ANNEX 5D

F3C MANOEUVRE DESCRIPTIONS AND DIAGRAMS

The manoeuvre schedules are listed below with the starting and ending direction (UU = Upwind - Upwind; DD = Downwind - Downwind; DU = Downwind - Upwind; UD = Upwind - Downwind) of each manoeuvre, relative to the wind, as indicated. The competitor has 9 minutes to complete the P schedule and 8 minutes to complete the SF and the F schedule. Schedule P will be flown for the preliminary rounds 1 through 4. Schedule SF/F will be flown for the semi final and final rounds.

SCHEDULE P

P1. VORTEX	(UU)
P2. DIAMOND 4	(UU)
(FLY BY)	
P3. DOUBLE CANDLE WITH DESCENDING FLIP	(DD)
P4. LOOP WITH 540° TAIL TURNS	(UU)
P5. UX WITH PUSHED FLIPS.....	(DD)
P6. OVAL WITH HALF ROLLS AND FLIP	(UU)
P7. OPPOSITE HALF AND FULL INVERTED ROLL	(DD)
P8. INVERTED UMBRELLA.....	(UU)
(FLY BY)	
P9. 180° AUTOROTATION	(DU)

SCHEDULE SF/F

F1. VERTICAL HOURGLASS WITH PIROUETTES 90°/180°.....	(UU)
F2. LAID EIGHT WITH PIROUETTES.....	(UU)
(FLY BY)	
F3. CANDLE WITH 360° TAIL TURN AND 180° PUSHED FLIP.....	(UU)
F4. DOUBLE CANDLE WITH HALF FLIPS AND HALF ROLLS.....	(DD)
F5. DOUBLE STALL TURNS WITH HALF ROLLS AND FLIP	(UU)
F6. THREE OPPOSITE ROLLS.....	(DD)
F7. INVERTED UMBRELLA WITH HALF ROLLS	(UU)
(FLY BY)	
F8. AUTOROTATION WITH FLIP AND TWO 90° TURNS	(DU)

5D.1 General

The manoeuvres are displayed in pictorial form in Figures 5D-P and 5D-SF/F 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. If pirouettes are performed in the wrong direction, the score shall be zero (0) points. 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 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 120º 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-P and 5D-SF/F.

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 P and SF/F.

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

5D.2 SCHEDULE P

P1: Vortex (UU) **K=1.5**

MA takes off vertically from the helipad and ascends to 2 m and hovers for a minimum of 2 seconds, ascends flying backwards describing the upper left (right) quarter of a circle with 5 m radius while simultaneously performing a 180° pirouette in any direction and stops over flag 1 (2), hovers for a minimum of 2 seconds and then hovers to the other flag 2 (1) while simultaneously performing two 180° pirouettes that are in opposite direction, stops and hovers over the flag 2 (1) for at least 2 seconds, descends forward describing the upper right (left) quarter of a circle with 5 m radius while simultaneously performing a 180° pirouette in any direction, stops over the center line for at least 2 seconds, descends and lands into the helipad.

P2: Diamond 4 (UU) **K=1.5**

MA takes off vertically from the helipad and ascends to 2 m while performing simultaneously a 90° pirouette in any direction. It hovers there for at least 2 seconds, ascends 2.5 m in a straight line to any flag while performing a 180° pirouette in any direction and stops for at least 2 seconds. MA ascends 2.5 m in a straight line to 7 m above the center line while performing a 180° pirouette in any direction and stops for at least 2 seconds. MA descends 2.5 m in a straight line to the second flag while performing a 180° pirouette in any direction and stops for at least 2 seconds. MA descends 2.5 m in a straight line to 2 m above the center line while performing a 180° pirouette in any direction and stops for at least 2 seconds. MA descends and lands into the helipad while simultaneously performing a 90° pirouette in opposite direction of the first pirouette.

