eights	7
2 Square Horizontal Eights	18
2 Vertical Eights	10
Hourglass	10
2 Overhead Eights	10
Four Leaf Clover	8
Landing	5

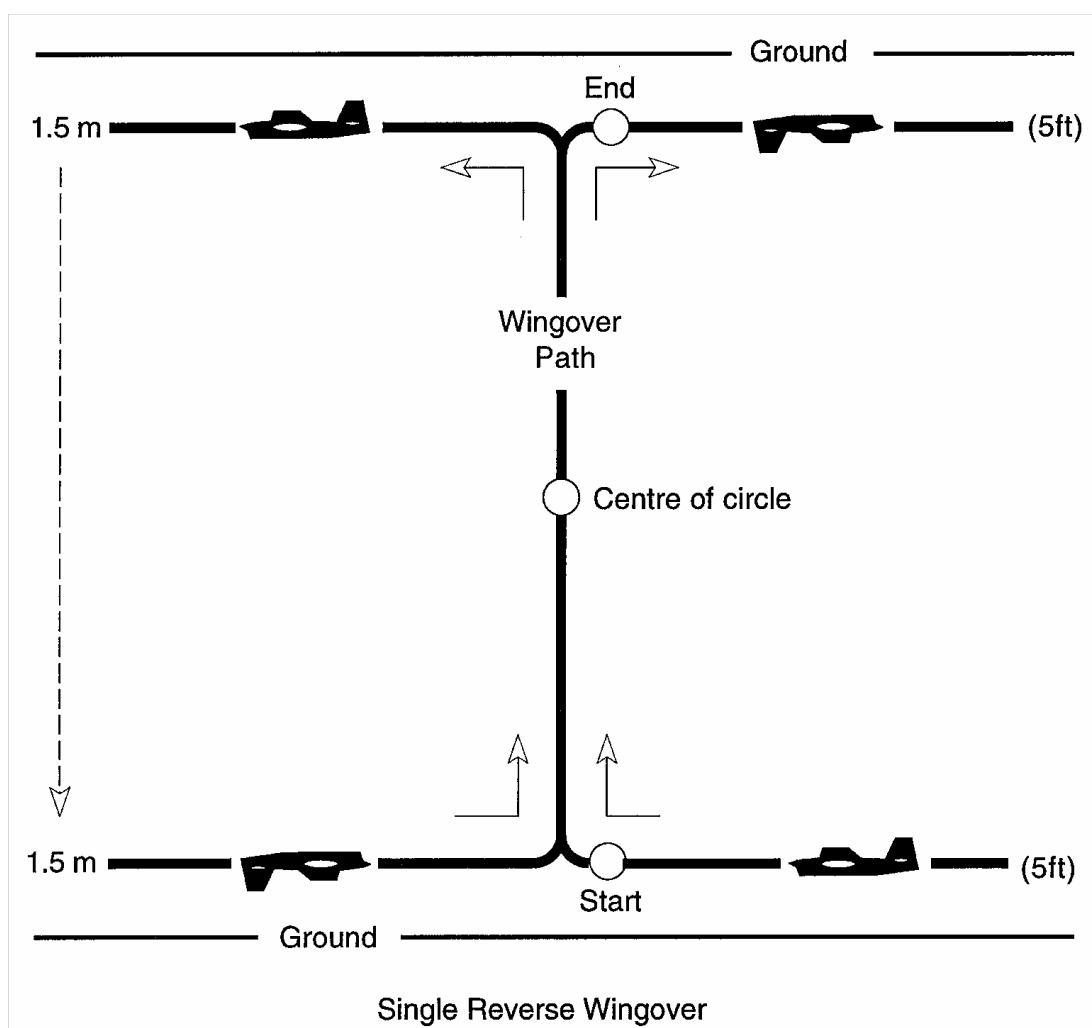
- c) The score for the respective manoeuvre shall be calculated by adding the original marks multiplied by the respective K-Factor above. The resulting total scores for each manoeuvre shall then be added together to produce a single total score per judge.
- d) The resulting single scores shall then be totalled and then divided by the number of judges and then rounded down to a single digit after the decimal point to produce the contestant's average final score per Official Flight.
- e) The total points score resulting from paragraph d) above shall then be entered against the respective contestant's name onto a Results Sheet, with one Results Sheet listing all registered contestants to be provided at the end of each Round. As soon as practicable after the completion of each Round copies of the completed Results Sheet for the respective Round shall be posted, plus issued to contestants and other interested parties. However no Results Sheets shall be issued to any of the judges before the end of the contest.
- f) At contests with no Fly-off included organisers shall calculate the final position reached in the contest by all registered contestants ("placings") as soon as practicable after completion of the last Round. Regardless of the number of Rounds flown, each contestant's placing shall be processed as follows:
- at Single-Circle format contests organisers shall take each contestant's 2 highest flight scores and add them together. The resulting total shall then be divided by 2. In case of ties the 3rd highest scores of the affected contestants shall be used to determine placings;
 - At Multi-Circle format contests organisers shall take each contestant's highest score from each Contest Flight Circle, add them together and then divide the resulting total by the number of Contest Flight Circles used at the contest. In case of ties, the affected contestants' 2nd highest score from any of the Contest Flight Circles shall be used to determine placings;
 - if, due to extraordinary circumstances, only 2 complete Rounds were flown, then each contestant's score from both the completed Rounds shall be used for placing.

- g) At contests when a Fly-Off is included the same procedure as at paragraphs b), c), and d) above shall be completed to determine the top 12 contestants (plus any other contestant/s tying for the 12th place) at the completion of the last Elimination Round. The contestants qualifying for the Fly-off shall then be re-drawn for a new flying order in each of the 3 separate Fly-Off Rounds.
- h) At all contests which include a Fly-off, only Fly-off scores shall be used for final placing in the contest, and all contestants taking part in the Fly-Off shall automatically be placed ahead of all contestants who did not qualify for the Fly-Off.
- i) For the final placing of Fly-off contestants the procedure shall follow the averaging principle set out in paragraph d) above by adding the 2 highest Fly-off scores for each contestant and then dividing the resulting total by 2. In case of ties, the 3rd highest Fly-off score shall be used to determine the final placings of affected contestants. If, due to extraordinary circumstances, only 2 complete Fly-off Rounds were flown then each contestant's Fly-off score from both Fly-off Rounds shall be used for final placing.
- j) At World and Continental Championships and other limited international contests only, organisers shall also rank the Final Results of all registered contestants for classification by National Teams. This shall be done by adding the final placings for the members of each National Team, and if applicable, shall include the results of the Fly-Off (paragraphs e), f) and g) above). National Teams shall be ranked by placing the lowest numerical total of each National Team member's placing in the highest National Team position, with complete teams (3 contestants) ranked ahead of teams with 2 contestants, and with 2 contestant teams ranked ahead of teams with only 1 contestant. For example, the 3 members of the team from "Country A" team achieve 1st, 5th, and 9th places (total 15), but the "Country A" team shall be ranked ahead of the team from "Country B" (whose 2 members achieved 2nd and 10th places, total 12). As above, this is because the team from "Country B" had only 2 team members, whereas the team from "Country A" had 3 members.

Notes:

- i) In accordance with the FAI Sporting Code, Section IV, Volume ABR, Section 4B, paragraph B.3.5, page 28, there are occasions when a National Team can consist of a 4th (Junior) member. In this event the procedure for classifying National Teams shall be followed as above, with the 3 highest placings of the respective National Team to be used, regardless of whether or not it was a Junior who scored one of those highest placings.
- ii) In addition, the FAI Sporting Code, Section IV, Volume ABR, Section 4B, paragraph B.3.5, page 28 provides that a currently reigning World or Continental Champion may defend his title in the next respective (World or Continental) Championship. Such participation may, subject to the provisions of paragraph B.3.5 as detailed above, be on the basis that the defending Champion is (I) a member of his respective National Team, or is (II) simply a single separate entrant. In both such cases the individual Final Results placing of the defending Champion shall be calculated as for all other contestants, including Fly-Off placing if applicable. However, if such defending Champion is participating on the basis of being a single separate entry (II above) and **not** as a member of his respective National Team, then his Final Results placing shall **not** be used for the ranking of any National Team.
- iii) At World and Continental championships and other limited international contests when 5 or more Junior contestants are registered, organisers should also consider awarding a separate title (such as Junior World or Junior Continental Champion). In such cases Organisers shall rank all Juniors both within the main Final Results listing as for all other contestants, and **also** as separate Junior contestants within a separate Junior Final Results Sheet. The Junior Final Results placings shall be calculated from the placings of all Junior contestants only, but as per the principles of paragraphs d), e), f), and g) above, as applicable. Thus the 3 highest placing Juniors shall be ranked separately as 1st, 2nd, and 3rd placed Junior contestants. Juniors shall not be ranked according to nation, as in paragraph h) above, but where the number of Junior contestants is sufficient, it is recommended that organisers also arrange a separate Juniors-Only Fly-Off, as per the principles of paragraphs e), f), and g) above. Also, according to their scores within the Results Sheet for all contestants in the contest at the end of the Elimination Rounds, Junior contestants may also participate in the Fly-Off as for any other contestant. In that case, Junior contestants at a contest with both a Fly-Off **and** a Juniors' Fly-off would receive 2 placings within the Final results of the contest - one for their placing in the Juniors' Fly-Off and another for the placing in the Fly-Off

4.2.19 The Single Reverse Wing Over Manoeuvre

Note:

All turns in this manoeuvre should be between 1.5 metres and 2.1 metres radius.

