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Avenue Mon-Repos 24
CH-1005 Lausanne
(Switzerland)
Tél.: +41(0) 21/345.10.70
Fax: +41(0) 21/345.10.77
E-mail: sec@fai.org
Web: www.fai.org

FEDERATION AERONAUTIQUE INTERNATIONALE

Avenue Mon Repos 24, 1005 LAUSANNE, Switzerland

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1 FAI Statutes, Chapter 1, para. 1.6

2 FAI Sporting Code, General Section, Chapter 3, para 3.1.3.

3 FAI Statutes, Chapter 1, para 1.8.1

4 FAI Statutes, Chapter 5, para 5.1.1.2; 5.5; 5.6 and 5.6.1.6

5 FAI Bylaws, Chapter 1, para 1.2.1

6 FAI Statutes, Chapter 2, para 2.3.2.2.5,

7 FAI Bylaws, Chapter 1, para 1.2.3

8 FAI Statutes, Chapter 5, para 5.1.1.2; 5.5; 5.6, 5.6.1.6

9 FAI Sporting Code, General Section, Chapter 3, para 3.1.7

10 FAI Sporting Code, General Section, Chapter 1, paras 1.2. and 1.4

11 FAI Statutes, Chapter 5, para 5.6.3

12 FAI Bylaws, Chapter 1, para 1.2.2

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THIS 2006 EDITION INCLUDES THE FOLLOWING AMENDMENTS MADE TO THE 2005 CODE

These amendments are marked by a double line in the right margin of this edition

Paragraph	Plenary meeting approving change	Brief description of change	Change incorporated by

RULE FREEZE FOR THIS VOLUME

With reference to paragraph A.12 of Volume ABR:

In all classes, the four-year rule for no changes to model aircraft/space model specifications, manoeuvre schedules and competition rules will be strictly enforced, but in step with the World Championship cycle of each category. This means that in Volume F3A:

a) changes can next be agreed at the Plenary meeting 2007 for application from January 2008;

b) new manoeuvre schedules are applied from January 2008.

The only exceptions allowed to the four-year rule freeze are genuine and urgent safety matters, indispensable rule clarifications and noise rulings.

VOLUME F3A

PART FIVE - TECHNICAL REGULATIONS FOR RADIO CONTROLLED CONTESTS

5.1. CLASS F3A - AEROBATIC POWER MODEL AIRCRAFT

5.1.1. **Definition of a Radio Controlled Aerobatic Power Model Aircraft**

Model aircraft, but not a helicopter, which is aerodynamically manoeuvred by control surface(s) in attitude, direction and altitude by a pilot on the ground using radio control.

5.1.2. **General Characteristics of Radio Controlled Aerobatic Power Models:**

Maximum overall span ..... 2 m

Maximum overall length ..... 2 m

Maximum total weight ..... 5 kg without fuel

Power source limitations: Any suitable power source may be utilised except those requiring solid propellants, gaseous or liquefied gaseous fuels. Electric powered model aircraft are limited to a maximum of 42 volts for the propulsion circuit.

Paragraph B.3.1. of Section 4b (Builder of Model aircraft) is not applicable to class F3A.

The maximum noise level will be 94 dB(A) measured at 3 m from the centre line of the model aircraft with the model aircraft placed on the ground over concrete or macadam at the flying site. With the motor running at full power measurement will be taken 90 degrees to the flight path on the right hand side and downwind from the model aircraft. The microphone will be placed on a stand 30 cm above the ground in line with the motor. No noise reflecting objects shall be nearer than 3 m to the model aircraft or microphone. The noise measurement will be made prior to each flight. If a concrete or macadam surface is not available then the measurement may be taken over bare earth or very short grass in which case the maximum noise level will be 92 dB(A).

In the event a model aircraft fails the noise test, no indication shall be given to the pilot, and/or his team, or the judges and both the transmitter and the model aircraft shall be impounded by the flight line official immediately following the flight. No modification or adjustment to the model aircraft shall be permitted (other than refuelling). The model aircraft shall be re-tested by a second noise steward using a second noise meter and in the event that the model aircraft fails the retest, the score for the preceding flight shall be zero.

The flight time will be interrupted while the noise check at the flying site is being made. The competitor shall not be delayed more than 30 seconds for the noise check.

Radio equipment shall be of the open loop type (i.e. no electronic feedback from the model aircraft to the ground). Auto-pilot control utilising inertia, gravity or any type of terrestrial reference is prohibited. Automatic control sequencing (pre-programming) or automatic control timing devices are prohibited.

Example: Permitted:

1. Control rate devices that are manually switched by the pilot.
2. Any type of button or lever control that is initiated and terminated by the pilot.
3. Manually operated switches to couple control functions.

Not permitted:

1. Snap buttons with automatic timing mode.
2. Pre-programming devices to automatically perform a series of commands.
3. Auto-pilots for automatic wing levelling.
4. Propeller pitch change with automatic timing mode.
5. Any type of voice recognition system.
6. Any type of learning function involving manoeuvre to manoeuvre or flight to flight analysis.

5.1.3. **Definition and Number of Helpers**

A helper may be a Team Manager, another competitor or an officially registered supporter. Each pilot is permitted one helper during the flight. Two helpers may be present during the starting of the motor(s). The second helper may place the model aircraft for take-off and retrieve the model aircraft following the landing.

5.1.4. **Number of Flights**

Competitors have the right to the same number of preliminary, semi-final, or finals flights. Only completed rounds will be counted.

5.1.5. **Definition of an Attempt**

There is an attempt when the competitor is given permission to start.

Note: If the motor fails to start within the three minutes allowed, the competitor must immediately make room for the next competitor. If the motor stops after the take-off has begun, but before the model aircraft is airborne, it may be restarted within the 3-minute starting period.

5.1.6. **Number of Attempts**

Each competitor is entitled to one attempt for each official flight.

