

PROJECT F3C-Sport

January 10, 2021

VOLUME F3 HELICOPTERS

PART FIVE - TECHNICAL REGULATIONS FOR RADIO CONTROLLED CONTESTS

5.4. CLASS F3C-Sport – RC AEROBATIC HELICOPTERS

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5.4.1. Definition of a Radio Controlled (R/C) Helicopter

An R/C helicopter is a heavier-than-air model aircraft (MA) that derives all of its lift and horizontal propulsion from a power driven rotor system(s) rotating about a nominally vertical axis (or axes). Fixed horizontal supporting surfaces up to 4% of the swept area of the lifting rotor(s) are permitted. A fixed or controllable horizontal stabiliser of up to 2% of the swept area of the lifting rotor(s) is permitted. Ground effect machines (hovercraft), convertiplanes or aircraft that hover by means of propellerslipstream(s) deflected downward are not considered to be helicopters.

5.4.2. Builder of the Model Aircraft

There is no requirement for the competitor to be the builder of the model in F3C. Refer C.5.1.2. in *CIAM General Rules*.

5.4.3. General Characteristics

a) AREA: The swept area of the lifting rotor cannot exceed 250dm². For helicopters with multiple rotors whose rotor shafts are more than one rotor diameter apart the total swept area of both rotors cannot exceed 250dm². For helicopters with multiple rotors whose rotor shafts are less than one rotor diameter apart the swept area of both rotors (counting the area of superposition only once) cannot exceed 250dm². The tail rotor must be driven by the main rotor and must not be driven by a separate engine/motor.

b) WEIGHT: The weight of the model aircraft (with fuel / with batteries) must not exceed 6.5 kg.

c) MOTOR : Internal combustion engine displacement: no restrictions.

Electric motors are limited to a maximum no load voltage of 51 volts for the propulsion circuit.

d) GYROS : The use of pre-programmed flight manoeuvres is forbidden. The use of automatic position (latitude and longitude) locking devices and altitude locking devices, whether with external references or not, are forbidden.

e) ROTOR BLADES : All-metal main or tail rotor blades are prohibited.

5.4.4. Noise Limit

Noise level measurements must be made before the start of a competition, preferably during the official practice day. The noise level must be measured at a distance of 3m (3 metres) while the helicopter is hovering with the skids/landing gear at 2m over the centre of a 2m diameter circle. A remote microphone mounted on a tripod must be used. The engine speed (RPM) must be the same as that used during the hovering portion of the flight schedules. During the measurement the helicopter must be rotated through 360° to determine the maximum noise level. The sound pressure level must not exceed 87dB (A) over a soft (grass) surface or 89dB (A) over a hard (asphalt, concrete, etc) surface. If the noise level limit is exceeded during the first measurement, two additional measurements must be made to substantiate the excessive noise level. The competitor may modify the helicopter and/or silencer system to reduce the noise level and after verification of an acceptable level, will be permitted to fly. If the noise level cannot be reduced to or below the noise level limit it will not be allowed to fly in the competition. The measuring equipment must be calibrated to the dB (A) sound pressure level scale defined in applicable ISO Standards. If noise measuring equipment that can be calibrated to ISO Standards is not available, the measurements will be advisory only and no competitor can be excluded from the competition.

5.4.5. Contest Area Layout

See FIGURE 5.4.A. Note: If two flight lines are used they must be parallel, operate simultaneously, face in the same direction and be separated by a minimum of 500m for a "front-to-back configuration" or a minimum of 1000m for a side-by-side configuration.

5.4.6. Number of Helpers

Each competitor is allowed only one mechanic/caller. The mechanic/caller must announce the start, finish and name or number of each manoeuvre, he can inform the pilot of wind direction, remaining flight time, proximity to prohibited areas, intrusions into the flight area, and give him indications during the execution of the figures.

5.4.7. Number of Model Aircraft

The number of model aircraft eligible for entry is two (2). Model aircraft numbers 1 and 2 may only be exchanged within the start circle. Both model aircraft must use the same radio frequency.

5.4.8. Number of Flights

Each competitor is entitled to four (4) official flights. If the four rounds cannot be completed, see paragraph 5.4.11 classification.

5.4.9. Definition of an Official Flight

There is an official flight when the competitor is officially called. The flight may be repeated if, for any unforeseen reason outside the control of the competitor, the model aircraft fails to make a start such as:

- a) The flight cannot safely be made within the allowed time limit.
- b) The competitor can prove that the flight was hindered by outside interference.
- c) Judging was impossible for reasons beyond the control of the competitor (model aircraft, engine, or radio failures are not considered to be outside the control of the competitor). In such cases the flight shall be repeated as close to the published time as possible. The competitor, however, has the right to refuse a flight.

