

ANNEX A TO CHAPTER 3

R/C HELICOPTER GRADING SYSTEM

1. **Grades of Competition**

The grades of competition are:

Expert
Advanced
Novice

- a) Expert will fly the F3C schedule of manoeuvres
- b) Advanced will fly the MAAA Advanced schedule of manoeuvres.
- c) Novice will fly the MAAA Novice schedule of manoeuvres.

All manoeuvres will be judged using the F3C criteria or equivalent when the exact manoeuvre is not part of the F3C schedule.

2. **Competitor promotion to a higher level.**

Having been placed as a winner of the event at a National Championship competition, promotion from Novice or Advanced will be automatic.

A pilot who has won or placed at State Championship level may elect to fly in the next higher grade at a National Championship.

A new competitor may elect to fly in any grade level at his first National Championship Competition.

A competitor may elect to fly at the next lower level if the competitor has never won a National Championships at the lower level or having won, has not competed in any State or National level for at least three years.

3. **M.A.A.A. Advanced Schedule of Manoeuvres**

All manoeuvres must be completed in the following order:

- A1. Vertical Triangle with 360° Pirouette
- A2. Constant Heading Horizontal Eight
- A3. Constant Heading Vertical Rectangle
- A4. Inside Loop – Upwind / Upwind
- A5. Slow Roll – Downwind / Downwind
- A6. 180° Stall Turn – Upwind / Downwind
- A7. Pushover – Upwind / Upwind
- A8. Powered Landing with 180° turn – Downwind / Upwind

4. **M.A.A.A. Novice Schedule of Manoeuvres**

All manoeuvres must be completed in the following order:

- A1. Constant Heading Vertical Triangle
- A2. Constant Heading Horizontal Eight
- A3. Constant Heading Vertical Rectangle
- A4. Descent and Landing.

5. **Definitions relating to the Novice Schedule**

Nose into Wind

To supply additional safety for pilot and officials, prior to the commencement of each of the Manoeuvres, the pilot has the option to position the model in such a way that it can fly or be as close to nose into wind as possible, using the four outer helipads or the pilot's required standing position as outlined by each manoeuvres description.

Hovers Briefly

Where the words "hovers briefly" are described in each manoeuvre, this requires the model to hover for a minimum of two seconds.

NOVICE MANOEUVRE DESCRIPTIONS

GENERAL

The manoeuvres are displayed in pictorial form. The manoeuvres are performed according to the F3C Manoeuvre Descriptions General Paragraph 5D.1 and the following descriptions.

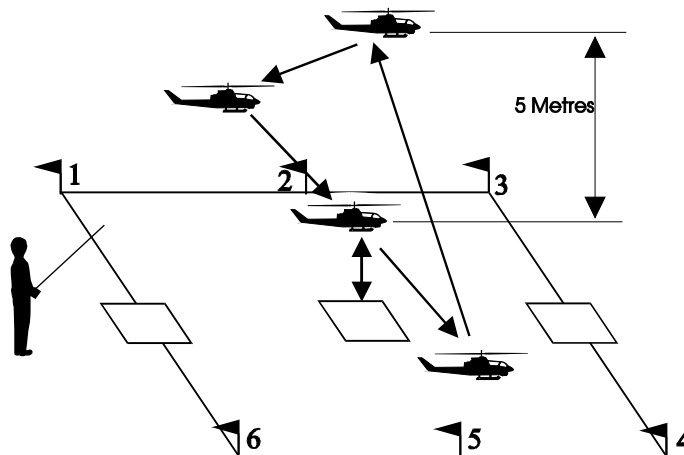
SCHEDULE A

A1. CONSTANT HEADING VERTICAL TRIANGLE

Model takes off from central helipad and ascends vertically to eye level and stops. Model then flies sideways from central helipad to a point directly above one of the centre flags (2 or 5) and stops. Model then climbs sideways at 45 degrees to an altitude of 5 m above eye level directly over the central helipad and stops. Model then descends sideways at 45 degrees to eye level directly over opposite centre flag and stops. Model then flies sideways to central helipad, stops and descends to a landing on the central helipad.