Note: An attempt can be repeated at the contest director's discretion only when for any unforeseen reason outside the control of the competitor the model aircraft fails to start (e.g. there is radio interference). Similarly, in a flight that is interrupted by any circumstance beyond the control of the competitor, the competitor is entitled to a re-fly but only the manoeuvre affected and the unscored manoeuvres that follow will be judged.

5.1.7. **Definition of an Official Flight**

There is an official flight when an attempt is made whatever the result.

5.1.8. **Marking**

Each manoeuvre may be awarded marks, in whole number increments, between 10 and 0 by each of the judges during the flight. These marks are multiplied by a coefficient which varies with the difficulty of the manoeuvre. Any manoeuvre not completed shall be scored zero (0). Manoeuvres must be performed where the judges can see them clearly. If a judge, for some reason outside the control of the competitor, is not able to follow the model aircraft through the entire manoeuvre, he may set the “Not Observed” (N.O.) mark. In this case, the judge’s mark for that particular manoeuvre will be the average of the numerical marks given by the other judges. Centre manoeuvres should be performed in the centre of the manoeuvring area while turn around manoeuvres should not extend past a line 60 degrees left and right of centre. Vertical height should not exceed 60 degrees. Also, manoeuvres should be performed along a line of flight approximately 150 m in front of the pilots. Infractions of this rule will be cause for downgrading by each judge individually and in proportion to the degree of infraction. The manoeuvring area will be clearly marked with white vertical poles, a minimum of 100 mm in diameter and a minimum of 4 m high, placed on centre and 60 degrees each side of centre on a line 150 m in front of the pilots. Flags and/or streamers of contrasting colour should be mounted on the poles to improve visibility. White or contrasting) lines, originating at the pilot's position and extending outward at least 50 m will also be used to mark the centre and extreme limits (60 degrees left and right of centre) of the manoeuvring zone. Audible and visual signals to indicate violations of the manoeuvring zone are not to be employed.

The judges shall be seated not more than 10 m, and not less than 7m behind the pilot's position (the apex of the 60 degree lines) and within an area described by the extension of the 60 degree lines to the rear of the pilot.

At the conclusion of the flight each judge will independently consider if the in-flight noise level of the model aircraft is too noisy. If a majority of the judges consider the model aircraft too noisy the flight score will be penalised 10 points for each counting judge.

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

The scores given by each judge for each competitor shall be made public at the end of each round of competition.

5.1.9. **Classification**

Each competitor will have four preliminary flights, with the best three counting to determine the team placing. All scores, preliminary, semi-final and final, will be normalised to 1000 points as described below. The top one third, but not more than 30 competitors, will then have two additional semi-final flights flying the known finals schedule. The total of the best three preliminary flights (normalised again to 1000 points) will count as one score along with the two semi-finals scores to provide three scores, the best two to count for semi-finals classification. The top ten competitors of the semi-finals will then have four additional flights to determine the individual winner. Two final flights will be the current known finals schedule and two will be unknown schedules (two different schedules) (see Annex F) flown one time each. The known and unknown schedules should be flown in alternating sequence. The best score from the known schedule will be combined with the best score from the unknown schedules for final classification. In the case of a tie the semi-final score will be used to decide the higher classification.

Scores for all rounds, preliminary, semi-finals and finals, will be computed using the Tarasov-Bauer-Long (TBL) statistical averaging scoring system. Only computer tabulation systems containing the TBL algorithm and judge analysis programs and approved by the CIAM Bureau can be used at World and Continental Championships. All scores for each round, preliminary, semi-final and finals, will then be normalised as follows. When all competitors have flown in front of a particular group of judges (i.e. a round) the highest score shall be awarded 1000 points. The remaining scores for that group of judges are then normalised to a percentage of the 1000 points in the ratio of actual score over winner's score.

$$\text{Points}_X = \frac{S_X}{S_W} \times 1000$$

Points_X = points awarded to competitor X

S_X = score of competitor X

S_W = score of winner of round.

Note 1: Final and semi-final flights to determine the individual winner are only required for World and Continental Championships. For smaller contests the total of the three best preliminary flights may be used to determine the individual winner and team placing.

Note 2: The TBL system can only be applied for events with at least 10 competitors and 5 judges. For those smaller events that are not scored with the TBL system, the high and low scores for each manoeuvre will be discarded if four or more judges are used.

5.1.10. **Judging**

For World Championships the organiser must appoint four panels of five judges each (a total of twenty judges). The judges must be of different nationalities and must be selected from a current list of International Judges. Those selected must reflect the approximate geographical distribution of teams participating in the previous World Championship with the final list approved by the CIAM Bureau. At least one third, but not more than two thirds of the judges must not have judged at the previous World Championships. Judge assignment to the four panels will be by random draw.

The invited judges must have had F3A judging experience within the previous twelve months and must submit a resume of his/her judging experience to the organiser when accepting the invitation to judge at a World Championship. The organiser must in turn submit the resumes to the CIAM Bureau along with the judges list for approval.

For World Championships with fewer than 72 competitors, and for Continental Championships, two panels of five judges may be used for the preliminary and semi-final rounds, and one panel of ten judges may be used for the final rounds.

For the semi-final rounds of a World Championship the judges will be arranged in two groups of ten judges. Assignment to the two groups will be by random draw.

For the final rounds of a World Championship the twenty judges will be arranged in three groups, a left hand group of six judges to judge only the left turn-around manoeuvres, a centre group of eight judges to judge only the centre manoeuvres and a right hand group of six judges to judge only the right turn-around manoeuvres. Judge assignments to the three groups will be by random draw for rounds one and two (one known and one unknown round) with a second draw for rounds three and four, except a judge will

not serve in the same group as the previous draw. For each competitor the score from the three groups (following TBL computation) will be combined for a total score for the flight.