5.4.10. Scoring

Each manoeuvre is given a score between 0 and 10 (including half) points by each judge. A new score sheet is issued to each competitor for each round. Only the competitor's number (no name or nationality) will appear on the score sheet. Any manoeuvre not completed shall be scored zero (0) points. If a manoeuvre is scored zero points all judges must agree. There shall be an official located on the field where any flight over the prohibited area can be observed. The prohibited area is the shaded area in Figure 5.4.A behind the judges' line. The area extends to infinity to the left, right and rear. A visual or audible signal shall be given to indicate such over flights. Competitors flying over this area will be penalised by scoring zero (0) points for the current flight. However, the judges shall score all manoeuvres. If an infringement has been made, the scores will be deleted from all score sheets after the flight. In addition, there shall be no score when:

- a) The competitor flies a model aircraft that has been flown in the same competition by another competitor, or flies a model aircraft that does not comply with the definition and general characteristics of a radio controlled helicopter.
- b) The competitor does not deliver his transmitter to the impound or operates any transmitter at the competition area during a round without permission.
- c) The competitor starts his model aircraft outside of the start circle.
- d) The competitor gets his transmitter from the impound before he is officially called.
- e) Manoeuvres must be performed where they can be seen clearly by the judges. If a judge, for some reason beyond the control of the competitor, is not able to follow the model aircraft through the entire manoeuvre, he may put a "Not Observed" (N.O.) mark. In this case, his score will, for that particular manoeuvre, be set to the average score given by the other judges, rounded to the nearest half point.

5.4.11. Classification

If all four official flying laps have been completed, the three best scores will be used to determine the individual ranking. If the competition is interrupted during these four flights, the individual classification is established by taking into account all the complete flight laps and removing the lower score. If only one round is possible, the ranking will be based on that one round.

All scores for each round will be normalised by awarding 1000 points to the highest scoring flight. The remaining scores are then normalised to a percentage of the 1000 points in the ratio of actual score over the score of the winner of the round.

The final individual classification will be determined by counting all completed rounds and by calculating according to the table below.

For example:

Points(X) = Score(X) divided by Score(W) multiplied by 1000

Où Points(X) = Points attribués au concurrent X

Score(X) = Score du concurrent X

Score(W) = Score du vainqueur du tour

Points (x) should be calculated to at least two decimal places and recorded (truncated) to two places after decimal point.

Ties for any of the first three places will be broken by counting the highest throwaway score. If the tie still stands a "sudden death" final must take place within one hour of the end of the scheduled final rounds.

5.4.12. Judging

For each competition, the organizer must appoint three judges for each flight round.

The scoring system must be organised in such a way that the competitors and the spectators can clearly see the scores awarded by all judges after each flight. The score sheet notation must be written (or entered in electronic devices) by the judges themselves.

5.4.13. Organisation

TRANSMITTER & FREQUENCY CONTROL (See Volume *CIAM General Rules*, Section C, Paragraph C.16.2). When all transmitters are of the spread spectrum type a transmitter impound is not required.

FLIGHT ORDER

The flight order for the first round will be determined by a random draw. The flight order for rounds two, three and four will start at the first, second and third quarter of the initial order.

PREPARATION TIME

A competitor must be called at least 5 minutes before he is required to enter the start circle. A start circle 2m in diameter will be provided away from the flight line, spectators, competitors and model aircraft (see FIGURE 5.4.A). When the previous competitor's flight time reaches 6 minutes the flight line director can give the signal to start the engine. In the case of electric motors, the battery must not be connected before signal has been given. The competitor is given 5 minutes to start the engine and make last minute adjustments. The model aircraft may only be hovered in the start circle up to 2m and must not be rotated beyond 180° left or right relative to the competitor. If the model aircraft is rotated beyond 180° the flight is terminated. The competitor in the start circle must reduce his engine's speed to an idle when the preceding competitor has completed the penultimate manoeuvre. If the competitor is not ready after the 5 minute preparation time, he is allowed to complete his adjustments in the start circle; however, his flight time will have started at the end of the 5 minute interval.

FLIGHT TIME

The flight time of 9 minutes begins when the competitor's model leaves the start circle with the permission of the flight line director and the judges. If the allotted time expires before a manoeuvre is completed, that manoeuvre and all remaining manoeuvre(s) will be scored zero.

RESTRICTIONS

After leaving the preparation circle, the model must be flown at 2m to the helipad along the model entry path shown on the Contest Area Layout (Figure 5.4.A). But, the pilot or the assistant can choose to carry the model by hand for the same path.

The pilot may test hover the helicopter on the helipad and reposition it, before announcing the start of the first manoeuvre, to accommodate wind conditions. If the engine stops the flight is terminated.

After the flight: In case of electric motors, the battery must be disconnected before the pilot brings the helicopter over the judging line.

INTERRUPTION OF A COMPETITION

If the wind component perpendicular to the flight line exceeds 8ms/s for a minimum of 20 seconds during a flight, the competition must be interrupted. The flight will be repeated and the competition continued as soon as the wind subsides below the criterion. If the wind does not subside before the round is completed, the entire round will be dropped. The decision will be taken by the organizer with the help of the judges.