Points will be deducted for the following reasons:

1. Ascent and / or descent was not 45 degrees.
2. Model pauses during the ascent and descent.
3. The model did not land smoothly on the central helipad.

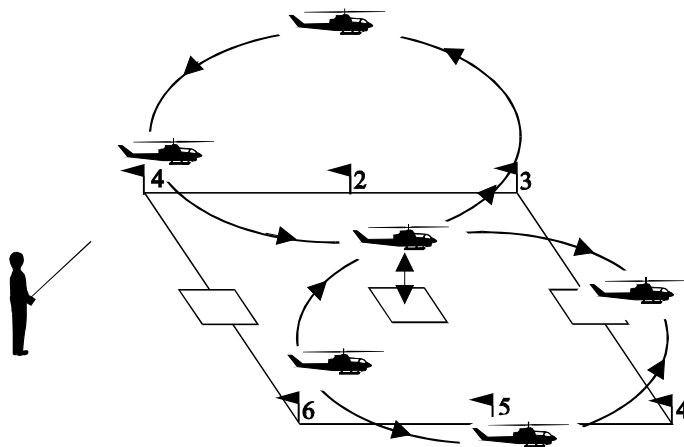


A2. CONSTANT HEADING HORIZONTAL EIGHT

Model takes off from central helipad and ascends vertically to eye level and stops. Model then flies a constant heading circle in either direction, starting forwards, for the first half of the eight followed by a constant heading circle in the opposite direction for the second half of the eight. The manoeuvre must be executed parallel to the judges line and the circles must be centered on the centre flags (2 and 5). Model returns to a point directly over the central helipad and stops. Model then descends to a landing on the central helipad.

Points will be subtracted for the following reasons:

1. Radii of the circles was not the same.
2. Circles were not constant heading.
3. Model did not land smoothly on the central helipad.

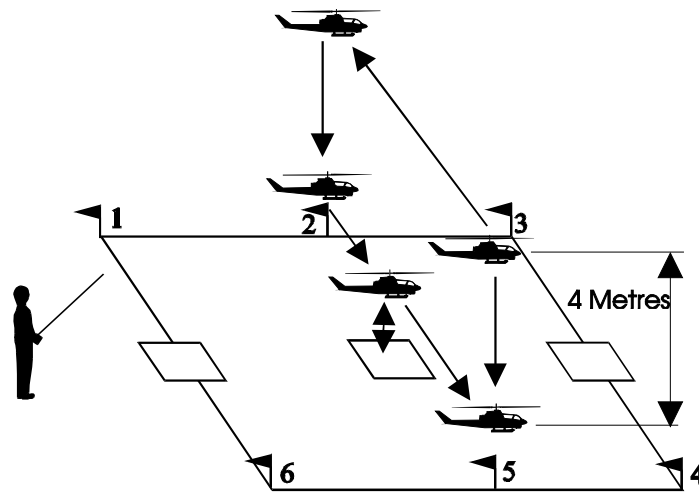


A3. CONSTANT HEADING VERTICAL RECTANGLE

Model takes off from central helipad and ascends vertically to eye level and stops. Model then flies sideways to a point directly above one of the centre flags (2 or 5) and stops. Model then climbs vertically 4 m and stops. Model then flies sideways 10 m to a point directly above the opposite centre flag and stops. Model then descends 4 m to eye level and stops. Model flies sideways to a point directly over the central helipad and stops. Model then descends to a landing on the central helipad.