Before every World Championship, there shall be a briefing for the judges, followed by training flights by non-competitors. Also, warm-up flights for the judges should be flown by non-competitors before the first official preliminary flight each day. For the semi-finals the highest placing non-semi-finalists and for the finals the highest placing two non-finalists should be awarded the honour of performing the warm-up flights. Warm-up flights should be judged but under no circumstances should they be tabulated. Any deviations from the above procedures must be stated in advance by the organisers and must have prior approval by the CIAM or the CIAM Bureau.

5.1.11. **Organisation for Radio Controlled Aerobatics Contests**

For transmitter and frequency control see Section 4b, Para. B.8.

The draw for flight order will be done for each flight line, except when possible, frequency will not follow frequency, nor team member follow team member. Also team members on separate flight lines will be separated by at least two competitors.

For flights two, three and four of the preliminary rounds the flight order will start 1/4, 1/2 and 3/4 down the flight order respectively.

The flight order for the first semi-finals round will also be by random draw. The second semi-finals flight will start 1/2 down the semi-finals flight order.

The flight order for the first round of the finals will be established by a random draw as above. The flight order for flights two, three and four will start 1/4, 1/2 and 3/4 down the finals flight order.

During the flight the competitor must stay in the proximity of the judges and under the supervision of the Flight Line Director.

Competitors must be called at least five minutes before they are required to occupy the starting area.

If his frequency is clear the competitor will be given his transmitter when he occupies the starting area so that he can perform a radio check. If there is a frequency conflict he must be allowed a maximum of one minute for a radio check before the start of the 3 minute starting time. The timer will notify the competitor when the minute is finished and immediately start timing the 3-minutes starting time.

5.1.12. **Execution of Manoeuvres**

The manoeuvres must be executed during an uninterrupted flight in the order in which they are listed. The competitor may make only one attempt at each manoeuvre during the flight. The pilot has three minutes to start his motor and ten minutes to complete his flight, both the three minutes and the ten minutes to start when the competitor is given permission to start his motor.

The model aircraft must take-off and land unassisted, that is, no hand launched flights. If any part of the model aircraft is dropped during the flight, scoring will cease at that point and the model aircraft must be landed immediately.

The flight ends when the landing sequence is completed. Scoring will cease with the expiration of the ten minute time limit.

5.1.13. **Schedule of Manoeuvres**

For 2004-2005, Schedule P-05 will be flown in the preliminaries. Schedule F-05 will be flown in the semi-finals, as well as in the finals, alternating with unknown schedules.

For 2006-2007, Schedule P-07 will be flown in the preliminaries. Schedule F-07 will be flown in the semi-finals, as well as in the finals, alternating with unknown schedules.

PRELIMINARY SCHEDULE P-05	K-Factor
1. Take-off sequence	1
2. Reverse Cuban 8, 4/8-pt. roll first, 2/2-pt. roll second, exit inverted	4
3. Stall turn, 2/4-pt. roll up, negative snap-roll down	4
4. Reversed four-point roll	4

5. Half square loop, full roll up, exit inverted	2
6. Inverted triangle loop with ½ rolls, exit inverted	3
7. Two turn inverted spin	2
8. Loop with integrated slow roll on top	4
9. Half clover, 2/4-pt. roll up, ½ roll down, exit inverted	3
10. 45 degrees up with 4-point roll, exit inverted	4
11. Reverse humpty bump, pull-push-push, 2/4-pt. roll down ½ roll up (or ¾-pt. roll down, ¼ roll up)	3
12. Reverse double Immelmann, full roll first, 2/4-pt. roll second, exit inverted	4
13. Goldfish, with ½ rolls	2
14. Square loop with ½ rolls in vertical legs, and 2/4-pt. rolls in horizontal legs	5
15. Half reverse Cuban 8, full roll, exit inverted	2
16. 4/8-pt. roll, with slow roll opposite	5
17. Humpty Bump, pull-pull-push, positive snap roll up, exit inverted at mid-level.	4
18. Vertical eight, top first, integrated ½ roll on centre	3
19. Split S with full roll, exit inverted	2
20. Three-quarter slow roll from inverted, exit inverted	4
21. Half square outside loop with 2/4-pt. roll up, exit inverted	2
22. Two 2-turn inverted spins, opposite, ½ roll exit	4
23. Landing sequence	1
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PRELIMINARY SCHEDULE P-07	K-Factor
1. Take-off sequence	1
2. Half clover, 2/4-pt. roll up, ½ roll down, exit inverted	4
3. Half square loop on corner, ½ rolls, exit inverted	2
4. Rev. Cuban 8 from top, 2/4-pt. roll and 4/8-pt. roll in downlines, exit inverted	4
5. Half reverse Cuban 8 from top, 2/2-pt. roll	3
6. 45 degrees down, with 1 ½ positive snap-roll, exit inverted	4
7. Humpty bump, push-push-push, with ½ roll up, exit inverted (or ¼ roll up and ¼ roll down)	3
8. Eight-point roll from inverted, exit inverted	5
9. Stall turn, ½ roll up, 2/2-pt. roll down	3
10. Loop, with integrated 4-pt. roll on top	4
11. Immelmann turn	1
12. Square loop on corner, from top, with ½ rolls	5
13. Figure 6, with ½ roll down	2
14. Hourglass, mid-entry, top first, with 2/4-pt. roll down, exit inverted	4
15. Three-quarter vertical 8, top first	2
16. Reverse knife-edge, exit inverted	5
17. Half square outside loop, 2/4-pt. roll up, exit inverted	2
18. 2 ½ turn inverted spin	4
19. Half horizontal hourglass, ½ roll up first, 2/2-pt. roll opposite second	3
20. Horizontal 8 from top, with half rolls integrated	4
21. Half outside loop with full roll, exit inverted	2
22. Six-sided loop, 2/4-pt. roll on top	4