5.4.14. Manoeuvre Schedules

FLIGHT PROGRAM

The general flight program is made up of figures from programs A and B. Each program includes eight figures, concerning the aerobatic figures, one figure must be performed on each pass. (see ANNEX 5D - F3C-Sport MANOEUVRE

PERFORMANCE OF THE SCHEDULES

The competitor must stand in the center of the 2m circle (labelled P in Figure 5.4.A - F3C-Sport Contest Area Layout) located 6m in front of the centre judge. Before the start of the first manoeuvre the pilot may fly or carry the model to the helipad. If the model is flown to the helipad then it must be flown at a height of 2 m (for safety reasons.) Alternatively, the helper may carry the model aircraft to the helipad.

The model aircraft may face left or right but must be parallel with the judges' line.

Each hovering manoeuvre ends with a landing on the helipad and after each landing the model aircraft may be repositioned (but maintain same direction) prior to the next takeoff.

After completing the hovering manoeuvres the competitor is allowed one free pass to set up for the flying sequence.

All aerobatics manoeuvres must be performed in an airspace that will allow them to be clearly seen by the judges. This airspace is defined by a field of view up to 60° above the horizon and between lines 60° to the right and left of judges 1 and 5. The non-observance of this rule will be penalised by a loss of points.

The aerobatics manoeuvres must be performed in a smooth flowing sequence, with a manoeuvre performed on each pass before the judges. There are no restrictions on turnaround manoeuvres.

The competitor must perform each listed manoeuvre only once during a flight. The competitor or his caller must announce the name (number) and start and finish of each manoeuvre. A manoeuvre performed out of sequence will result in a zero score for that manoeuvre only. Before the landing manoeuvre the competitor is allowed another free pass to accommodate a possible change in wind direction.

5.4.15. Manoeuvre Descriptions and Diagrams

Refer to ANNEX 5D

5.4.16. Judges' Guide

Refer to ANNEX 5E

ANNEX 5D

F3C-Sport MANOEUVRE DESCRIPTIONS AND DIAGRAMS

The manoeuvreschedules are listedbelowwith the starting and ending direction (UU = Upwind - Upwind; DD = Downwind - Downwind; DU = Downwind - Upwind; UD = Upwind - Downwind) of eachmanoeuvre, relative to the wind, as indicated. The competitor has 9 minutes to complete one of the twoprograms « A » or « B ».

For the two programs, the pilot can choose the 8 figures from the list of each program.

He can choosebetween:

- 2 hover figures + 5 aerobatic figures and landing.

Or

- 3 hover figures + 4 aerobatic figures and landing.

Or

- 4 hover figures + 3 aerobatic figures and landing.

Only for this “A” program and with regard to the hovering flight figures, the pilot can choose to start his model in forward translation instead of in backward translation as described in the descriptions.

SCHEDULE A

A1. TRIANGLE POINT DOWN.....	(UU)
A2. DIAMOND.....	(UU)
A3. M.....	(UU)
A4. HOURGLASS.....	(UU)
(FLY BY)	
A5. DOUBLE STALL-TURNS	(DD)
A6. OVAL WITH TWO ½ ROLLS.....	(UU)
A7. COBRA WITH 90° LOOP	(DD)
A8. LOOPING.....	(UU)
A9. FULL ROLL	(DD)
A10. 180°STALL-TURN.....	(UD)
(FLY BY)	
A11. LANDING WITH 180° turn	(DU)

SCHEDULE B K=1.3 for all figures

B1. TRIANGLE POINT DOWN WITH PIROUETTES 180°.....	(UU)
B2. DIAMOND	(UU)
B3. FLOWER	(UU)
B4. CIRCLE	(UU)
(FLY BY)	
B5. COBRA WITH FLIP.....	(DD)
B6. LOOP WITH 180° STALL TURNS.....	(UU)
B7. TWO OPPOSITE ROLLS	(DD)
B8. PULBACK WITH HALF LOOP.....	(UU)
B9. CUBAN EIGHT	(DD)
B10. OVAL WITH FLIP	(UU)
(FLY BY)	
B11. LANDING WITH TWO 90° TURNS	(DU)

5D.1 General

The manoeuvres are displayed in pictorial form in Figures **5D-A and 5D-B** for the case where the wind direction is left to right. The following descriptions apply to all manoeuvres and if not performed properly must result in downgrades. Points will also be subtracted if a manoeuvre is not performed as described. The starting/ending altitude for the hovering manoeuvres is 2m above the helipad. If a manoeuvre is unrecognisable it must be severely downgraded. Ascents from, and descents to, the helipad must be vertical. Landings must be smooth and centred on the helipad. During the hovering manoeuvres all stops must be of 2 seconds minimum duration (unless specified otherwise). Circular and linear hovering segments must be performed at a constant speed. Every pirouette must be performed at a constant turning rate. The hovering manoeuvres must be started with the nose of the model aircraft (MA) facing left or right and must be flown as a unit (the starting heading must be same for each hovering manoeuvre). The competitor must stand **in the center of the** 2m diameter circle marked "P" in Figure 5.4.A during all manoeuvres.