Recommended entry procedure:

From normal upright level flight at a height of 1.5 metres.

- a) Start of Manoeuvre:
At the beginning of the first turn from normal upright level flight into a "vertical" climb.
- b) The first "vertical" climb and dive segment:
The model aircraft should turn sharply into a "vertical" climb and should then maintain a "straight line" climb that is at right angles to the ground. It should pass directly over the flyer's head and then change into a "straight line" dive that is also at right angles to the ground. This dive should continue until the second turn, which should sharply turn the model aircraft from its dive into normal "straight line" inverted level flight at a height of 1.5 metres.
- c) The inverted "horizontal" level flight segment:
After recovery from the first "vertical" dive and until the start of the turn into the second "vertical" climb, the model aircraft should fly a segment of smooth inverted level flight segment which is parallel to the ground at a height of 1.5 metres, with no height deviations of more than plus/minus 30 cm, and with no abrupt changes in attitude. The length of this segment, including turns, should be $\frac{1}{2}$ a lap.
- d) The second "vertical" climb and dive segment:
The model aircraft should turn sharply into a "vertical" climb and should then maintain a "straight line" climb that is at right angles to the ground. The model aircraft should pass directly over the flyer's head and then change into a "straight line" dive that is also at right angles to the ground. This dive should continue until the fourth turn, which should sharply turn the model aircraft from its dive

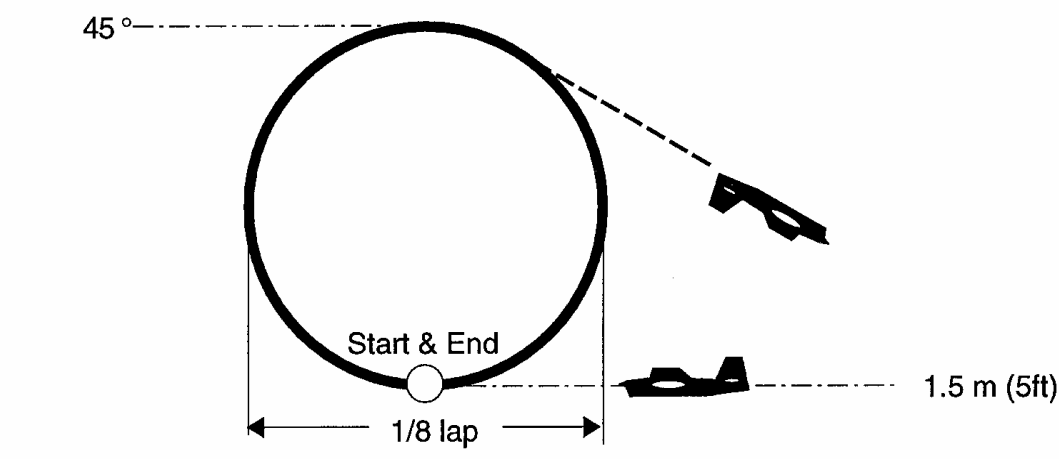
into normal "straight line" upright level flight at a height of 1.5 metres, that height to be met within plus/minus 30 cm. The point where the model aircraft starts its recovery turn into normal upright level flight at the end of the whole manoeuvre should be exactly opposite the point where the model aircraft first reached a "vertical" climb attitude at the start of the complete manoeuvre.

- e) End of Manoeuvre:
The end of the fourth turn (recovery to normal upright level flight).

Recommended exit procedure:

Continue normal upright level flight at 1.5 metres.

4.2.20 The Three Consecutive Inside Loops Manoeuvre



Three Consecutive Inside Loops

Manoeuvre size, overall:

Height 45 degrees line elevation angle; width $\frac{1}{8}$ th of a lap.

Recommended entry procedure:

From normal upright level flight at a height of 1.5 metres.

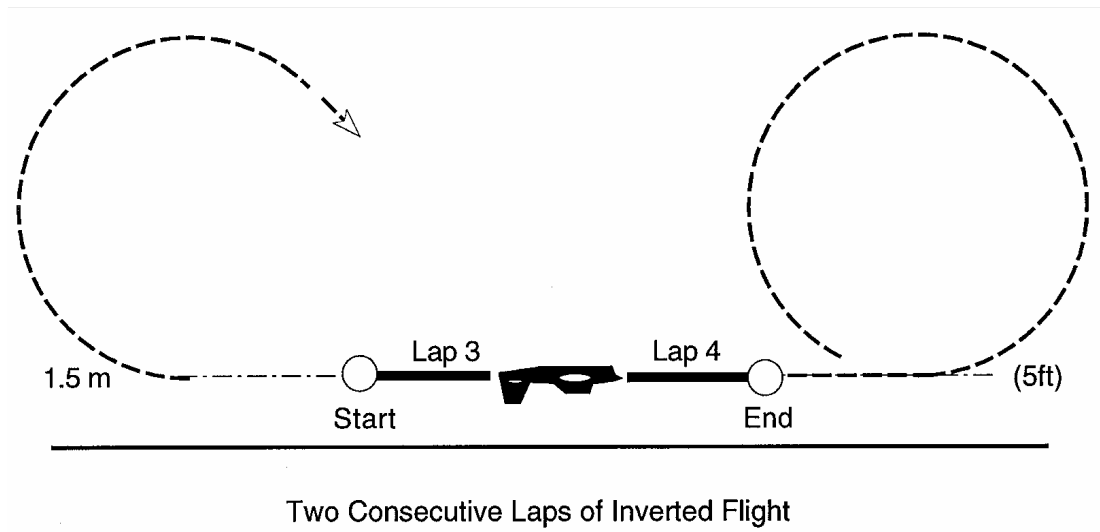
- a) Start of Manoeuvre:
At the start of the first loop, as the model aircraft departs normal upright level flight.
- b) The first loop figure:
From normal upright level flight at 1.5 metres plus/minus 30 cm, the model aircraft should fly smoothly upwards along a circular flight path until reaching a height of line elevation angle 45 degrees. At that point the model aircraft should be inverted. Without interruption the model aircraft should continue its circular flight path downwards until passing the bottom of the loop at a height of 1.5 metres plus/minus 30 cm, in upright flight. The whole flight path should be circular and smooth, with no deviations and no flat spots. When the model aircraft reaches a "vertical" attitude for the first time this has defined the lateral reference line for the whole manoeuvre.
- c) The second and third loop figures:
The model aircraft should follow a flight path exactly as described above. The second and third loops should be placed in exactly the same position as the first loop, and should be of exactly the same size.
- d) End of Manoeuvre:
At the end of the third loop, as the model aircraft completes recovery into normal upright level flight.

Recommended exit procedure:

The model aircraft should continue for another half loop, recovering inverted and descending to the normal inverted flight level within $\frac{1}{2}$ a lap, remaining inverted at a height of 1.5 metres.

next Manoeuvre next page

4.2.21 The Two Consecutive Laps of Inverted Level Flight Manoeuvre



Recommended entry procedure:

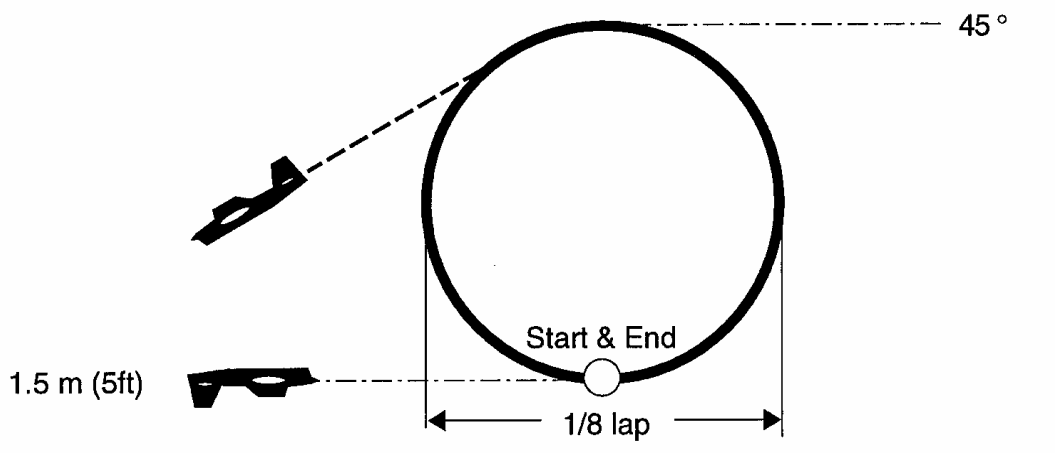
From inverted level flight at a height of 1.5 metres.