P3: Double candle with descending flip (DD) **K=1.0**

MA flies straight and level for a minimum of 10 m and pulls up into a vertical ascent. After a nose up stop MA flies backwards vertically for 2m minimum performs a half pulled travelling flip, descends vertically for a minimum of 2m, performs a centred half loop and ascends vertically. After a nose up stop MA flies backwards vertically for 2m minimum, performs a half pulled travelling flip, descends vertically for 2m minimum and then pulls into horizontal straight and level flight for a minimum of 10m.

Note 1: The 2 flips must be made at the same altitude.

Note 2: The bottom of the half loop must be at the same altitude as when entering the figure.

P4: Loop with 540° Tail Turns (UU) **K=1.0**

MA flies straight and level for a minimum of 10 m and performs 1 ¼ loop starting from the center line. When reaching half of the height of the former loop MA performs a 540° tail turn in any direction followed by a half loop in opposite direction. When reaching again half of the height of the first loop MA performs a second 540° tail turn in any direction. After MA pulls with quarter loop into horizontal straight and level flight for a minimum of 10 m at the same altitude as when entering the figure.

Note: The tail turns must be executed exactly at half the height of the loop with the MA being precisely vertical.

P5: UX with Pushed Flips (DD) **K=1.0**

MA flies straight and level for a minimum of 10 m and pulls up into a 45° ascent with a centered half roll in any direction. Once the MA has come to a stop, MA performs a 225° pushed flip, performs a centered 'U', stops, performs a 225° pushed flip, performs a 45° descent with a centered half roll in any direction. MA pulls into horizontal straight and level flight for a minimum of 10 m.

Note 1: The bottom of the 'U' and the rolls must be centered.

Note 2: The bottom of the ‘U’ must be at the same altitude as when entering the figure.

P6: Oval with ½ Rolls and Flip (UU) **K=1.0**

MA flies straight and level for a minimum of 10 m and pulls up into a half loop followed by a half roll in any direction, followed by a travelling 360° centered pulled flip and followed by a second half roll in any direction. MA then performs a half positive loop and pulls into horizontal straight and level flight for a minimum of 10 m at the same altitude as when entering the figure.

Note 1: If there is a straight line before the first half roll, there must be the same straight line after the second half roll.

Note 2: If there is a straight line after the first half roll, there must be the same straight line before the second half roll.

P7: Opposite half and full inverted rolls (DD) **K=1.0**

MA flies straight and level for a minimum of 10m and performs a half roll in either direction, flies inverted for a minimum of 1 second, performs a full centred inverted roll in the opposite direction, flies inverted for a minimum of 1 second, performs a half roll in the same direction as the first half roll. MA flies straight and level flight for a minimum of 10m.

Note 1: The middle of the manoeuvre must be centred.

Note 2: There is one point deduction per inverted flight section that does not last in minimum 1 second.

P8: Inverted Umbrella (UU) **K=1.0**

MA flies straight and level for a minimum of 10 m and pulls up into a vertical ascent at center line. After a nose up stop MA performs a half backward loop. After MA stops it performs a centered ‘U‘. After a nose up stop MA performs a second half backward loop. After a nose down stop MA descends forward vertically on center line followed by a quarter loop and exit after a 10 m straight line at the same altitude as when entering the figure.

Note 1: The quarter loops at the entrance and the exit of the figure and the half loop of the centered ‘U’ must have the same radius.

Note 2: The two half backward loops must be of equal size and must have half radius than the half loop of the centered ‘U’.

Note 3: The bottom of the ‘U’ must be at the same altitude as when entering the figure.