All aerobatic manoeuvres must start and end in the direction indicated with a straight and level flight line of 10m minimum length. Entry and exit must be at the same altitude and heading. Loops or parts of a loop must be round and have the same diameter. Consecutive loops must be in the same location and plane. Rolls must be performed at a constant roll rate. Consecutive rolls must have the same roll rate and must be at the same altitude and heading. During all aerobatics manoeuvres the competitor must maintain his MA above a minimum altitude of 10 m. Aerobatic manoeuvres must be centred within the 120° horizontal field of view and must be symmetrical about the centre line. Aerobatic manoeuvres flown at a distance greater than 100m from the judges' line will be downgraded. In case of a dispute the manoeuvre text takes precedence over Figures **5D-A and 5D-B**.

Note: When the word "centred" is used, it means that the MA crosses an imaginary plane that extends from a line drawn vertically upward, from the centre judge out through the helipad. This refers to both Schedules **A and B**.

Scoring criteria for landing; See ANNEX 5E paragraph 5E.6.11.

5D.2 SCHEDULE A

A1 : TRIANGLE point down (UU)

K=1.0

MA takes off vertically from the helipad and ascends to 2 m, stops and hovers for at least 2 seconds.

Ascends obliquely backwards to 7 m by a straight line, stop over flag 1(2) and hovers for at least 2 seconds.

Perform a straight horizontal line forward, stops over flag 2 (1) and hovers for at least 2 seconds.

Descends obliquely backwards of 5m by straight line, stops over the center line and hovers for at least 2 seconds.

Descends and lands into the helipad.

A2 : DIAMOND(UU)

K=1.0

MA takes off vertically from the helipad and ascends to 2 m, stops and hovers for at least 2 seconds.

Ascends obliquely backwards to 4.5m by a straight line, stops over flag 1(2) and hovers for at least 2 seconds.

Ascends obliquely forwards to 7m by a straight line, stops over the center line and hovers for at least 2 seconds.

Descend obliquely forwards of 2.5m by straight line, stops over flag 2(1) and hovers for at least 2 seconds.

Descend obliquely backwards of 2.5m by straight line, stop over the center line and hovers for at least 2 seconds.

Descends and lands into the helipad.

A3 : « M » (UU)**K=1.0**

The MA takes off vertically from the helipad and ascends to 2 m, stops and hovers for at least 2 seconds.

Performs a straight line horizontal backwards, stops over flag 1(2) and hovers for at least 2 seconds.

Ascends vertically to 7 m, stops and hovers for at least 2 seconds.

Descends obliquely at 45° forward of 5m by straight line, stops over the center line and hovers for at least 2 seconds.

Ascends obliquely at 45° forward to 7m by a straight line, stops over flag 2 (1) and hovers for at least 2 seconds.

Descends vertically 5m, stops and hovers for at least 2 seconds.

Performs a straight line horizontal backwards, stops over the center line and hovers for at least 2 seconds.

Descends and lands into the helipad.

A4 : HOURGLASS (UU)**K-1.0**

The MA takes off vertically from the helipad and ascends to 2 m, stops and hovers for at least 2 seconds.

Performs a straight line horizontal backwards, stops over flag 1(2) and hovers for at least 2 seconds.

Ascends obliquely in forward up to 7m in a straight line, stops over flag 2(1) and hovers for at least 2 seconds.

Performs a straight line horizontal backwards, stops over flag 1(2) and hovers for at least 2 seconds.

Descends obliquely in forward of 5m in a straight line, stops over flag 2(1) and hovers for at least 2 seconds.

Performs a straight line horizontal backwards, stops over the center line and hovers for at least 2 seconds.

Descends and lands into the helipad.

A5 : DOUBLE STALL-TURNS (DD)**K=1.3**

Before the center line, the MA flies horizontally in a straight line for a minimum of 10 m, as soon as the center line is crossed, it performs a pulled quarter loop followed by a vertical ascent.

At the top of the ascent, vertical tail down, the model performs a 180° stall-turn in any direction followed by a vertical descent then a pulled and centered half loop followed by a vertical ascent.

At the top of the ascent, vertical tail down, the model performs a 180° stall-turn in any direction followed by a vertical descent then a pulled quarter loop which must end on the center line.

Performs a straight horizontal line for a minimum of 10 m at the same altitude as when entering the figure.

A6 : OVAL WITH TWO HALF ROLLS (UU)**K=1.0**

Before the center line, the MA flies horizontally straight line for a minimum of 10 m then,

After crossing the center line, the MA continues on the same trajectory for a minimum of 30m.