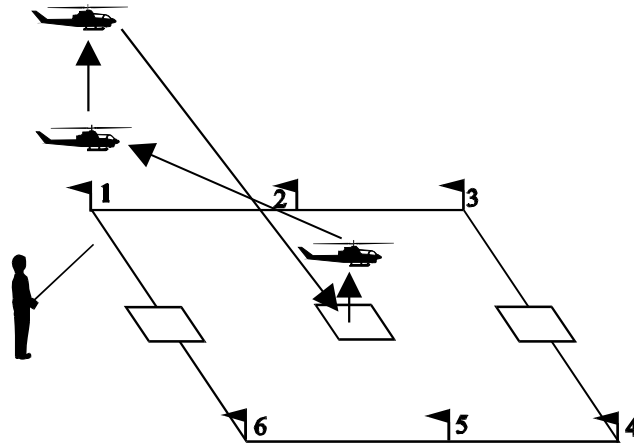
Points will be deducted for the following reasons:

1. Model pauses during the ascent and descent.
2. Model did not maintain a constant heading.



A4. DESCENT AND LANDING

Model takes off from central helipad and ascends vertically to eye level and stops. Model then flies backwards diagonally to a point above one of the corner flags (1 or 6) and stops. Model then climbs vertically 5 m and stops. Model then flies a constant heading and angled descent directly to the central helipad and lands. The model must not hover before touchdown.

**Scoring Criteria:**

The maximum score of 10 points can only be achieved when the model makes a smooth touchdown on the central helipad with skids or landing gear completely inside the 1.2 m circle. A maximum score of 9 points can be obtained with a perfect landing inside the 1.2 m circle but with part of the landing gear touching the circle (rotor shaft must point to inside the 1.2 m circle when viewed from above). If the model makes a perfect landing within the 10 m square the manoeuvre can achieve a maximum score of 8 points. If the model makes a perfect landing outside the 10 m square a maximum score of 5 points can be awarded.

Points will be deducted for the following reasons:

1. Model pauses during the descent.
2. Model did not maintain a constant heading.
3. Model lands hard, bounces or hovers before touchdown.

ADVANCED MANOEUVRE DESCRIPTIONS

GENERAL

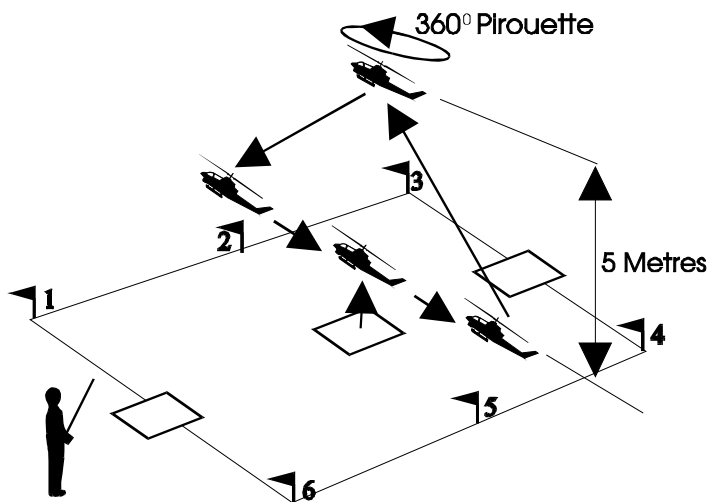
The manoeuvres are displayed in pictorial form. The manoeuvres are performed according to the F3C Manoeuvre Descriptions General Paragraph 5D.1 and the following descriptions.

SCHEDULE AA1. VERTICAL TRIANGLE WITH 360° PIROUETTE

Model takes off from central helipad and ascends vertically to eye level and stops. Model then flies backwards from central helipad to one of the centre flags (2 or 5) and stops. Model then climbs forward at 45 degrees to an altitude of 5 m above eye level directly over the central helipad and stops. Model performs a 360° pirouette in either direction and stops. Model then descends forward at 45° to eye level directly over opposite centre flag and stops. Model then flies backwards to central helipad, stops and descends to a landing on the central helipad.