P9: 180° Autorotation (DU) **K=1.0**

MA flies straight and level for a minimum of 10 m at a minimum altitude of 20 m. Manoeuvre begins when model aircraft crosses an imaginary plane that extends vertically upward from a line drawn from the center judge out through the helipad. MA must be in the autorotation state when it cuts this plane, the engine must be off (or at idle) at this point and the MA must be descending. 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 MA must appear as a semi-circle when viewed from above, starting at the vertical plane and ending at a line drawn from the center judge through the helipad. 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.3 SCHEDULE SF/F

F1: Vertical Hourglass with Pirouettes 90°/180° (UU) **K=1.5**

MA takes off vertically from the helipad and ascends to 2 m, stops and hovers for a minimum of 2 seconds, flies backwards to flag 1 (2) while simultaneously performing a 90° nose in pirouette, stops and hovers for a minimum of 2 seconds. MA ascends sideways to 7 m over flag 2 (1) by a straight line while simultaneously performing two 180° pirouettes that are in opposite direction, stops and hovers for a minimum of 2 seconds. MA flies sideways horizontally back to flag 1 (2) while simultaneously performing two pirouettes 180° that are in opposite direction, stops and hovers for a minimum of 2 seconds. MA descends sideways to 2 m over flag 2 (1) by a straight line while simultaneously performing two 180° pirouettes that are in opposite direction, stops and hovers for a minimum of 2 seconds. MA flies sideways horizontally to the helipad while simultaneously performing a 90° pirouette in opposite direction as the first pirouette, stops and hovers for a minimum of 2 seconds. MA descends and lands into the helipad.

Note: The change of the pirouettes direction must be done smoothly on the center line.

F2: Laid Eight with Pirouettes (UU) **K=1.5**

MA takes off vertically from the helipad and ascends to 4.5 m while performing simultaneously a 360° pirouette in any direction, then hovers there for at least two seconds. MA flies backwards and descends describing a vertical circle with a radius of 2.5 m while simultaneously performing a 360° pirouette in any direction.

MA flies forward and descends describing a vertical circle with a radius of 2.5 m while simultaneously performing a 360° pirouette in the opposite direction, stops and hovers for at least two seconds over the helipad. MA descends and lands into the helipad while simultaneously performing a 360° pirouette in any direction.

Note: The change of direction of the pirouettes must occur smoothly on the center line.

F3: Candle with 360° Tail Turn and 180° pushed Flip (UU) **K=1.0**

MA flies straight and level for a minimum of 10 m and pulls up into vertical ascent on center line by doing a quarter loop. MA then performs a 360° tail turn, descends minimum 2 m vertically backwards and performs a 180° pushed flip while descending vertically. MA descends minimum 2 m vertically forward, pulls with a quarter loop into horizontal straight and level flight for a minimum of 10 m at the same altitude as when entering the figure.

Note 1: The quarter loops at the entrance and the exit of the figure must have the same radius.

Note 2: The vertical lines before and after the 180° flip must be of equal length.

F4: Double Candle with ½ Flips and ½ Rolls (DD) **K=1.0**

MA flies straight and level for a minimum of 10 m and performs after crossing the center line a quarter loop and pulls up into a vertical ascent. At the end of the vertical ascent MA performs a 180° pushed flip followed by a recognizable distance of a vertical nose down descend followed by a half roll in any direction. MA performs a half inside loop and pulls up into a vertical ascent. At the end of the vertical ascent MA performs a 180° pulled flip followed by a recognizable distance of a vertical nose down descend followed by a half roll in any direction. MA performs a quarter inside loop which must end at the center line and exit after a 10 m straight line at the same altitude as when entering the figure.

Note 1: The 180° flips and the half rolls must be on the same altitude.

Note 2: The vertical lines before the half rolls must be of equal length.

F5: Double Stall Turns with half Rolls and Flip (UU) **K=1.0**

MA flies straight and level for a minimum of 10 m and pulls up into vertical ascent on center line by doing a quarter loop. At the end of the ascent MA performs a 180° stall turn followed by a half roll in any direction. MA performs a ¾ inside loop followed by a travelling 360° centered pushed flip and another ¾ inside loop. MA ascents vertically and performs a second 180° stall turn at the end of the ascent followed by a half roll in any direction. MA pulls with a quarter looping into horizontal straight and level flight for a minimum of 10 m at the same altitude as when entering the figure.