- Start of Manoeuvre:
At the start of the third lap after the exit from the previous manoeuvre.
- 2 laps of inverted flight segment:
The model aircraft should maintain 2 complete laps of smooth and stable inverted flight at a height of 1.5 metres with no height deviations of more than plus/minus 30 cm, and with no abrupt changes of attitude.
- End of Manoeuvre:
At the end of the fourth lap after the exit from the previous manoeuvre.

Recommended exit procedure:

Continue inverted flight, remaining at the normal level flight height of 1.5 metres until entry to the next manoeuvre.

4.2.22 The Three Consecutive Outside Loops Manoeuvre



Manoeuvre size, overall:

Height 45 degrees line elevation angle; width $\frac{1}{8}$ th of a lap.

Recommended entry procedure:

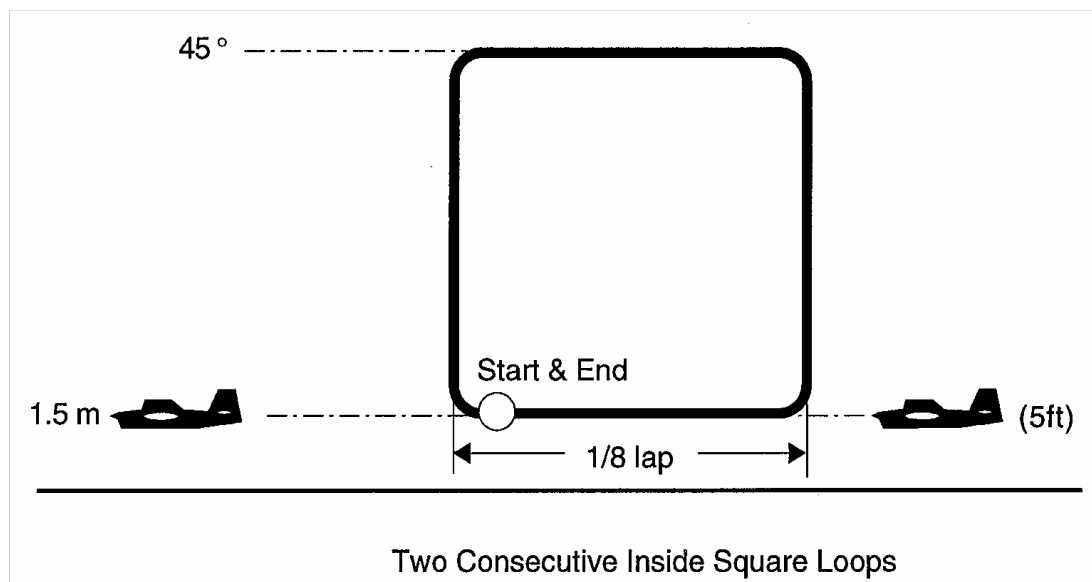
From inverted level flight at a height of 1.5 metres.

- a) **Start of Manoeuvre:**
At the beginning of the first loop, as the model aircraft departs level inverted flight.
- b) **The first loop figure:**
From level inverted flight at a height of 1.5 metres plus/minus 30 cm, the model aircraft should fly smoothly upwards along a circular flight path until reaching a height of line elevation angle 45 degrees. At that point it should be upright. Without interruption the model aircraft should continue its circular flight path downwards until passing the bottom height of 1.5 metres plus/minus 30 cm, in inverted flight. The whole flight path should be circular and smooth, with no deviations and no flat spots. When the model aircraft reaches a "vertical" attitude for the first time this has defined the lateral reference line for the whole manoeuvre.
- c) **The second and third loop figures:**
The model aircraft should follow a flight path exactly as described above. The second and third loops should be placed in exactly the same position as the first loop, and should be of exactly the same size.
- d) **End of Manoeuvre:**
At the end of the third loop, as the model aircraft passes a height of 1.5 metres, plus/minus 30 cm, in inverted level flight.

Recommended exit procedure:

Continue for another half loop, recovering to upright flight and then descending to the normal upright level height of 1.5 metres.

4.2.23 The Two Consecutive Inside Square Loops Manoeuvre



Note:

All turns in this manoeuvre should be between 1.5 metres and 2.1 metres radius.

Manoeuvre size, overall:

Height 45 degrees line elevation angle; width $\frac{1}{8}$ th of a lap.

Recommended entry procedure:

From normal upright level flight at a height of 1.5 metres.

- a) **Start of Manoeuvre:**

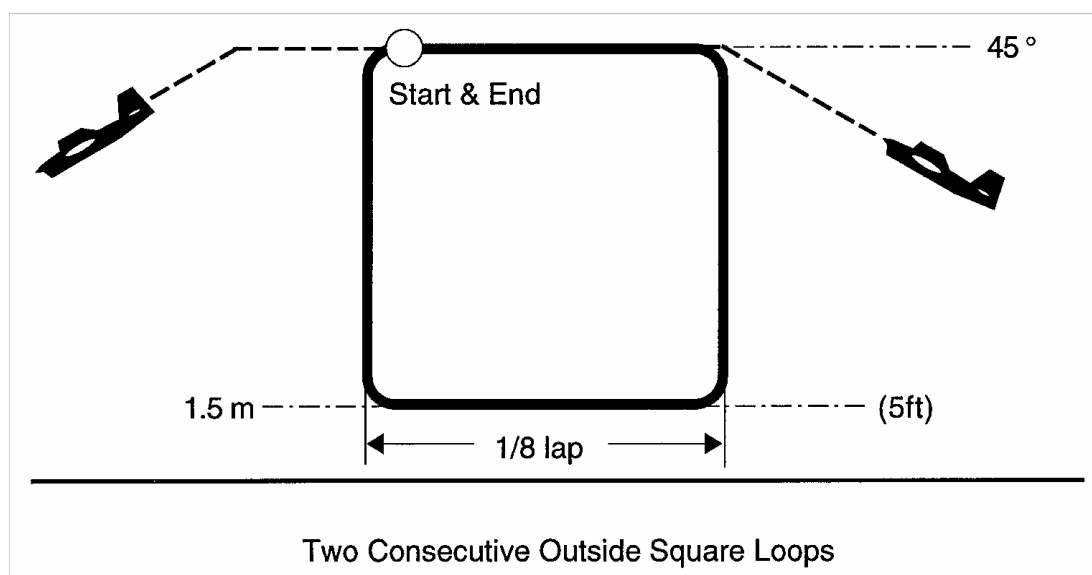
At the point where the model aircraft begins its first turn into a "vertical" climb from normal upright level flight.

- b) First loop figure - first turn plus "vertical" climbing segment:
The model aircraft should sharply turn into, and then steadily maintain, a "straight line" climb that is at right angles to the ground.
- c) First loop figure - second turn plus top "horizontal" segment:
The model aircraft should turn sharply into, and then steadily maintain inverted level flight at a height of 45 degrees line angle elevation. The level portion of this flight path should be parallel to the ground.
- d) First loop figure - third turn plus "vertical" diving segment:
The model aircraft should sharply turn into, and then steadily maintain, a "straight line" dive that is at right angles to the ground.
- e) First loop figure - fourth turn plus bottom "horizontal" segment:
The model aircraft should sharply turn into, and then steadily maintain upright level flight at a height of 1.5 metres, plus/minus 30 cm, The level portion of the flight path should be parallel to the ground and the total length of the bottom segment, including both turns, should be $\frac{1}{8}$ th of a lap.
- f) The second loop figure:
The model aircraft should follow a flight path exactly as described in the segments above. The second loop should be placed in exactly the same position as the first loop, and should be of exactly the same size.
- g) End of Manoeuvre:
In normal upright level flight at a height of 1.5 metres, plus/minus 30 cm, at the point where the model aircraft started its first turn into a "vertical" climb at the beginning of the complete manoeuvre.

Recommended exit procedure:

Maintain normal upright level flight at 1.5 metres.

4.2.24 The Two Consecutive Outside Square Loops Manoeuvre



Note:

All turns in this manoeuvre should be between 1.5 metres and 2.1 metres radius.

Manoeuvre size, overall:

Height 45 degrees line elevation angle; width $\frac{1}{8}$ th of a lap.