Points will be deducted for the following reasons:

1. Ascent and / or descent was not 45 degrees.
2. Model did not maintain lateral position during pirouette.

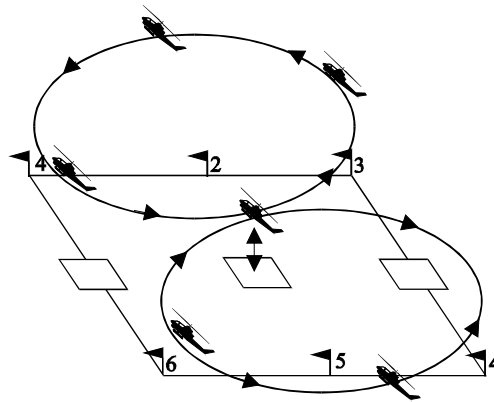


A2. CONSTANT HEADING HORIZONTAL EIGHT

Model takes off from central helipad and ascends vertically to eye level and stops. Model then flies a constant heading circle forward for the first half of the eight followed by a constant heading circle in the opposite direction for the second half of the eight. The manoeuvre must be executed parallel to the judges line and the circles must be centred on the centre flags (2 and 5). Model returns to a point directly over the central helipad and stops. Model then descends to a landing on the central helipad.

Points will be deducted for the following reasons:

1. Radii of the circles were not the same.
2. Circles were not constant heading.
3. Model did not land smoothly on the helipad.

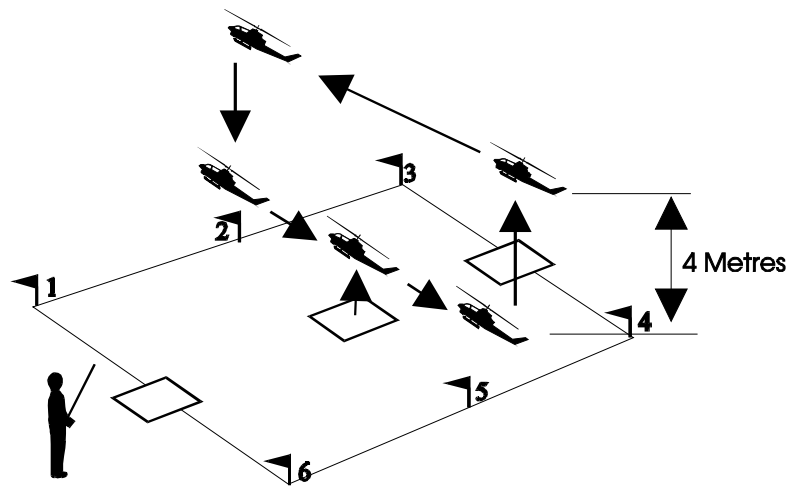


A3. CONSTANT HEADING VERTICAL RECTANGLE

Model takes off from central helipad and ascends vertically to eye level and stops. Model then flies backwards to one of the centre flags (2 or 5) and stops. Model then climbs vertically 4 metres and stops. Model then flies forwards 10 metres to opposite centre flag and stops. Model then descends 4 metres and stops. Model flies backwards to central helipad and stops. Model then descends to a landing on the central helipad.

Points will be deducted for the following reasons:

1. Model pauses during the ascents and descents.
2. Model did not maintain a constant heading.
3. Model did not land smoothly on the helipad.



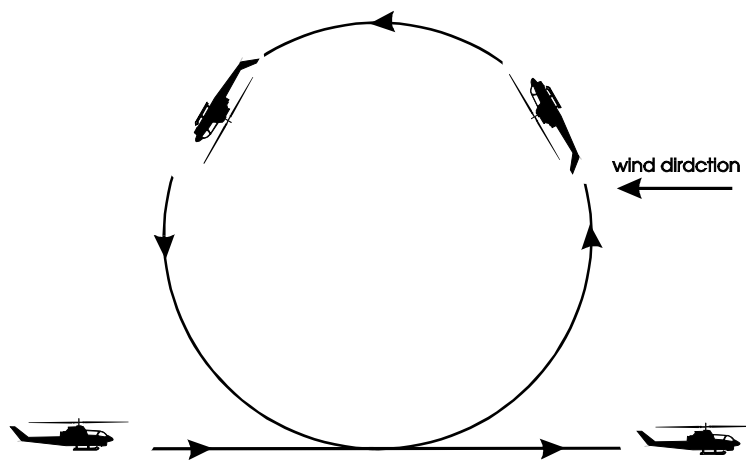
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A4. INSIDE LOOP – UPWIND / UPWIND

Model flies straight and level for a minimum of 10 metres then climbs for a loop while maintaining the nose in the direction of flight. The model ends the loop and flies straight again and horizontal for a minimum of 10 metres on the same heading and same altitude as the start of the manoeuvre.