Performs a pulled half loop followed by a half roll (any direction) itself followed by a centered horizontal straight line.

Performs a half roll (in any direction) followed by a pulled half loop itself followed by a straight line at the same altitude as when entering the figure up to the center line.

After crossing the center line, MA performs straight horizontal line for a minimum of 10 m.

A7 : COBRA WITH 90° LOOP (DD)**K=1.0**

The MA flies horizontally in a straight line for a minimum of 10m, performs 1/8 of a pulled loop and ascends to 45° in the straight line.

Before the top, MA performs a pushed and centered 90° quarter loop.

Descends at 45° in the straight line, then performs 1/8 of a pulled loop followed by a straight line horizontal for a minimum of 10 m at the same altitude as when entering the figure.

A8 : LOOP(UU)**K=1.0**

Before the center line, the MA flies horizontally in a straight line for a minimum of 10 m, as soon as the center line is crossed, it performs a full centered loop.

MA performs a straight horizontal line for a minimum of 10 m at the same altitude as when entering the figure.

A9 : Full roll (DD)**K=1.0**

The MA flies horizontally straight line for a minimum of 10 m then,

Performs a full centered roll.

Performs a straight horizontal line for a minimum of 10 m at the same altitude as when entering the figure.

A10 : 180° STALL-TURN(UD)**K=1.0**

Before the center line, the MA flies horizontally straight line for a minimum of 10m, as soon as the center line is crossed, it performs a pulled quarter loop followed by a vertical ascent.

At the end of the ascent the MA performs a stall turn followed by a vertical descent.

Performs a pulled quarter loop which must end on the center line.

Performs a straight horizontal line for a minimum of 10 m at the same altitude as when entering the figure.

A11 : LANDING WITH 180° TURN(DU)**K=1.0**

The maneuver begins at least 10m before the center line at a minimum altitude of 20 m, then the MA crosses an imaginary plane which extends vertically upwards from a line drawn from the center judge through the heliport.

At this point the MA should begin the 180° turn downhill, the rate of turn and airspeed should be constant from that point to a point just before touchdown at the heliport.

The flight path of the MA should appear as a semicircle when viewed from above, starting in the vertical plane and ending in the center of the heliport's center circle.

The MA's flight path must never be parallel to the ground or judge's line.

Scoring criteria for landing:

See ANNEX 5E Paragraph 5E.6.11.

5D.2 SCHEDULE B

B1 : TRIANGLE POINT DOWN WITH 180° PIROUETTES (UU)

K=1.3

MA takes off vertically from the helipad and ascends to 2 m, stops and hovers for at least 2 seconds.

Ascends obliquely backwards to 7m by in a straight line while simultaneously performing a 180° pirouette, stops over 1(2) and hovers for at least 2 seconds.

Performs backward horizontally straight line while simultaneously performing two 180° pirouettes, stops over flag 2(1) and hovers for at least 2 seconds.

Descends obliquely forwards of 5m by straight line while simultaneously performing a 180° pirouette, stops over the center line and hovers for at least 2 seconds.

Descends and lands into the helipad.

Note : The direction of the pirouettes is not imposed.

B2 : DIAMOND WITH PIROUETTES 360° (UU)

K=1.3

MA takes off vertically from the helipad and ascends to 2 m, stops and hovers for at least 2 seconds.

Ascends obliquely backwards to 4.5m by in a straight line, stops over flag 1(2) and hovers for at least 2 seconds.

Performs a 360° pirouette (any direction), stops and hovers for at least 2 seconds.

Ascends obliquely forwards to 7m by in a straight line, stops over helipad and hovers for at least 2 seconds.

Descends obliquely forwards to 4.5m by in a straight line, stops over flag 2(1) and hovers for at least 2 seconds.

Performs a 360° pirouette (any direction), stops and hovers for at least 2 seconds.

Descend obliquely backwards 2.5m in a straight line, stops over helipad and hovers for at least 2 seconds.

Descends and lands into the helipad.

B3 : FLOWER (UU)

K=1.3

MA takes off vertically from the helipad and ascends to 2 m, stops and hovers for at least 2 seconds.

Ascends backwards describing the upper left (right) quarter of a circle with a radius of 5m, stops over flag 1(2) and hovers for at least 2 seconds.

Descends forwards by describing a semicircle with a radius of 5m while performing simultaneously a 360° pirouette in any direction, stops over flag 2 (1) and hovers for at least 2 seconds.

Descends backwards describing the upper right (left) quarter of a circle a radius of 5m, stop over the center line and hovers for at least 2 seconds.

Descends and lands into the helipad.

B4 : VERTICAL CIRCLE (UU)

K=1.3

MA takes off vertically from the helipad and ascends to 2 m, stops and hovers for at least 2 seconds.

Go forward to make a vertical circle with a radius of 5m, stops over the helipad and hovers for at least 2 seconds.