Note 1: Before and after the half rolls straight vertical lines are allowed, but they must all be of equal length.

Note 2: Before and after the 360° flip straight horizontal lines are allowed, but they must all be of equal length..

F6: Three opposite Rolls (DD) **K=1.0**

MA flies straight and level for a minimum of 10 m, performs a roll in any direction followed by a roll in opposite direction followed by a roll in the same direction as the first roll. MA flies straight and level for a minimum of 10 m.

Note 1: During the second roll the MA must be in inverted flight when it crosses the center line.

Note 2: The rolls must be executed one immediately after the other, straight flights between the rolls will be downgraded by one to two points.

Note 3: The elapsed time from the beginning of the first to the end of the third roll must be at least 4 seconds.

F7: Inverted Umbrella with half Rolls (UU) **K=1.0**

MA flies straight and level for a minimum of 10 m and pulls up into a vertical ascent on center line. After a nose up stop MA performs immediately in a backward vertically flight a half roll in any direction followed by a half backward loop. After MA stops it performs a centered ‘U’. After a nose up stop MA performs a half backward loop followed by a backwards vertically ascent. After a nose down stop MA performs immediately in a forward vertically flight a half roll in any direction followed by a vertical descent. MA pulls with a quarter looping into horizontal straight and level flight for a minimum of 10 m at the same altitude as when entering the figure.

Note 1: The quarter loops at the entrance and the exit of the figure and the half loop of the centered ‘U’ must have the same radius.

Note 2: The two half backward loops must be of equal size and must have half radius than the half loop of the centered ‘U’.

Note 3: The bottom of the ‘U’ must be at the same altitude as when entering the figure.

Note 4: The two rolls must be performed at the same altitude.

F8: Autorotation with Flip and two 90° Turns (DU) **K=1.0**

MA flies straight and level flight for a minimum of 10 m performs a pulled 360° flip in horizontal movement, flies horizontal straight and level for a maximum of 10 m and turns off the engine (or at idle) during this straight flight period, just before reaching the center line. MA executes 3 constantly descending sides with two 90° turns in the direction of the pilot and lands against the wind into the helipad.

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

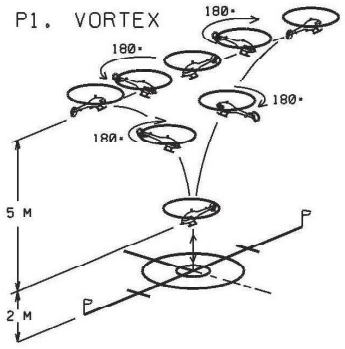
Note 2: Parts of the second side, the second 90° turn and the beginning of the third side may be flown out of the 60° flight window.

Scoring criteria for landing: See ANNEX 5E Paragraph 5E.6.11.

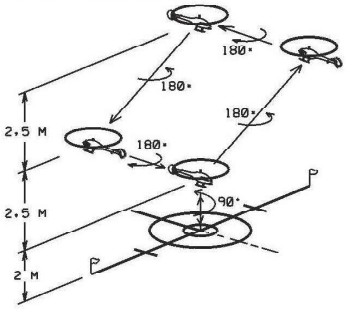
Note: Manoeuvre diagrams are overleaf.