Recommended entry procedure:

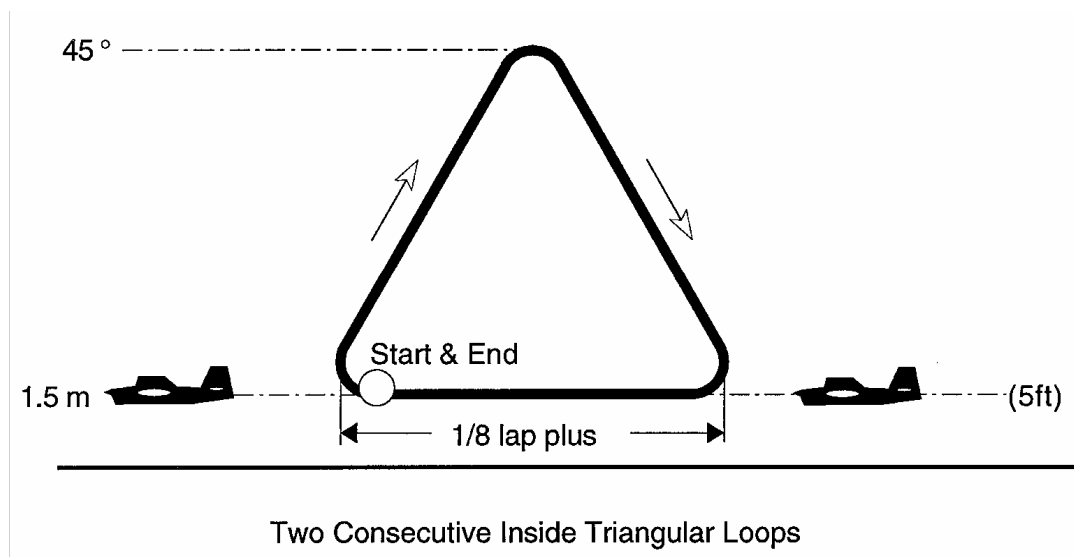
Use $\frac{3}{4}$ of a lap to climb to a height of 45 degrees line elevation angle and maintain this height in upright level flight for $\frac{1}{8}$ th of a lap.

- a) **Start of Manoeuvre:**
At the point where the model aircraft begins its first turn into a "vertical" dive from 45 degrees line elevation angle.
- b) **First loop figure - first turn plus "vertical" diving segment:**
The model aircraft should sharply turn into, and then steadily maintain, a "straight line" dive that is at right angles to the ground.
- c) **First loop figure - second turn plus bottom "horizontal" segment:**
The model aircraft should turn sharply into, and then maintain smooth and steady inverted level flight at a height of 1.5 metres without deviating by more than plus/minus 30 cm. The level portion of this flight path should be parallel to the ground and the total length of the bottom segment, including both turns, should be exactly $\frac{1}{8}$ th of a lap.
- d) **First loop figure - third turn plus "vertical" climbing segment:**
The model aircraft should sharply turn into, and then steadily maintain, a "straight line" climb that is at right angles to the ground.
- e) **First loop figure - fourth turn plus top "horizontal" segment:**
The model aircraft should sharply turn into, and then steadily maintain upright level flight at a height of 45 degrees line elevation angle. The level portion of this flight path should be parallel to the ground.
- f) **The second loop figure:**
The model aircraft should follow a flight path exactly as described in the segments above. The second loop should be placed in exactly the same position as the first loop, and should be of exactly the same size.
- g) **End of Manoeuvre:**
In upright level flight at a height of 45 degrees line elevation angle, at the same point where the model aircraft started its first turn at the beginning of the complete manoeuvre.

Recommended exit procedure:

Maintain upright level flight at a height of 45 degrees line elevation angle for at least 1.0 metre after the end of the manoeuvre and then descend to the normal upright level flight height (1.5 metres) within approximately $\frac{1}{2}$ a lap.

4.2.25 The Two Consecutive Inside Triangular Loops Manoeuvre



Note:

All turns in this manoeuvre should be between 1.5 metres and 2.1 metres radius. In each turn the model aircraft should change its angle of pitch attitude by approximately 60 degrees.

Manoeuvre size, overall:

Height 45 degrees line elevation angle; width slightly more than $\frac{1}{8}$ th of a lap.

Recommended entry procedure:

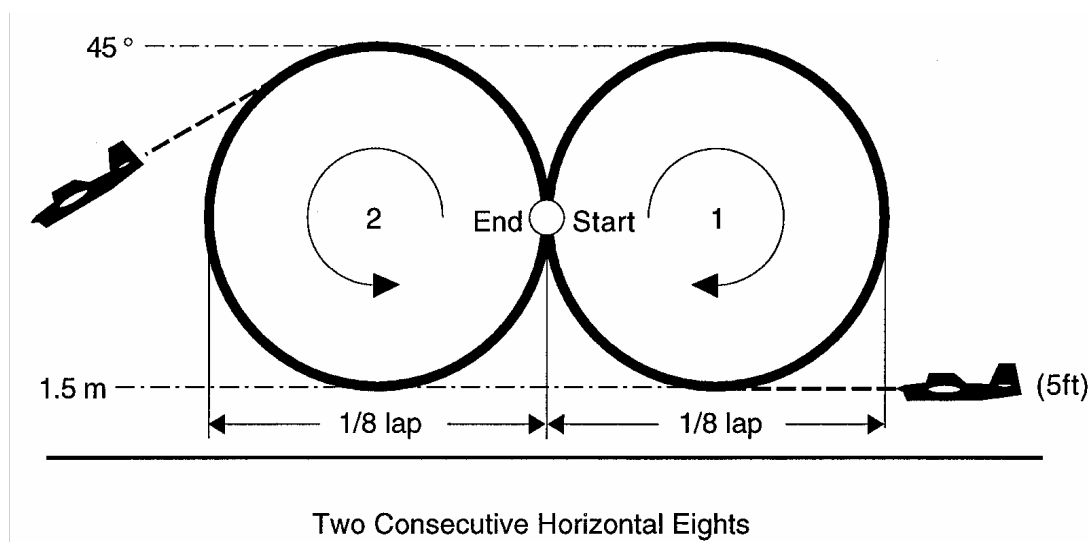
From normal upright level flight at a height of 1.5 metres.

- a) **Start of Manoeuvre:**
From the point in normal upright level flight where the model aircraft starts its first turn.
- b) **First triangle figure – first turn and climb segment:**
The model aircraft should turn sharply into a "straight line" inverted climb and the angle of this flight path should be at 30 degrees beyond vertical in relation to the ground. After completing the turn the model aircraft should maintain this flight path until starting the second turn.
- c) **First triangle figure – second turn and dive segment:**
The model aircraft turn sharply into a "straight line" inverted dive and the angle of this flight path should be at 60 degrees (that is: 30 degrees less than vertical in relation to the ground). After completing the turn the model aircraft should maintain this flight path until starting the third turn. The height reached during this second turn should not be more or less than a line elevation angle of 45 degrees.
- d) **First triangle figure - third turn plus bottom "horizontal" segment:**
The aircraft should sharply turn into to upright "straight line" level flight at a height of 1.5 metres, plus/minus 30 cm. The length of all 3 sides of this triangular loop (including two turns per side) should be equal, and the bottom segment, including both turns, should be slightly more than $\frac{1}{8}$ th of a lap in length.
- e) **The second triangular loop figure:**
The model aircraft should follow a flight path exactly as described in the three segments above. The second loop should be placed in exactly the same position as the first loop, and should be of exactly the same size.
- f) **End of Manoeuvre:**
With the model aircraft in normal upright level flight, at the point where the model aircraft started its first turn at the start of the complete manoeuvre.

Recommended exit procedure:

Continue normal upright level flight at 1.5 metres.

4.2.26 The Two Consecutive Horizontal Eights Manoeuvre



Manoeuvre size, overall:

Height 45 degrees line elevation angle; width $\frac{1}{4}$ of a lap.

Recommended entry procedure:

From normal upright level flight at a height of 1.5 metres.