Points will be deducted for the following reasons:

1. The loop is not round.
2. The model did not maintain the same heading throughout the manoeuvre.
3. The model started and finished the manoeuvre at different attitudes.

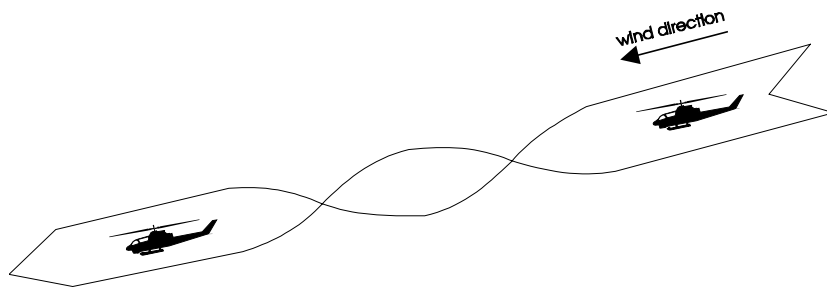


A5. SLOW ROLL – DOWNWIND / DOWNWIND

Model flies straight and level for a minimum of 10 metres. At a constant altitude the model starts a slow roll in either direction around an axis which coincides with the line of flight. The model continues this roll in the same direction until it flies horizontally again and at a constant altitude for a minimum of 10 metres.

Points will be deducted for the following reasons:

1. The roll should be a minimum duration of 3 seconds.
2. The model loses altitude during the roll.
3. The model finishes the manoeuvre on a different heading from that on which it started the manoeuvre.

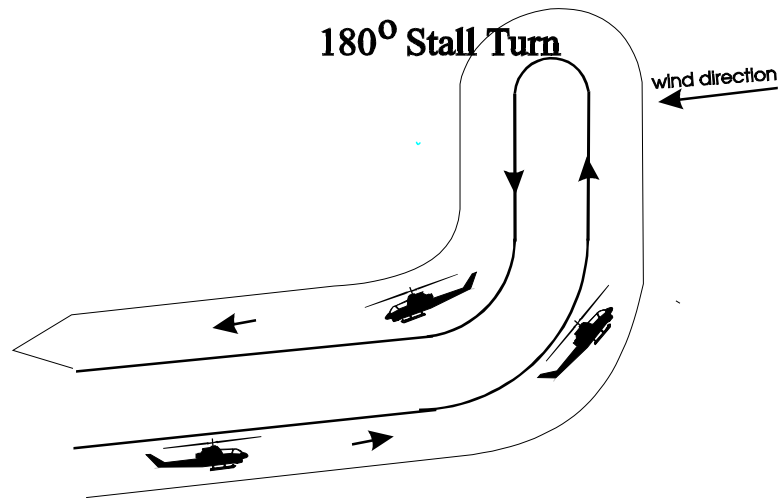


A6. 180° STALL TURN – UPWIND / DOWNWIND

Model flies straight and level for a minimum of 10 metres then climbs vertically with a smoothly rounded curve of 90°. When the vertical climb stops the model turns 180° around the yaw axis so that the nose points downward. While diving the model follows the same path as the climb and recovers to straight and level flight for a minimum of 10 metres.

Points will be deducted for the following reasons:

1. The model does not climb exactly vertical or does not end its vertical climb.
2. The model does not rotate exactly 180° and oscillates before diving.
3. The model finishes the manoeuvre on a different heading to that on which it started and manoeuvre.