Descends and lands into the helipad.

B5 : COBRA WITH PULLED FLIP (DD)**K=1.3**

The MA flies horizontally straight line for a minimum of 10 m, performs 1/8 of a pulled loop and ascends to 45° in the straight line.

At the top, the MA performs a centered pulled 270° flip.

Descends at 45° in the straight line, then performs 1/8 of a pulled loop followed straight line horizontal for a minimum of 10 m at the same altitude as when entering the figure.

B6 : LOOP WITH TWO STALL TURNS (UU)**K=1.3**

Before the center line, the MA flies horizontally in a straight line for a minimum of 10 m, as soon the center line is crossed, it performs a pulled 1 ¼ loop.

When reaching half of the height of the former loop the MA performs a vertical ascent.

At the end of the ascent the MA performs a 180° stall turn in any direction followed by a vertical descent

By reaching half the height of the old loop again the MA performs a pulled half loop in opposite direction.

When reaching again half of the height of the first loop the MA performs a second vertical ascent.

At the end of the ascent the MA performs a 180° stall turn in any direction followed by a vertical descent.

When reaching again half of the height of the former loop the MA performs a pulled quarter loop which must end on the center line.

Performs straight horizontal line for a minimum of 10 m at the same altitude as when entering the figure.

Note 1: Vertical ascents must be started at half the height of the loop with the MA being vertical.

Note 2: The stall turns must be executed at the height of the same altitude.

B7 : TWO OPPOSITE ROLLS (DD)**K=1.3**

The MA flies horizontally in a straight line for a minimum of 10 m, then

Performs a roll in any direction followed by a recognizable centered straight line and then a second roll in the opposite direction to the first.

Performs straight horizontal line for a minimum of 10 m at the same altitude as when entering the figure.

B8 : PULLBACK WITH HALF LOOP (UU)**K=1.3**

Before the center line, the MA flies horizontally in a straight line for a minimum of 10 m, as soon as the center line is crossed, the MA performs 1/4 of a pulled loop followed by a vertical ascent.

At the top of the ascent, vertical tail down, the MA performs a centered backward half loop.

At the end of the half loop, vertical nose down, the MA performs a vertical descent.

MA performs a quarter pulled loop which must end on the center line.

MA performs straight horizontal line for a minimum of 10 m at the same altitude as when entering the figure.

B9 : CUBAN EIGHT (DD)**K=1.3**

Before the center line, the MA flies horizontally in a straight line for a minimum of 10 m, crosses the center line and continues on the same trajectory,

Performs 3/4 of a pulled loop, descends at 45° while performing a half roll (any direction) centred,

Performs 3/4 of pulled loop, descends at 45° while performing a half roll (any direction) centred,

Performs 1/8 of a pulled loop followed straight line horizontal for a minimum of 10 m at the same altitude as when entering the figure.

Note 1: Before and after the roll the MA may fly a straight line. All straight lines must have the equal length corresponding also to the pushed flip.

B10: OVAL WITH FLIP (UU)

K=1.3

Before the center line, the MA flies horizontally in a straight line for a minimum of 10 m, crosses the centre line and continues on the same trajectory.

Performs a pulled half loop followed by a traveling centered pushed 360° flip in horizontal flight.

Performs a pulled half loop that ends at the same height as when entering the figure.

Performs a straight horizontal line to the center line, continuous on the same trajectory for at least 10m.

Note 1: Before and after the flip the MA may fly a straight line on its back, both lines must have the same length.

Note 2 : The MA should be flat on the centre line.

B11: LANDING WITH TWO 90° TURNS (DU)

K=1.3

The maneuver begins at least 10m before the center line at a minimum altitude of 20 m, then the MA crosses an imaginary plane which extends vertically upwards from a line drawn from the center judge through the heliport.

At this point, the MA executes 3 constantly descending sides with two 90° turns in the **direction of the central circle** and lands against the wind into the heliport.