23. Landing sequence	1
	72

SEMI- FINALS, AND FINALS SCHEDULE F-05	K-Factor
1. Take-off sequence	1
2. Rolling loop with one roll	5
3. Half square loop on corner, 2/4-pt. rolls, exit inverted	2
4. Reverse humpty bump with roll down, positive snap-roll up, exit inverted	5
5. Figure 6 with ½ roll down, exit inverted	2
6. Inverted hourglass, mid entry, top first, 2/4-pt. roll down	4
7. Two-turn positive spin, exit inverted	3
8. Reverse ¾-pt, roll inverted to exit inverted	4
9. Stall turn, 2/8-pt. roll up, ¾-pt. roll down	3
10. Rolling circle with three rolls opposite, first roll to outside	5
11. Half roll, half outside loop, with full roll	3
12. Reverse avalanche, 1 ½ negative snap-roll, exit inverted	5
13. Reverse humpty bump, pull-push-push, 2/8-pt. roll down, ¼ roll up (or 2/4-pt. roll down, ½ roll up)	3
14. Reverse golf ball from top, with ½ rolls	4
15. Half square outside loop, 1 ½ positive snap-roll down	4
16. Reverse knife-edge, exit inverted	5
17. Rolling half outside loop, full roll.	3
18. 45 degrees down, 2/4-pt. roll and negative snap-roll opposite, ½ roll exit	5
19. Landing sequence	1
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SEMI-FINALS, AND FINALS SCHEDULE F-07	K-Factor
1. Take-off sequence	1
2. Humpty bump, pull-push-push, 4/8-pt. roll up, pos. snap down, exit inverted	5
3. Three-quarters of a reverse Cuban 8, ½ roll and 2/4-pt. roll in uplines	3
4. Reverse double avalanche, negative snap roll first, positive snap-roll second	5
5. Half square outside loop, 2/2-pt. roll opposite, exit inverted	2
6. Rolling figure S, with opposite rolls integrated, exit inverted	5
7. Negative snap-roll split S	4
8. Slow roll from knife-edge, exit inverted	5
9. Top hat, ¾-pt. roll up, ¾ roll down	3
10. Rolling circle, with 2 rolls reversed	5
11. Humpty bump, pull-push-pull, ½ roll down (or ¼ rolls up and down)	3
12. Vertical half square loop, 4-pt. roll up, 2 ½ negative spins, exit inverted	5
13. Half square loop on corner, with ½ rolls	2
14. Reverse triangle, with knife-edge	5
15. Rolling half loop, exit inverted	3
16. Four-point roll from inverted, exit inverted	4
17. Stall turn, 4/8-pt. roll up, ½ roll down exit inverted	3
18. 45 degrees up, 1 ½ negative snap roll	4

19. Landing sequence	1
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The description of the manoeuvres, judging notes, and Aresti diagrams are given in Annex 5A. The Judges' Guide is at Annex 5B.

ANNEX 5A

F3A - RADIO CONTROLLED AEROBATIC MODEL AIRCRAFT

DESCRIPTION OF MANOEUVRES

5A.1.13. The shape of all manoeuvres is judged on the flight path of a model aircraft, and manoeuvres must start and finish in straight and level upright or inverted flight. Centre manoeuvres must start and finish on the same heading, while turn-around manoeuvres must finish on a heading 180 degrees to entry. When appropriate, entry and exit of centre manoeuvres must be at the same altitude, unless specified otherwise. Positioning adjustments in altitude are allowed in turn-around manoeuvres.

All manoeuvres which have more than one loop or parts of loops must have the loops and parts of loops the same diameter and in the case of consecutive loops, in the same place. Similarly, all manoeuvres that have more than one continuous roll must have the same roll rate. All manoeuvres that have more than one point roll, must have the same roll rate, and the points must be of equal duration. Where there is a combination of continuous rolls and point rolls within a manoeuvre, the roll rate for the point rolls does not necessarily have to be the same as the roll rate for the continuous rolls. All consecutive rolls (continuous and/or point rolls) on a horizontal line must be at the same altitude and heading.

All manoeuvres with rolls, part rolls, point rolls, or snap-rolls, or combinations of same, must have lines of equal length before and after the rolls or combinations, except when specified otherwise. Barrels rolls and axial rolls instead of specified snap rolls must be scored zero. Spiral dives instead of specified spins must be scored zero. Snap-roll entries to spins must be scored zero. Wing-overs instead of stall turns must be scored zero.

Any violation of the above will be reason for downgrading, in addition to the downgrades for deviations from the manoeuvre descriptions and the judging notes in Annex 5A, the Judges Guide (Annex 5B) and any official judge training material. Note that these lists are not all-inclusive.

PRELIMINARY SCHEDULE P-05

P-05.01 Take-off sequence: Place the model aircraft on the runway, and take off. Soon after reaching a safe height, turn 90 degrees toward the line defined by the upwind and downwind markers. When approximately over this line, turn 270 degrees in the opposite direction for a downwind trim pass with the model aircraft upright. When approaching the downwind marker, perform a 180-degree turn, reversal, or other turn-around manoeuvre of the competitor's choice.

Judging notes:

- Take-off sequence not followed, zero points.
- Model aircraft passes behind the judges' line (zero line), zero points.
- Model aircraft is flown very far past the left-hand and/or right-hand marker flags, zero points.
- Only two scores, a zero or a 10, may be awarded for the take-off sequence.

P-05.02 Reverse Cuban eight, 4/8pt. Roll first, 2/2pt. Roll second, exit inverted: Pull to a 45 degree upline, execute four points of an eight-point roll, followed by a three-fourths inside loop and a two-point roll on the second 45 degree line. Push through 5/8 of an outside loop to exit inverted.

P-05.03 Stall turn, 2/4pt. Roll up, negative snap-roll down: Push vertical and perform two points of a four-point roll followed by a stall turn. On the downline perform a negative snap-roll, then pull to level flight.

Judging notes:

- Snap-roll must be negative.

P-05.04 Reversed four-point roll: On a horizontal line perform two points of a four-point roll, followed by two points of a four-point roll in the opposite direction.