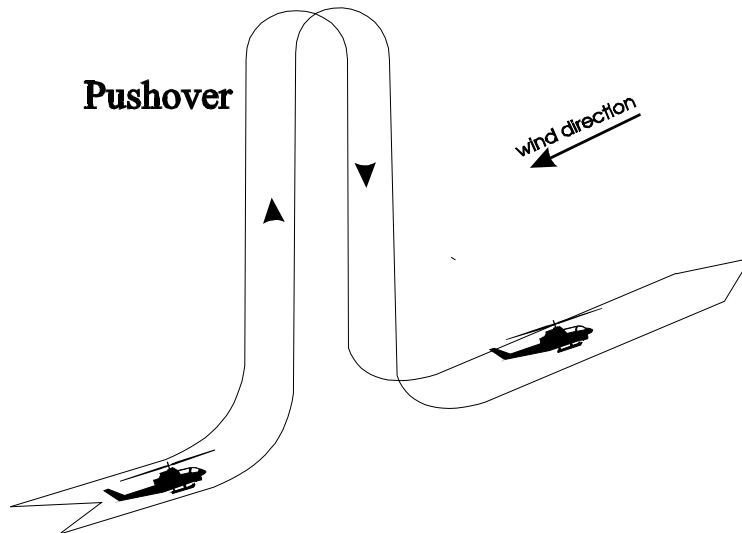


A7. PUSHOVER – UPWIND / UPWIND

Model flies straight and level for a minimum of 10 metres then enters a 90° vertical ascent. When model comes to a stop nose of model is pushed forward 90° to level and upright position and stops. Nose of model is then pushed over 90° again to vertical (nose down) position followed by vertical descent and 90° pullout back to straight and level flight for a minimum of 10 metres.

Points will be deducted for the following reasons:

1. Vertical segments were not parallel.
2. Model drifted toward or away from the judges.
3. Pushovers were not 90°



A8. POWERED LANDING WITH 180° TURN – DOWNWIND / UPWIND

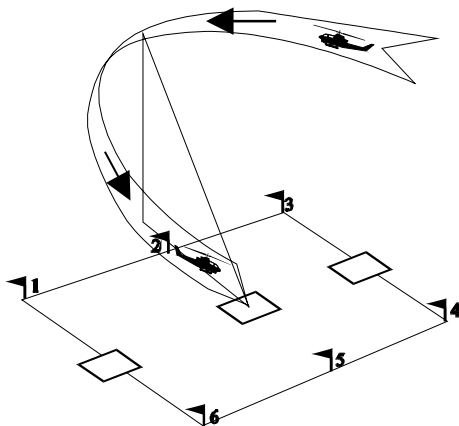
Model flies at a minimum altitude of 20 metres. Manoeuvre begins when model crosses an imaginary plane that extends vertically upward from a line drawn from the centre judge out through the central helipad. Model must be descending when it cuts this plane. The 180° turn must start at this point and the turning and descending rate must be constant from this point to a point just before touchdown on the helipad. The flight path of the model just appear as a semi-circle when viewed from above, starting at the vertical plane and ending at a line drawn from the centre judge through the central helipad. The model's flight path must never be parallel to the ground or judge's line and model must not hover before touch down.

Scoring criteria:

The maximum score of 10 points can only be achieved when the model makes a smooth touchdown on the central helipad with the skids or landing gear completely inside the 1.2 metre circle and parallel to the judge's line. A maximum score of 9 points can be obtained with a perfect landing inside the 1.2 metre circle but with part of the landing gear touching the circle (rotor shaft must point to inside of circle when viewed from above). If the model makes a perfect landing inside the 10 metre square the manoeuvre can achieve a maximum score of 8 points. If the model makes a perfect landing outside the 10 metre square a maximum score of 6 points can be awarded. If the flight path is stretched (flying parallel to the ground or judge's line) to reach the square, line of helipad, the manoeuvre will be severely downgraded. If the 180° turn is completed outside the 10 metre square the maximum score can only be 5 points.

Points will be deducted for the following reasons:

1. Model made a hard landing.
2. Model landed while it still had forward speed.
3. Model did not perform an exact 180° turn.
4. Model did not maintain a constant rate of descent during the 180° turn.
5. Model did not maintain a constant turning rate during the 180° turn.
6. Flight path was stretched to reach helipad or square.



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