- a) **Start of Manoeuvre:**
When the model aircraft passes the intersection point for the first time.
Note:

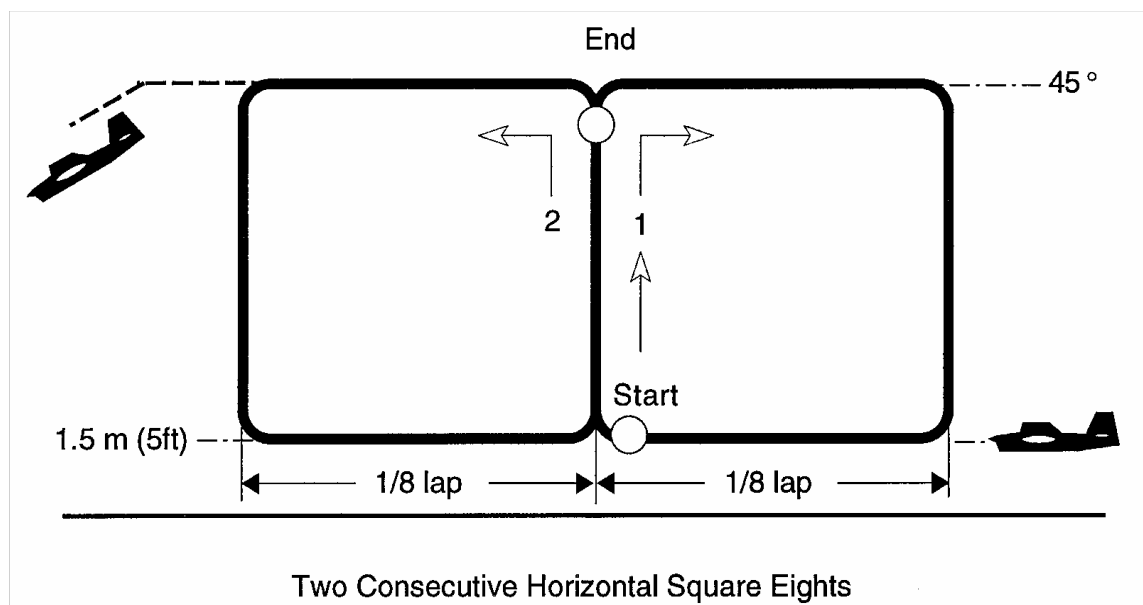
When the model aircraft reaches a "vertical" climbing attitude for the first time this has defined the intersection point for the whole manoeuvre (that is: after $\frac{1}{4}$ of the first loop of the first eight has been flown).

- b) The first eight figure - first inside loop segment:
From normal upright level flight the model aircraft should fly upwards along a circular flight path to a height of line elevation angle 45 degrees, at which point it should be inverted. The model aircraft should continue its circular flight path downwards without interruption until reaching the normal upright level flight height of 1.5 metres, plus/minus 30 cm, at which point it should be upright. The model aircraft should then continue, without interruption, its circular flight path for a further $\frac{1}{4}$ of a loop until reaching the intersection point, at which point the model aircraft should be momentarily "vertical".
Note:
The intersection point first defined by the model aircraft at the beginning of this manoeuvre should be maintained throughout the whole of the manoeuvre. At the time of passing through the intersection point and transitioning to the first outside loop the model aircraft should be momentarily in a "vertical" nose up attitude but should not visibly travel in a "straight line", nor travel along a "vertical" climbing flight path.
- c) The first eight figure – the outside loop segment (actually 1 complete loop from the intersection point onwards):
After passing through the intersection point the model aircraft should continue, without interruption, to fly a complete outside loop by flying upwards along a circular flight path to a height of 45 degrees line elevation angle, at which point the model aircraft should be upright. The model aircraft should continue its circular flight path downwards, without interruptions, until reaching the inverted flight height of 1.5 metres, plus/minus 30 cm, at which point it should be inverted. The model aircraft should then continue, without interruption, its circular flight path for a further $\frac{1}{4}$ of a loop until reaching the intersection point, at which point it should be momentarily "vertical".
- d) The second complete eight figure:
The model aircraft should follow a flight path exactly as set out in the individual segments above. The second figure eight should be flown in exactly the same position and should be of exactly the same size as the first eight figure.
- e) End of Manoeuvre:
As the model aircraft completes the second eight figure, when passing the intersection point in a "vertical" climb for the fifth and last time.

Recommended exit procedure:

After passing the intersection point for the last time, continue the circular flight path for approximately a further 135 degrees of arc, then descend from this flight path in a dive of approximately 45 degrees until levelling out into normal upright level flight at 1.5 metres.

4.2.27 The Two Consecutive Horizontal Square Eights Manoeuvre



Note:

All turns in this manoeuvre should be between 1.5 metres and 2.1 metres radius.

Manoeuvre size, overall:

Height 45 degrees line elevation angle; width $\frac{1}{4}$ of a lap.

Recommended entry procedure:

From normal upright level flight at a height of 1.5 metres.

a) Start of Manoeuvre:

With the model aircraft in normal upright level flight, from the point where the model aircraft starts its first turn upwards into a "vertical" climb for the first time.

Note:

When the model aircraft reaches a "vertical" climbing attitude for the first time, this has defined the intersection line for the whole manoeuvre.

b) The first eight figure – the first climbing turn and "vertical" climbing segment of the first (inside) square loop:

The model aircraft should turn sharply into a "vertical" climb, reaching and maintaining a "straight line" flight path that is at right angles to the ground.

c) The first eight figure - the second turn and top "horizontal" segment of the first (inside) square loop:

The model aircraft should turn sharply into inverted level flight to reach a height of 45 degrees line angle elevation as it becomes inverted. This section should be parallel to the ground.

d) The first eight figure - the third turn and "vertical" dive segment of the first (inside) square loop:

The model aircraft should turn sharply into a "vertical" dive, reaching and maintaining a "straight line" flight path that is at right angles to the ground.

e) The first eight figure - the fourth turn and bottom "horizontal" segment of the first (inside) square loop:

The model aircraft should turn sharply into smooth upright level flight, and this section should be parallel to the ground at a height of 1.5 metres, plus/minus 30 cm, The length of the whole bottom segment, including both turns, should be exactly $\frac{1}{8}$ th of a lap.

f) The first eight figure - the first climbing turn and "vertical" climb segment of the second (outside) square loop:

At the end of the previous segment (paragraph e) above), the model aircraft should turn sharply into a "vertical" climb, reaching and maintaining a "straight line" flight path which is at right angles to the ground. This flight path should be in exactly the same position as defined by the model aircraft at the beginning of the manoeuvre (paragraph a) above).

g) The first eight figure - the second turn and top "horizontal" segment of the second (outside) square loop:

The model aircraft should turn sharply into upright level flight to reach a height of 45 degrees line elevation angle as it becomes level. The top segment should be flown with the flight path parallel to the ground.

h) The first eight figure - the third turn "vertical" dive segment of the second (outside) square loop:

The model aircraft should turn sharply into a "vertical" dive, reaching and maintaining a "straight line" flight path that is at right angles to the ground.

i) The first eight figure - the fourth turn and bottom "horizontal" segment of the second (outside) square loop:

The model aircraft should turn sharply into inverted smooth level flight, and this section should be parallel to the ground at a height of 1.5 metres plus/minus 30 cm. The length of the whole bottom segment, including both turns, should be exactly $\frac{1}{8}$ th of a lap.

j) The second eight figure:

The model aircraft should follow a flight path exactly as set out in the individual segments above. The second eight figure should be flown in exactly the same position and should be of exactly the same size as the first eight figure.

k) The final turn and last "vertical" climb exit from manoeuvre segment:

At the end of the second bottom "horizontal" segment of the fourth loop the model aircraft should again turn sharply into a "vertical" climb, reaching and maintaining a "straight line" flight path which is at right angles to the ground. This flight path should be in exactly the same position as defined by the model aircraft at the start of the manoeuvre (paragraphs a) and b) above).