P-05.05 Half square loop, full roll up, exit inverted: Pull vertical and perform a full roll, pull to exit inverted.

P-05.06 Inverted triangle loop, with half rolls, exit inverted: Pull through 135 degrees to a 45 degree downline and perform a half roll. Push through 90 degrees to a 45 degree upline, perform a half roll, and pull to exit inverted.

P-05.07 Two turn inverted spin: Perform two consecutive inverted (negative) spins, then pull to level flight.

Judging notes:

- Snap-roll entry, zero points.
- Forced entry, downgrade.

P-05.08 Loop with integrated slow roll on top: Pull up and complete an inside loop. Over the full top 90 degree quadrant of the loop perform a full roll, integrated with the circular path of the loop.

P-05.09 Half clover, 2/4pt- roll up, half roll down, exit inverted: Pull to a vertical upline and perform two points of a four-point roll. Push into ¾ outside loop, fly inverted, push into a second ¾ outside loop, followed by a half roll on the downline. Push to exit inverted.

Judging notes:

- Upline and downline must coincide.

P-05.10 45 degrees up with 4pt. roll, exit inverted: Push to a 45 degree upline and perform a four-point roll. Pull to exit inverted.

P-05.11 Reverse humpty bump, pull-push-push, with options: Pull to a vertical downline and perform two points of a four-point roll (or alternatively three points of a four point roll). Push through a half outside loop to a vertical upline and perform a half roll (or alternatively a quarter roll). Push to recover upright.

P-05.12 Reverse double immelmann, full roll first, 2/4pt. roll second, exit inverted: Push to a half outside loop, followed immediately by a full roll, fly inverted, then push to a half outside loop, followed immediately by two points of a four-point roll to exit inverted.

Judging notes:

- The straight inverted flight is equal to the diameter of the half outside loops.

P-05.13 Goldfish, with half rolls: Pull to a 45 degree downline and perform a half roll, followed by ¾ of an inside loop. On the second 45 degree downline, perform a half roll, then pull to recover upright.

P-05.14 Square loop, with half rolls and 2/4pt. rolls: Pull to a vertical upline and complete a square loop. In each of the vertical legs, perform a half roll, and in the horizontal legs two points of a four-point roll.

P-05.15 Half reverse Cuban eight, with full roll, exit inverted: Pull to a 45 degree upline and perform a full roll. Push through 5/8 of an outside loop to exit inverted.

P-05.16 Four points of an 8pt. roll, slow roll opposite: On a horizontal line, perform four points of an eight-point roll from inverted, followed immediately by a slow roll in the opposite direction.

P-05.17 Humpty bump, positive snap-roll up, exit inverted at mid-level: Pull to a vertical upline, perform a full positive snap-roll, then pull through a half inside loop to a vertical downline, then push to exit inverted.

P-05.18 Vertical eight, mid-entry, with half roll integrated with the loops: Push to complete a full outside loop, then perform a half roll, followed by a full outside loop directly under the first outside loop, to recover upright. The half roll must be fully integrated with the circular flight path of the last 1/8th portion of the first outside loop, and the first 1/8th portion of the second outside loop.

P-05.19 Split S, with full roll, exit inverted: Perform a full aileron roll, followed immediately by a half outside loop, to exit inverted.

Judging notes:

- The half outside loop is immediately after the roll.

P-05.20 Two three-quarter slow rolls opposite from inverted, exit inverted: From level inverted flight perform three-quarters of a slow roll to knife edge, then immediately perform three-quarters of a slow roll in the opposite direction to recover in level inverted flight.

Judging notes:

- The roll reversal is immediate, with no pause.

P-05.21 Half square outside loop with 2/4pt. roll up, exit inverted: From level inverted flight push to a vertical upline and perform two points of a four-point roll, then pull to exit inverted.

P-05.22 Two two-turn inverted spins, opposite from inverted, half roll exit: From inverted, perform a two-turn inverted spin then immediately perform a two-turn inverted spin in the opposite direction. Hold a vertical downline, then push to level inverted flight followed by a half roll to recover upright.

Judging notes:

- Snap-roll entry, zero points.
- Forced entry, downgrade.
- The spin reversal is immediate.
- The exit half roll is part of the manoeuvre.

P-05.23 Landing sequence: At reduced power, execute a 180 degree level or descending turn within the aerobatic zone to a downwind heading. Fly a downwind leg, with the model aircraft upright. When approximately over the downwind marker, turn 180 degrees toward the runway, and fly a descending approach to the runway, touching down in the landing zone. The landing sequence is complete when the model aircraft has either rolled 10 meters or comes to rest, if within 10m.

Judging notes:

- Model aircraft does not follow landing sequence, zero points.
- Turns which are not either level or descending will be cause for awarding a zero score for the landing.
- If any landing gear leg retracts on landing, zero points.
- If the model aircraft lands anywhere outside the landing zone before the landing is completed, zero points. The landing zone is designated by a circle of 50m radius or lines across a standard runway spaced 100 metres apart where the runway is at least 10m wide.
- Only two scores, a zero or a ten, may be awarded for the landing sequence

PRELIMINARY SCHEDULE P-07

P-07.01 Take-off sequence. See P-05.01.

P-07.02 Half clover, with 2/4-pt. roll up and half roll down. Pull to a vertical upline and perform two points of a four-point roll. Push into ¾ outside loop, fly inverted, push into a second ¾ outside loop to a vertical downline, followed by a half roll. Pull to recover in level flight.

Judging notes:

- Upline and downline must coincide.

P-07.03 Half square loop on corner, with half rolls, exit inverted: Pull to a 45 degree upline and perform a half roll. Push through 90 degrees to a 45 degree upline and perform a second half roll, then pull to a level inverted exit.

P-07.04 Reverse Cuban eight from top, 2/4pt. roll and 4/8pt. rolls in downlines, exit inverted: From inverted, pull to a 45 degree downline, and perform two points of a 4-point roll. Pull through 3/4 of an inside loop and on the second 45 degree downline, perform four points of an eight-point roll, and then pull through 5/8 of an inside loop to exit inverted.