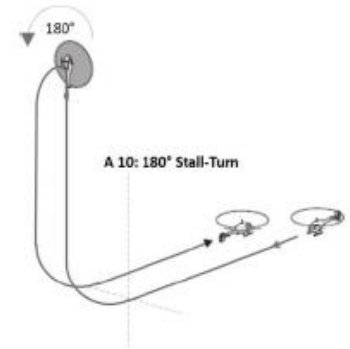
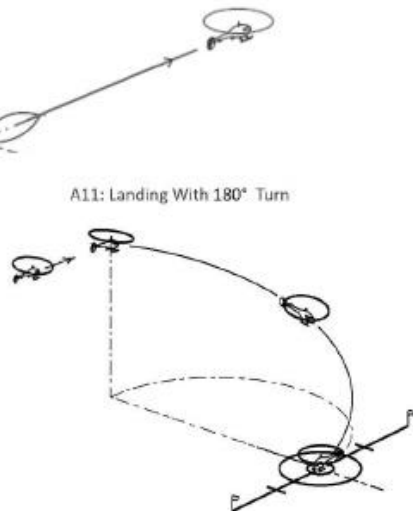
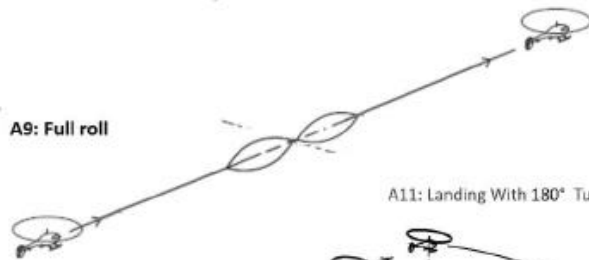
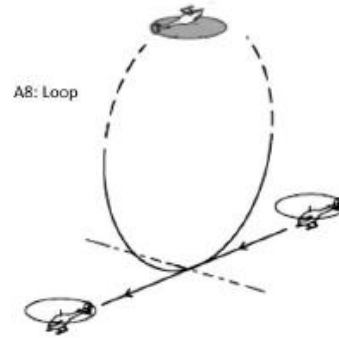
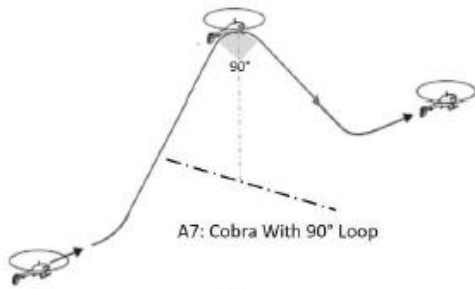
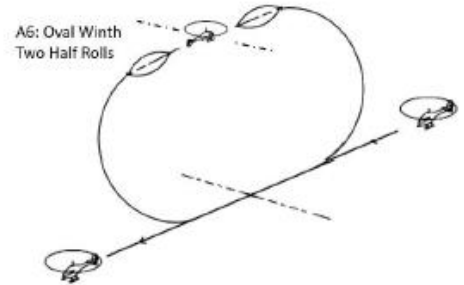
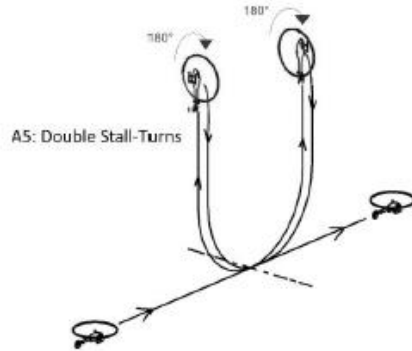
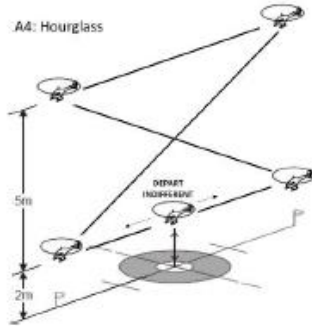
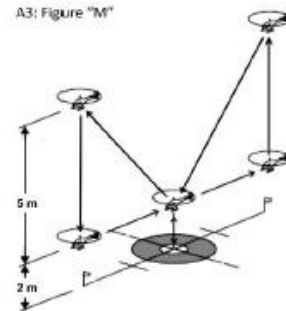
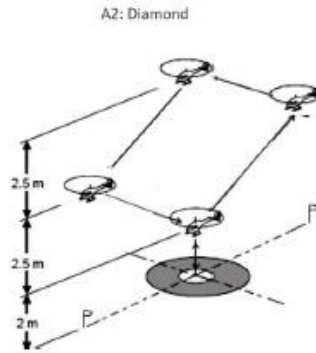
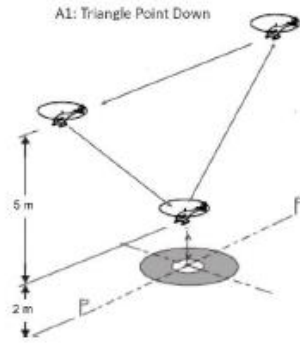
Note 1: The descent rate must be constant to a point just before touchdown on the heliport.

Note 2: Parts of the second side, the second 90° turn and the beginning of the third side may be flown out of the 60° flight window.

Scoring criteria for landing:

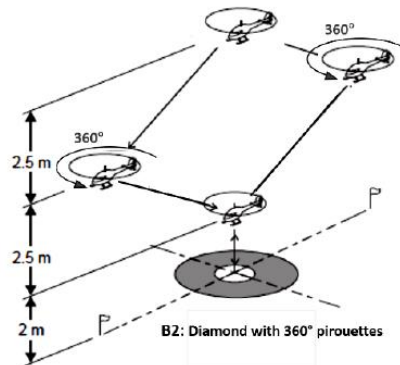
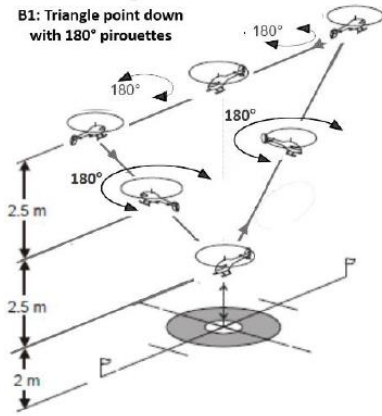
See ANNEX 5E Paragraph 5E.6.11.