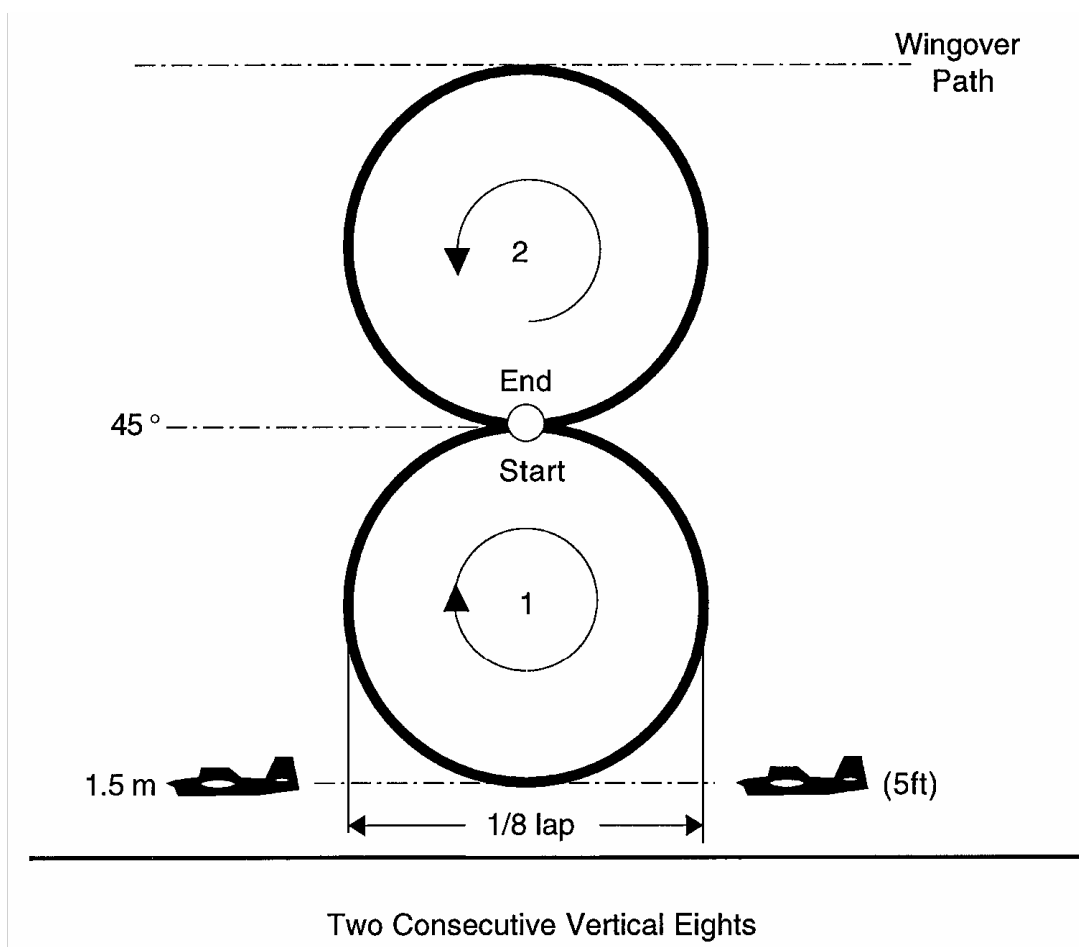
- l) End of Manoeuvre:
At the end of the last vertical climb segment, before turning into normal upright exit flight at 45 degrees line angle.

Recommended exit procedure:

Complete a further 90 degrees turn into "straight line" upright level flight at a height of 45 degrees line angle. Maintain this level flight path parallel to the ground until clear of the left hand side of the left hand loop by approximately 5.0 metres then make a turn into a dive of approximately 45 degrees nose down attitude. Recover into normal upright level flight at 1.5 metres.

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4.2.28 The Two Consecutive Vertical Eights Manoeuvre

Manoeuvre size, overall:

Height 90 degrees line elevation angle; width $\frac{1}{8}$ th of a lap.

Recommended entry procedure:

From normal upright level flight at a height of 1.5 metres, fly upward along a circular flight path to a height of line elevation angle 45 degrees. At this point the model aircraft should be inverted.

a) Start of Manoeuvre:

After the model aircraft has flown the first half of an inside loop, as it passes through the intersection point for the first time.

Note:

The intersection of the whole manoeuvre is defined when the model aircraft passes through inverted level flight at a height of 45 degrees line elevation angle for the first time.

b) The first eight figure - the first (inside loop) segment:

As the model aircraft passes through the intersection point for the first time it should continue to fly a completely circular inside loop with no flat spots or deviations. The bottom of this loop should be at a height of 1.5 metres, plus/minus 30 cm. The loop should be completed by the model aircraft continuing this circular flight path until reaching an inverted attitude at a height of 45 degrees line elevation angle.

c) The first eight figure - the second (outside loop) segment:

As it passes through the intersection point the model aircraft should continue without interruption, flying a completely circular outside loop without flat spots or deviations. The bottom of this second loop should be at a height of 45 degrees line elevation angle and the top should be at 90 degree line elevation.

Note:

The flight path of this second loop should touch the intersection point, and this intersection point should be maintained throughout the entire manoeuvre. At the time of passing through the intersection point and then transitioning into the second (outside) loop, the model aircraft should be

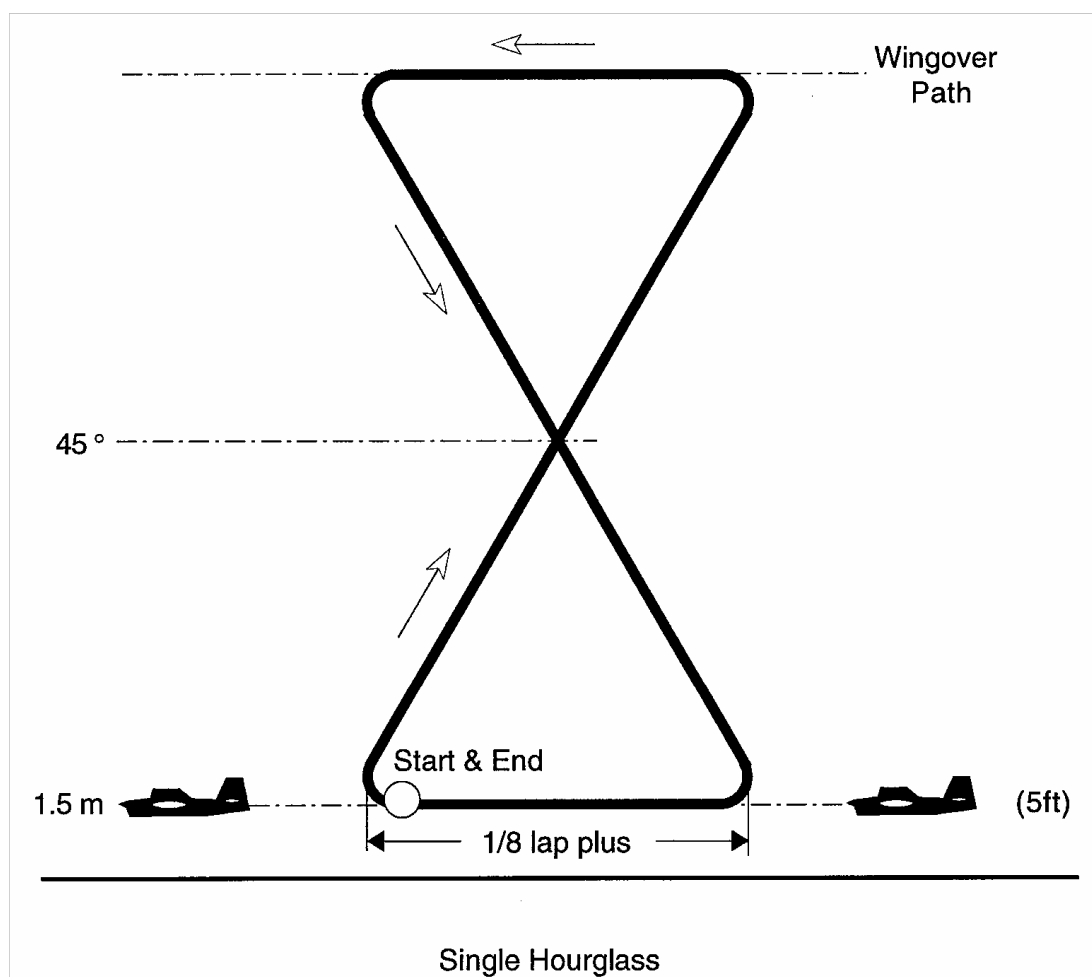
momentarily in a level inverted flight attitude but should not visibly follow a "straight line" flight path. Neither should the model aircraft climb nor dive during this momentary period of inverted flight. In addition, the centres of both loops should be positioned on an imaginary line drawn upwards from the ground at right angles.

- d) The second eight figure:
The model aircraft should follow a flight path exactly as set out in the individual segments above. The second figure eight should be flown in exactly the same position and should be of exactly the same size as the first eight figure.
- e) End of Manoeuvre:
As the model aircraft completes the second eight figure, at the moment when it reaches inverted level flight at a height of 45 degrees line elevation angle.

Recommended exit procedure:

Continue for a further half inside loop until the model aircraft is upright at a height of 1.5 metres, and then continue in normal level upright flight at a height of 1.5 metres.

4.2.29 The Single Hourglass Manoeuvre



Note:

All turns in this manoeuvre should be between 1.5 metres and 2.1 metres radius. In each turn the model aircraft should change its angle of pitch attitude by approximately 60 degrees.

Manoeuvre size, overall:

Height 90 degrees line elevation angle; width slightly more than $\frac{1}{8}$ th of a lap.