P-07.05 Half reverse Cuban eight, from top, with 2/2pt. roll: From inverted, pull to a 45 degree downline and perform two points of a two-point roll. Then push through a 5/8 outside loop to recover in level flight.

P-07.06 45 degrees down with 1 ½ positive snap roll, exit inverted: Push to a 45 degree downline, and perform one and one half positive snap rolls. Push 45 degrees to exit inverted.

Judging notes:

- Snap roll must be positive.

P-07.07 Push-push-push humpty bump with half roll or ¼ roll options, exit inverted: Push to a vertical upline and perform a half roll (or alternatively a quarter roll), then push through a half outside loop to a vertical downline (and perform a second quarter roll) and push to exit inverted.

P-07.08 Eight-point roll from inverted, exit inverted: From inverted on a horizontal line, perform an eight-point roll, to exit inverted.

P-07.09 Stall turn, half roll up, 2/2pt. roll down: Push to a vertical upline and perform a half roll, followed by a stall turn. On the downline perform a two points of a two-point roll and pull to recover upright..

P-07.10 Loop with integrated 4-point roll on top: Pull up to complete a loop. Over the full top 90 degree quadrant of the loop perform a four-point roll, integrated with the circular path of the loop.

P-07.11 Immelmann turn: Pull to complete a half inside loop, followed immediately by a half roll to exit upright.

Judging notes:

- The half roll must be immediately after the half loop.

P-07.12 Square loop on corner from top, with half rolls: Push to a 45 degree downline to complete a full square loop on corner. In each of the sides, perform a half roll.

P-07.13 Figure 6 with half roll: Push to a vertical downline and perform a half roll, followed by ¾ of an outside loop to recover upright.

P-07.14 Hourglass, mid-entry, with 2/4pt. roll down, exit inverted: Pull to a 45 degree upline, pull 135 degrees to horizontal inverted, pull 135 degrees to a 45 degree downline and perform two points of a four-point roll, pull 135 degrees to horizontal, pull 135 degrees to a 45 degree upline, then pull 45 degrees to exit inverted on the same level as that of entry.

P-07.15 Three-quarter vertical eight: Push to complete a full outside loop, followed by a half inside loop directly below the outside loop to recover upright.

P-07.16 Reverse knife-edge, exit inverted: On a horizontal line, perform a quarter roll to knife-edge and fly a straight line. Roll 180 degrees in the opposite direction and fly a second line in knife-edge flight, then perform a quarter roll in the same direction to exit inverted.

Judging notes:

- The knife-edge segments are of equal length and duration, and must be long enough to demonstrate controlled, sustained knife-edge flight.

P-07.17 Half square outside loop, 2/4pt. roll up, exit inverted: Push to a vertical upline and perform two points of a four-point roll, then pull to exit inverted.

P-07.18 2 ½ turns inverted spin: Perform two and a half consecutive inverted (negative) spins, hold a vertical downline, then pull to level flight.

Judging notes:

- Snap entry, zero points.
- Forced entry, downgrade.

P-07.19 Half horizontal hourglass, half roll, and two half rolls opposite in uplines: Pull to a 45 degree upline and perform a half roll. Pull 135 degrees to a vertical downline, pull 135 degrees to a 45 degree upline and perform two half rolls in opposite direction, then push to recover upright.

P-07.20 Horizontal eight from top, with integrated half rolls: Push to complete ¾ of an outside loop, perform a half roll, integrated with the last 1/8 quadrant of the first loop and the first 1/8 quadrant of the following loop, then push to complete a full outside loop directly behind the first outside loop, perform a half roll, integrated with the last 1/8 quadrant of the loop and the first 1/8 quadrant of the following part-loop, and push to recover upright.

Judging notes:

- The two outside loops are round, with the half rolls integrated with portions of the loops.

P-07.21 Half outside loop with full roll, exit inverted: Push to complete a half outside loop, followed immediately by a full roll, to exit inverted.

Judging notes:

- The full roll must be immediately after the half outside loop.

P-07.22 Six-sided loop, with 2/4pt. roll on top: Push to a 60 degree upline and complete a six-sided loop. In the top leg, perform two points of a four-point roll.

P-07.23 Landing sequence: See P-05.23.

FINALS SCHEDULE F-05

F-05.01 Take-off sequence: See P-05.01.

F-05.02 Rolling loop with one roll: Pull to complete a loop, with a full roll integrated with the entire loop.

F-05.03 Half square loop on corner with 2/4pt. rolls, exit inverted: Pull to a 45 degree upline and perform two points of a four-point roll. Push through 90 degrees to a 45 degree upline and perform two points of a four-point roll, then pull to exit inverted.

F-05.04 Reverse humpty bump with full roll down and positive snap-roll up, exit inverted: Before centre, pull to a vertical downline and perform a full roll, followed by a half outside loop to a vertical upline. Then perform a positive snap-roll and pull to exit inverted.

Judging notes:

- Snap-roll must be positive.

F-05.05 Figure 6 with half roll, exit inverted: Pull to a vertical downline and perform a half roll, followed by ¾ of an inside loop to exit inverted.

F-05.06 Hourglass, inverted mid-entry, with 2/4pt. roll down: Push to a 45 degree upline, push 135 degrees to horizontal, push 135 degrees to a 45 degree downline and perform two points of a four-point roll, push 135 degrees to inverted horizontal, push 135 degrees to a 45 degree upline, then push 45 degrees to recover upright on the same level as that of entry.

F-05.07 Two turn positive spin, exit inverted: Perform two consecutive positive spins, then push to level inverted flight.

Judging Notes:

- Snap roll entry, zero points.
- Forced entry, downgrade.

F-05.08 Reverse 3/4-pt. roll, inverted to inverted: On a horizontal line from inverted, perform three points of a four-point roll in one direction, followed by three points of a four-point roll in the opposite direction, to exit inverted.