PROGRAMME "A"

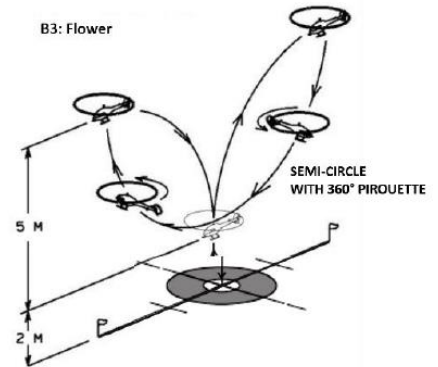


PROGRAMME "B"

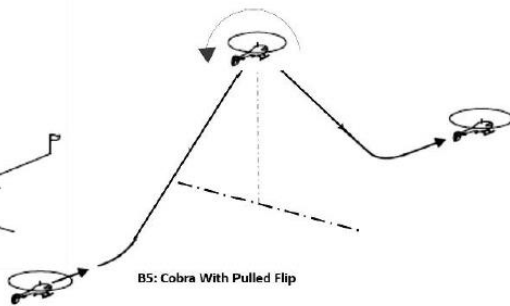
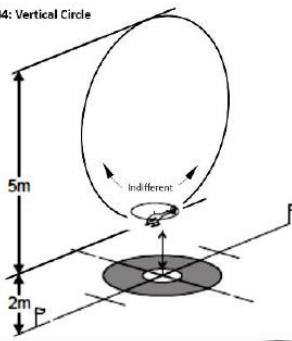
B1: Triangle point down with 180° pirouettes



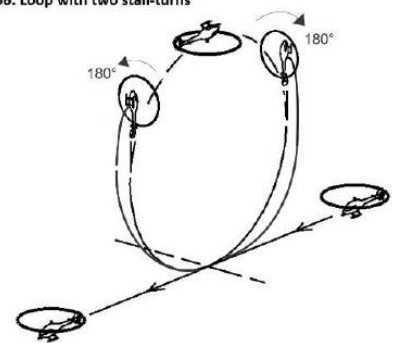
B3: Flower



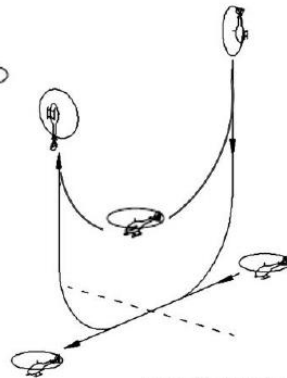
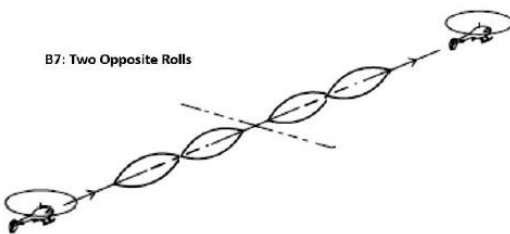
B4: Vertical Circle



B6: Loop with two stall-turns

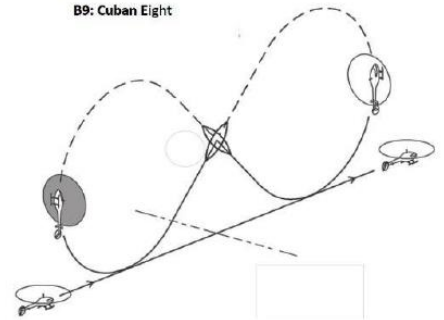


B7: Two Opposite Rolls

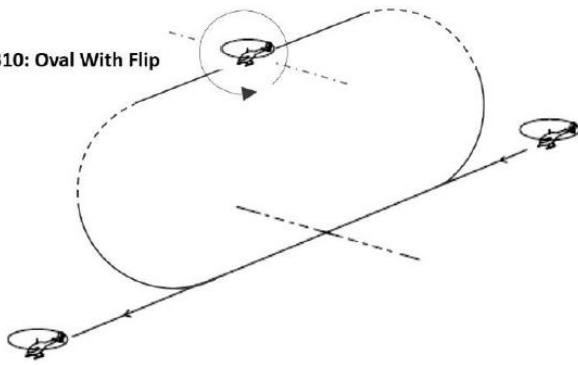


B8: Pullback With Half Loop

B9: Cuban Eight



B10: Oval With Flip



B11: Landing With Two 90° Turns