Recommended entry procedure:

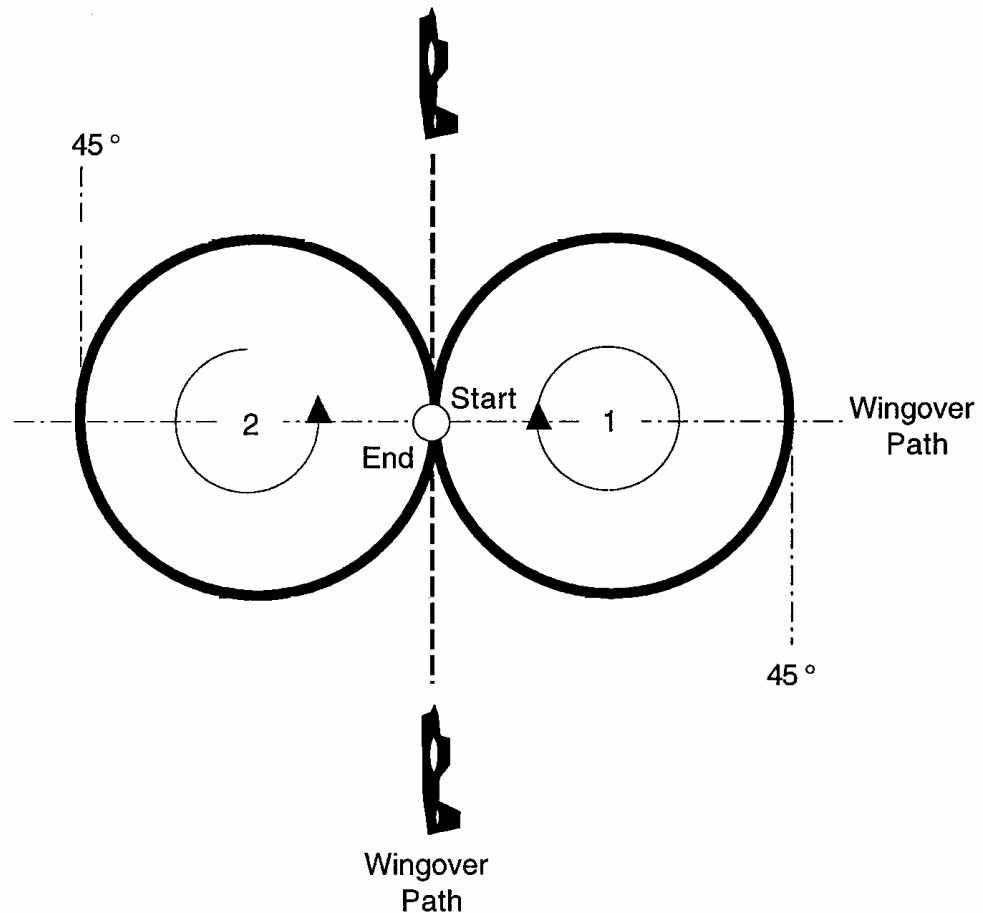
From normal upright level flight at a height of 1.5 metres.

- a) Start of Manoeuvre:
From the point where the model aircraft starts its first turn into a climb for the first time.
- b) The first turn and inverted climb segment:
The model aircraft should sharply turn into, and then maintain an inverted climb with a "straight line" flight path angled at approximately 30 degrees past right angles (relative to the ground). The climb should be continued until a sharp outside turn that then results in the model aircraft following the Wingover manoeuvre flight path. That Wingover flight path should be positioned at 90 degrees to the centre line axis of the whole manoeuvre and the middle point of this flight path should be positioned directly above the centre of the circle.
- c) The overhead second turn, Wingover, and third turn segment:
The "straight line" overhead Wingover flight path should be positioned at 90 degrees to the centre line axis of the whole manoeuvre and the mid point of the flight path should be positioned directly over the centre of the circle. The length of this segment, including its two turns, should be slightly more than $\frac{1}{8}$ th of a lap. This segment should be finished with a sharp outside turn through approximately 60 degrees into an inverted dive.
- d) The inverted dive segment:
The model aircraft should turn sharply into, and then maintain, an inverted dive with a "straight line" flight path angled at approximately 60 degrees relative to the ground.
- e) The intersection:
The intersection of the "straight line" climb and the "straight line" dive flight paths should be at a height of 45 degrees line elevation angle.
- f) The fourth turn and bottom level flight segment:
The model aircraft should sharply turn into normal upright level flight at a height of 1.5 metres, plus/minus 30 cm. The length of this segment, including two turns, should be slightly more than $\frac{1}{8}$ th of a lap.
- g) Symmetry of the complete Manoeuvre:
The figure should be flown symmetrically in relation to its "vertical" centre line axis, and this centre line axis should be at right angles to the ground.
- h) End of Manoeuvre:
At exactly the same point as the model aircraft started its first turn at the start of the complete manoeuvre.

Recommended exit procedure:

Continue in normal upright level flight at 1.5 metres.

4.2.30 The Two Consecutive Overhead Eights Manoeuvre



Two Consecutive Overhead Eights

Manoeuvre size, overall:

Loop diameters $\frac{1}{8}$ th of a lap; lowest points of both loops at 45 degrees line elevation angle.

Recommended entry procedure:

From normal upright level flight the model aircraft should climb in a Wingover flight path to a point directly over the centre of the circle.

a) Start of Manoeuvre:

As the model aircraft passes through the overhead point for the first time.

Note:

The intersection point of the complete manoeuvre should be directly over the centre of the circle and should be maintained throughout this entire manoeuvre.

b) The first complete (inside loop) segment:

From the overhead position the model aircraft should fly a completely circular inside loop, returning to the overhead/intersection point. The right hand bottom of this loop should all be at a height of 45 degrees line elevation angle. This loop should be positioned symmetrically on an imaginary line on the face of the flying hemisphere which is drawn upwards at 90 degrees to the axis of the model aircraft's Wingover climb to the intersection point.

c) The passage through the intersection point and transition into the second (outside) loop segment:

As the model aircraft passes through the intersection/overhead point, it should smoothly transition into the second (outside) loop without flat spots or deviations. At the point of flying directly above the centre of the circle the model aircraft should be momentarily in a "knife edge" position with a line elevation angle of 90 degrees.

d) The second complete (outside loop) segment:

From the overhead position the model aircraft should transition smoothly into the second completely circular (outside) loop, completing this loop when it has again returned to the overhead/inter-section point. The left hand bottom of this loop should be all at a height of 45

degrees line elevation angle. Those bottoms should also all be positioned symmetrically on an imaginary line on the face of the flying hemisphere which is drawn upwards at 90 degrees to the axis of the model aircraft's climb to the intersection point (paragraph c) above).

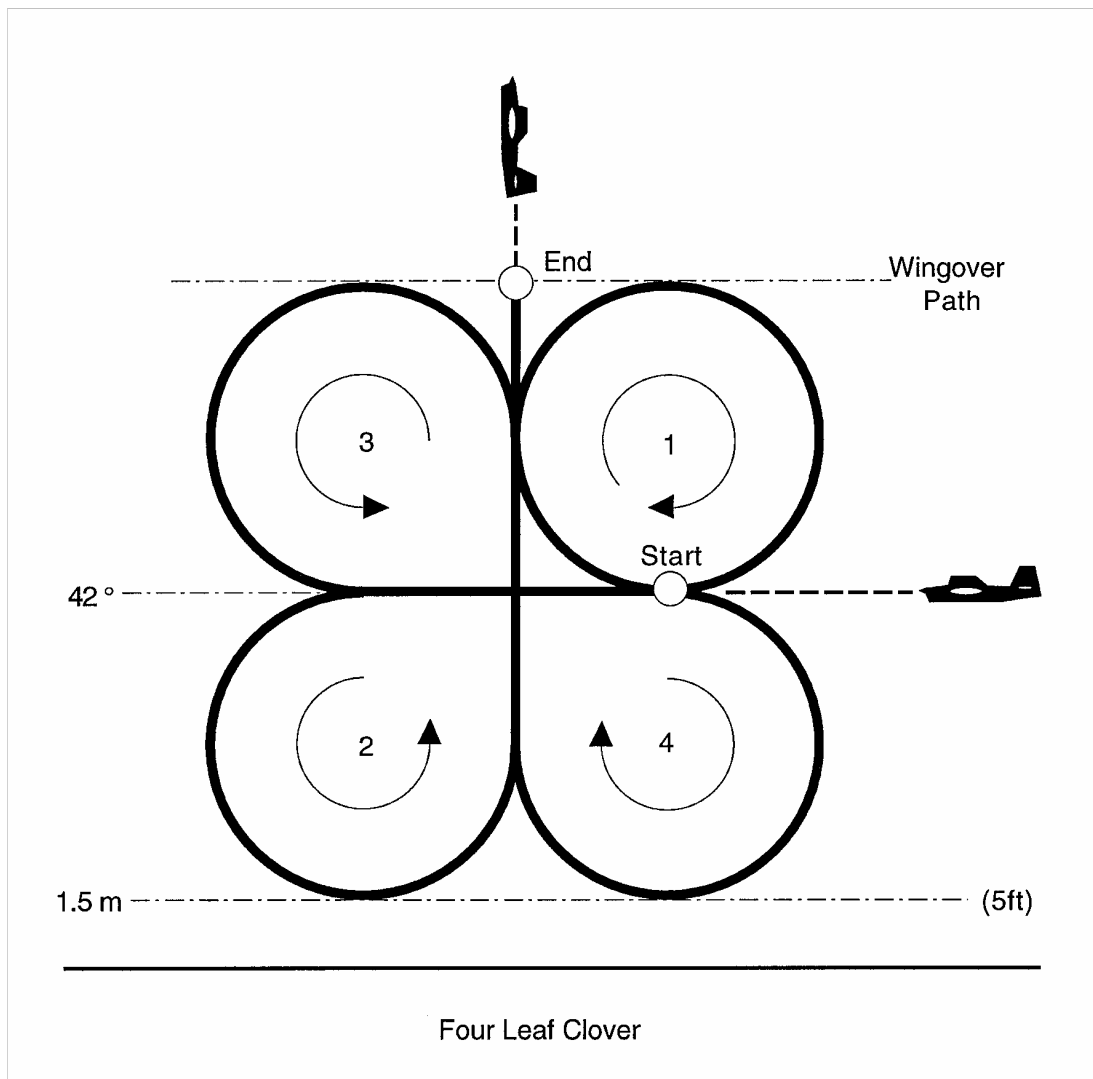
- e) The second eight figure:
The model aircraft should fly the second eight figure exactly as set out in the individual segments above and this second eight figure should be flown in exactly the same and should be of exactly the same size as the first eight figure
- f) End of Manoeuvre:
At the end of the second (outside) loop of the second eight figure, as the model aircraft passes through the intersection point.