F-05.09 Stall turn, 2/8pt. roll up, 3/4pt. roll down: From inverted push to a vertical upline and execute two points of an eight-point roll, followed by a stall turn. On the downline, perform three points of a four-point roll and pull to recover upright.

F-05.10 Rolling circle with three rolls in opposite directions, first roll to the outside: Perform a rolling circle (away from or towards the runway), with three rolls in opposite directions, the first and third rolls to the outside of the circle, to recover in upright flight at the same point as entry.

Judging Notes:

- Roll rate must be constant.
- Roll reversal must be immediate.
- Circle must be of constant radius and wind corrected.
- Manoeuvre must be downgraded if the circle is too large, and too far out, or if done towards the runway, the circle is outside the manoeuvring zone.

F-05.11 Half roll, half outside loop, full roll: Perform a half roll to inverted, then push to complete a half outside loop, followed immediately by a full roll, to exit upright.

Judging notes:

- The half roll and full roll are immediately before and immediately after the half outside loop.

F-05.12 Reverse avalanche with 1 ½ negative snap roll, exit inverted: Push to a half outside loop. At the bottom perform a one-and-a-half negative snap roll, then pull through a half loop to exit inverted.

Judging notes:

- Snap roll must be negative.

F-05.13 Reverse humpty bump with options, pull-push-push: Pull to a vertical downline, perform two points of an eight-point roll (or alternatively two points of a four-point roll), then push through a half outside loop to a vertical upline, perform a quarter roll (or alternatively a half roll), then push to recover upright.

F-05.14 Reverse golf ball from top, with half rolls: Push to a 45 degree downline, perform a half roll, pull through ¾ of an inside loop to a 45 degree upline, perform a second half roll and push to recover upright..

F-05.15 Half square outside loop, with 1 ½ positive snap-roll down: Push to a vertical downline and perform a 1 ½ positive snap-roll, then pull to exit upright.

Judging notes:

- Snap-roll must be positive.

F-05.16 Reverse knife-edge, exit inverted: On a horizontal line, perform a quarter roll to knife-edge and fly a straight line. Roll 180 degrees in the opposite direction and fly a second line in knife-edge flight, then perform a quarter roll in the same direction to exit inverted.

Judging notes:

- The knife-edge segments are of equal length and duration, and must be long enough to demonstrate controlled, sustained knife-edge flight.

F-05.17 Rolling half outside loop with full roll: Push to complete a half outside loop, with a full roll integrated with the half loop.

F-05.18 45 degree down, with 2/4pt. roll and negative snap-roll opposite, half roll exit: Push to a 45 degree downline and perform two points of a four-point roll, followed immediately by a negative snap-roll in the opposite direction. Push to inverted, and perform a half roll to recover upright.

Judges notes:

- Snap roll is immediately after 2/4pt. roll.
- Snap roll must be in the opposite direction to the 2/4pt. roll.
- Snap roll must be negative.
- Exit half roll is part of the manoeuvre.

F-05.19 Landing sequence: See P-05.23.

FINALS SCHEDULE F-07

F-07.01 Take-off sequence: See P-05.01.

F-07.02 Pull-push-push humpty bump, 4/8pt. roll up, positive snap-roll down, exit inverted: Pull to a vertical upline and execute four points of an eight-point roll. Push through a half outside loop to a vertical downline and perform a positive snap-roll, then push to exit inverted.

Judging notes:

- Snap-roll must be positive.

F-07.03 Three-quarters of a reverse Cuban eight, half roll and 2/4pt. rolls in uplines: Push to a 45 degree upline and perform a half roll. Push through ¾ of an outside loop to a 45 degree upline and perform two points of a four-point roll, then push to recover upright.

F-07.04 Reverse double avalanche: Push to complete an outside loop. At the bottom perform a negative snap-roll, and at the top a positive snap-roll.

Judging notes:

- Snap rolls must be negative and positive respectively.

F-07.05 Half square outside loop, 2/2pt. roll opposite, exit inverted: Push to a vertical downline and perform two points of a two-point roll in opposite directions. Push to exit inverted.

Judging notes:

- The reversal of the 2-pt. rolls must be immediate.

F-07.06 Rolling figure S, with integrated opposite rolls, exit inverted: Push to a half outside loop, followed immediately by a second half loop directly above the first to exit inverted. In each half loop, perform a roll (second roll in opposite direction) that is integrated with the half loop.

Judging notes:

- Half loops must be round.
- Rolls must be continuous and integrated with the half loops.
- Rolls must be in opposite directions.
- Roll reversal is immediate.

F-07.07 Negative snap-roll, half loop: From inverted, perform a negative snap-roll, followed immediately by a half inside loop, to recover upright

Judging notes:

- Snap-roll must be negative.
- Half loop is immediately after snap-roll.

F-07.08 Slow roll from knife-edge, exit inverted: On a horizontal line perform a quarter roll to knife-edge, then perform a slow roll in the opposite direction to a knife-edge position, followed by another quarter roll in the opposite direction to the slow roll, to exit inverted.

Judging notes:

- Knife-edge positions need to be demonstrated only briefly.

F-07.09 Top hat with 3/4pt. roll up and ¾ roll down: Push to a vertical upline and perform three points of a four-point roll, pull to level inverted flight, pull to a vertical downline and perform a three-quarter roll, then pull to exit upright.

Judging notes:

- Horizontal cross-box leg must be inverted.
- Inverted cross-box horizontal leg may be only very brief, or longer if required by the competitor.

F-07.10 Rolling circle, two rolls reversed: Perform a rolling circle (away from or towards the runway), with two rolls in opposite directions. The first roll is to the outside of the circle and the second roll is to the inside of the circle, to recover upright, at the same point as entry.

Judging notes:

- Roll rate must be constant.
- Roll reversal must be immediate.
- Circle must be of constant radius and wind corrected.
- Manoeuvre must be downgraded if the circle is too large, and too far out, or if done towards the runway, the circle is outside the manoeuvring zone.