FIGURE 5D-P: F3C MANOEUVRE SCHEDULE P

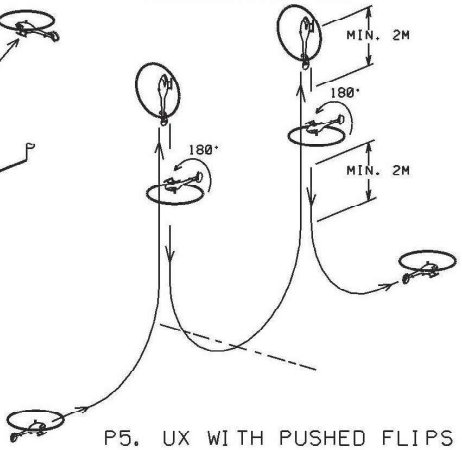
P1. VORTEX



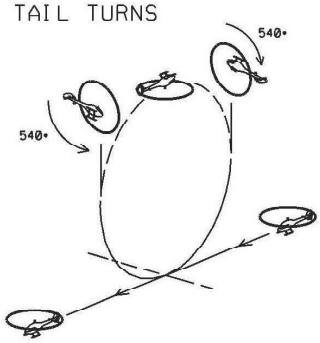
P2. DIAMOND 4



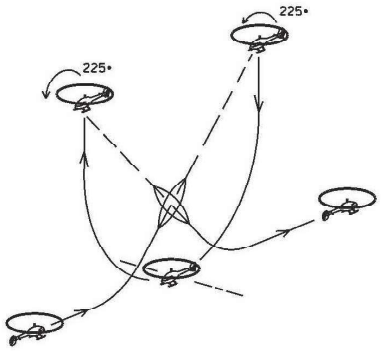
P3. DOUBLE CANDLE WITH DESCENDING FLIP



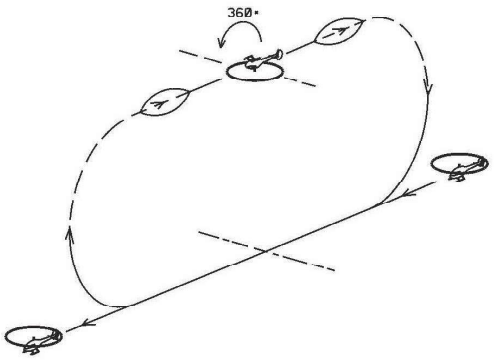
P4. LOOP WITH 540° TAIL TURNS



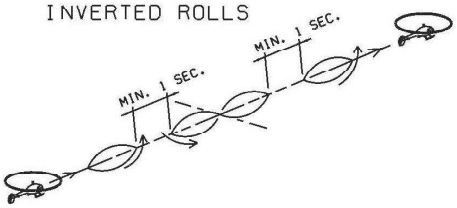
P5. UX WITH PUSHED FLIPS



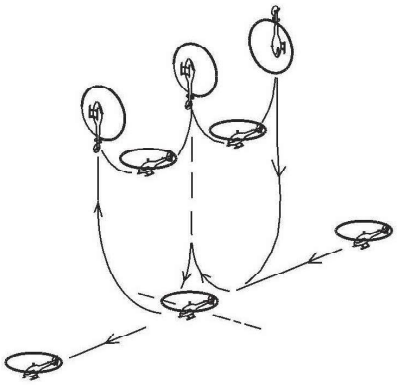
P6. OVAL WITH HALF ROLLS AND FLIP



P7. OPPOSITE HALF AND FULL INVERTED ROLLS



P8. INVERTED UMBRELLA



P9. 180° AUTOROTATION

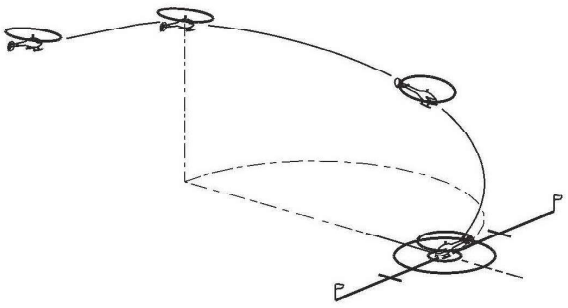
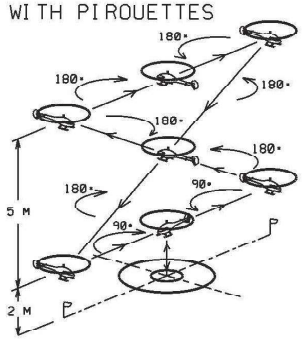
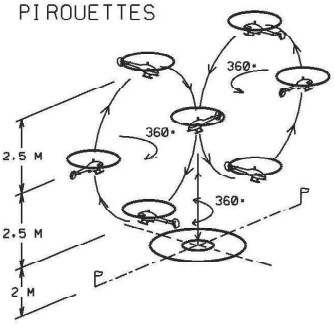