Recommended exit procedure:

Continue by completing most of the second (diving) half of the Wingover flight path that was used to start the manoeuvre. Then recover into normal upright level flight at 1.5 metres.

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4.2.31 The Single Four-Leaf Clover Manoeuvre

Manoeuvre size, overall:

Height 90 degrees line elevation angle; width $\frac{1}{4}$ lap.

Recommended entry procedure:

Use $\frac{3}{4}$ of a lap to climb to a height of 42 degrees line elevation angle and maintain this height in upright level flight for $\frac{1}{8}$ th of a lap.

- a) Start of Manoeuvre:
At the point of entry into the first (inside) loop.
- b) The first complete (inside) loop figure:
Note:
"Complete loop" (above) means a full circular loop of 360 degrees.
The top of this first loop should be tangential to the Wingover path located at 90 degrees to the centre line axis of the whole manoeuvre. The model aircraft should recover into upright level flight at a height of 42 degrees line elevation angle. This loop should be positioned tangentially to an imaginary "vertical" line drawn upwards at right angles from the ground. The lateral position of this line is determined when the model aircraft reaches a "vertical" attitude for the first time and this imaginary line then becomes the lateral reference for the whole manoeuvre.
- c) The upright level flight at 42 degrees line elevation angle segment:
At 42 degrees line elevation angle the model aircraft should fly on an upright level flight path that is parallel to the ground. The length of this segment should be equal to the diameter of the first loop.
- d) The second (outside) $\frac{3}{4}$ of a loop segment:
Note:

" $\frac{3}{4}$ of a loop" (above) means a circular arc of 270 degrees.

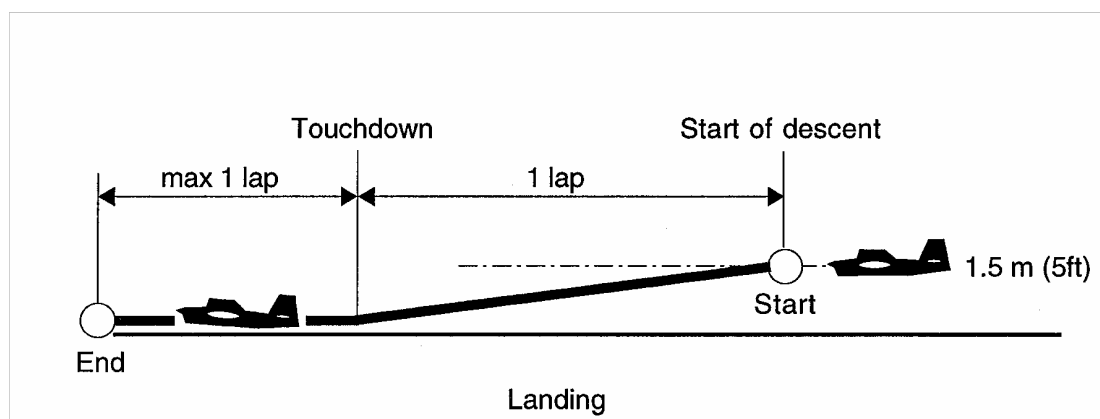
This $\frac{3}{4}$ loop should be flown as a true arc without visible deviations from a circular flight path and the bottom should be at a height of 1.5 metres, plus/minus 30 cm. This $\frac{3}{4}$ loop should end with the model aircraft entering a "vertical" climb whose flight path is the same as the great circle line resulting from flying the first loop.

- e) The first "vertical" climb segment:
The model aircraft should climb "vertically" at right angles to ground and the length of this segment should be equal to the diameter of the first loop.
- f) The third (outside) $\frac{3}{4}$ loop segment:
Note:
" $\frac{3}{4}$ of a loop" (above) means a circular arc of 270 degrees.
This $\frac{3}{4}$ loop should be flown as a true arc without visible deviations from a circular flight path and the bottom should be at a height of 42 degrees line elevation. This $\frac{3}{4}$ loop should end with the model aircraft recovering to inverted level flight at a height of 42 degrees line elevation angle.
- g) The inverted level flight at 42 degrees line elevation angle segment :
The model aircraft should follow an inverted flight path which is parallel to the ground. The length of this segment should be equal to the diameter of the first loop.
- h) The fourth (inside) $\frac{3}{4}$ loop segment:
Note:
The term " $\frac{3}{4}$ of a loop" (above) means a circular arc of 270 degrees.
This $\frac{3}{4}$ loop should be flown as a true arc without visible deviations from a circular flight path and the bottom should be at a height of 1.5 metres, plus/minus 30 cm. This $\frac{3}{4}$ loop should end with the model aircraft entering a "vertical" climb whose flight path is the same as the great circle line resulting from flying the first loop.
- i) The second "vertical" climb segment:
The model aircraft should climb "vertically" at right angles to ground and the length of this segment should be such that the model aircraft flies through the complete clover leaf figure.
- j) End of Manoeuvre:
At the end of the last "vertical" climb, as the model aircraft passes through a point directly above the centre of the circle.

Recommended exit procedure:

Continue the Wingover path from the last vertical climb (paragraph i) above) into a "vertical dive, then recover into normal upright level flight at 1.5 metres. Other manoeuvring after completion of the Cloverleaf is permitted.

4.2.32 The Landing Manoeuvre



Recommended entry procedure:

From normal upright level flight at a height of 1.5 metres.

- a) Start of Manoeuvre:
As the model aircraft leaves a height of 1.5 metres, plus/minus 30 cm, and with the motor/s stopped (gliding flight).
- b) The descent segment:

The model aircraft should fly for 1 full gliding lap (power off condition), measured from the start of the descent at the 1.5 metres plus/minus 30 cm height, until the point of touchdown. The rate of descent should remain constant throughout this whole gliding lap, from the moment that it leaves the 1.5 metres height until the moment that it touches down. The touch down itself should be smooth and either a "2 point" or a "3 point" touch down shall be judged as being equally correct.

- c) End of Manoeuvre:
When the model aircraft comes to a complete stop after touching down at the end of the ground roll which is clearly in a forwards direction and in line with its normal flight motion. The length of the ground roll shall not exceed one lap.
- d) End of timing:
Official timing of the complete flight shall stop at the moment that the model aircraft completes the Landing Manoeuvre (that is, when the model aircraft comes to a complete stop at the end of the ground roll, as per c) above).
- e) Excess time and "irregular" Landing Manoeuvres:
The mark 0 (zero) shall be awarded for this complete manoeuvre if the Official Timekeeper confirms that the model aircraft comes to a complete stop at the end of the ground roll after the 7 minutes total time allowed for an Official Flight has expired (refer 4.2.14). The mark 0 (zero) points shall also be awarded for this complete manoeuvre if:
- i) the model aircraft crashes;
 - ii) the model aircraft lands on its belly;
 - iii) the model aircraft lands upside-down;
 - iv) the model aircraft is fitted with a retractable landing gear and if this was not fully extended at the time of touch down, or if the retractable landing gear is apparently fully extended but if it collapses when touching down.;
 - v) the model aircraft flips over at the moment of touching down, but;
- Note:
the mark zero (0) points shall not be awarded for this complete manoeuvre if the model aircraft flips over during the ground rollout phase and if, in the opinion of the judges, a) the flip over was due to adverse wind conditions, or if, b) the flip over was due to poor ground surface conditions affecting what would be otherwise be predictable as the model aircraft's normal ground roll after touching down.

End