FIGURE 5D-SF/F: F3C MANOEUVRE SCHEDULE SF/F

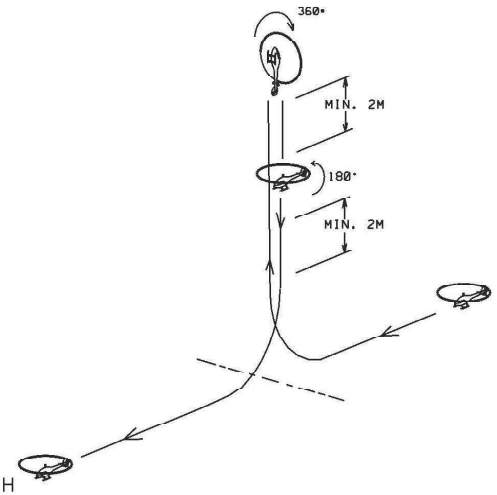
F1. VERTICAL HOURGLASS WITH PIROUETTES



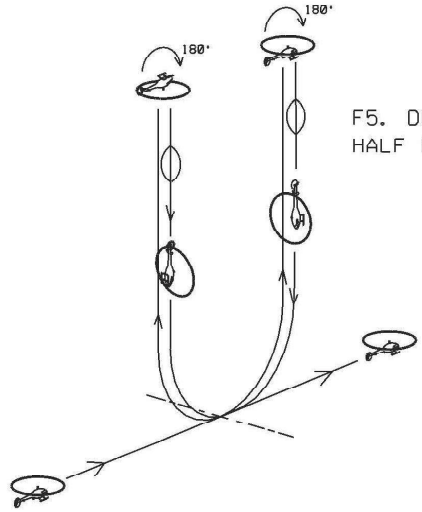
F2. LAID EIGHT WITH PIROUETTES



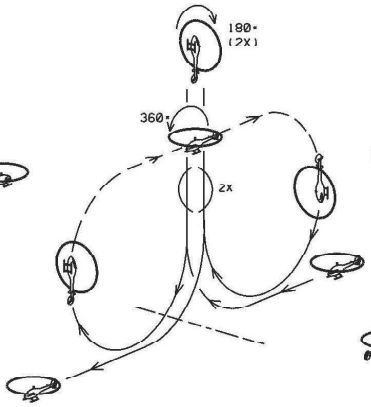
F3. CANDLE WITH 360° TAIL TURN AND 180° PUSHED FLIP



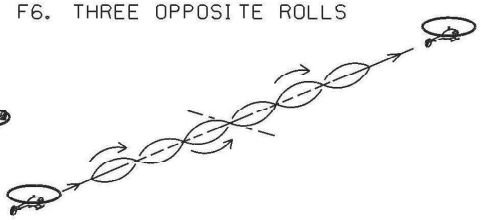
F4. DOUBLE CANDLE WITH HALF FLIPS AND HALF ROLLS



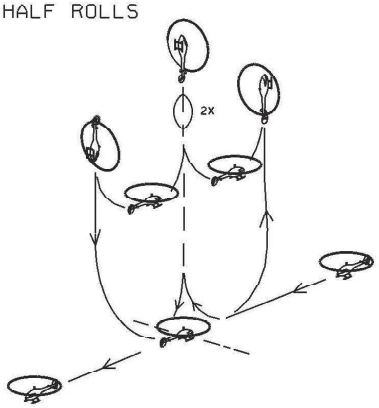
F5. DOUBLE STALL TURNS WITH HALF ROLLS AND FLIP



F6. THREE OPPOSITE ROLLS



F7. INVERTED UMBRELLA WITH HALF ROLLS



F8. AUTOROTATION WITH FLIP AND TWO 90° TURNS