F-07.11 Pull-push-pull humpty bump, with roll options: Pull to a vertical upline (and as an option, perform a quarter roll), push through a half outside loop to a vertical downline, perform a half roll (or alternatively a quarter roll) and pull to recover upright.

F-07.12 Vertical half square loop, four-point roll up, 2 ½ negative spins, exit inverted: After centre, pull to a vertical upline and perform a four-point roll. Pull to level inverted flight, gradually reducing power while maintaining a horizontal flight path. Perform two and a half consecutive inverted (negative) spins on centre, then push to exit inverted.

Judging notes:

- Snap-roll entry, zero points.
- Forced entry, downgrade.

F-07.13 Half square loop on corner, with half rolls, exit inverted: Push to a 45 degree upline and perform a half roll. Pull through 90 degrees to a 45 degree upline and perform a second half roll, then push to recover upright.

F-07.14 Reverse triangle with knife edge: Push to a 45 degree downline, then push 135 degrees to level inverted flight. Perform a quarter roll to knife edge and fly a straight line, followed by a quarter roll to level inverted flight. Push through 135 degrees to a 45 degree upline and push 45 degrees to recover upright.

Judging notes:

- The knife-edge segment must be long enough to demonstrate controlled, sustained knife-edge flight.

F-07.15 Rolling half loop, exit inverted: Push to complete a half outside loop, with a full roll integrated with the half loop, to exit inverted.

F-07.16 Four-point roll from inverted, exit inverted: From level inverted flight perform a four-point roll, to recover in level inverted flight.

F-07.17 Stall turn, 4/8pt. roll up, half roll down, exit inverted: Push to a vertical upline and perform four points of an eight-point roll, followed by a stall turn to a vertical downline. Perform a half roll down and push to exit inverted.

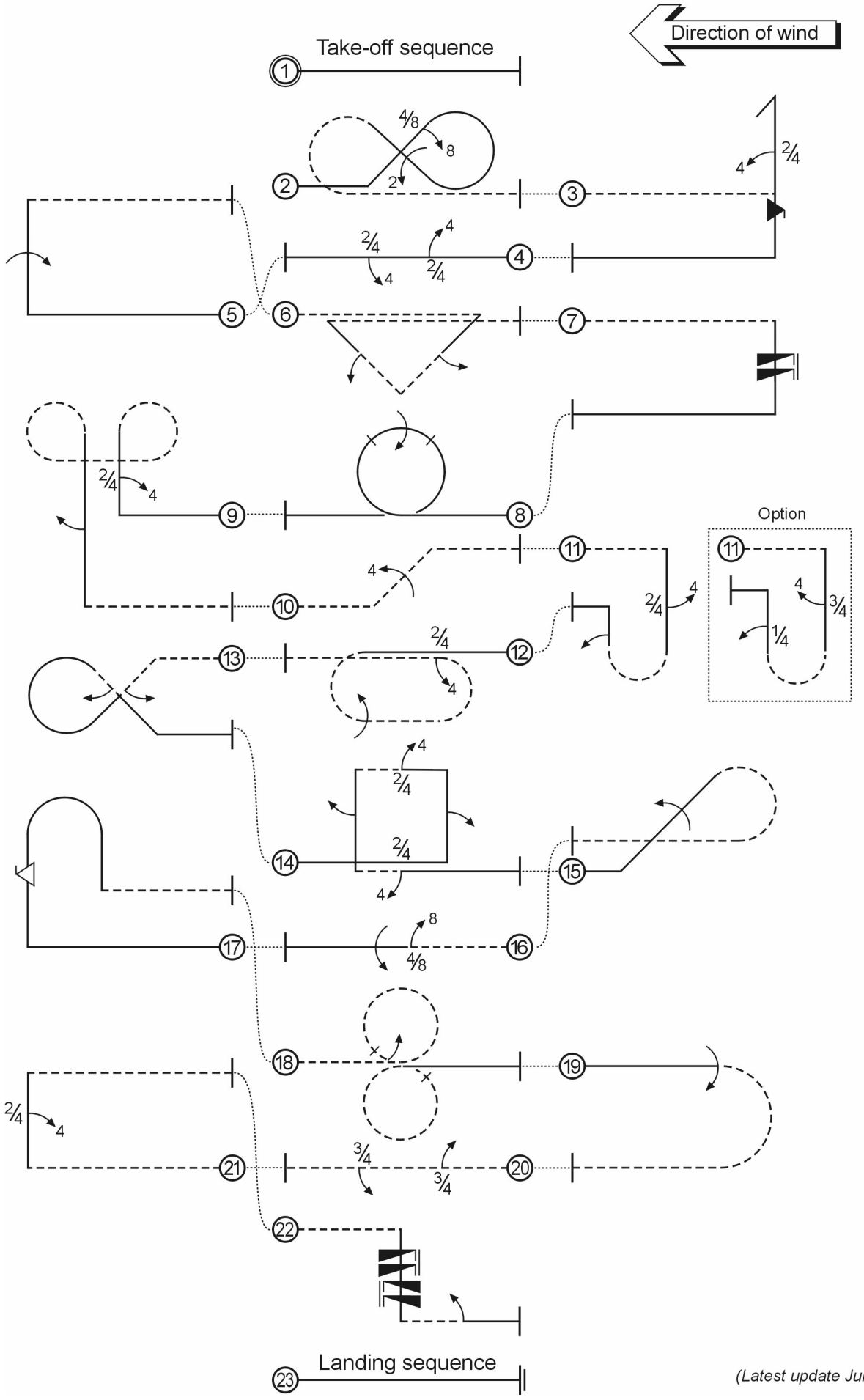
F-07.18 45 degree up with 1 ½ negative snap-roll: From inverted push to a 45 degree upline, perform one and a half negative snap-roll, then push to recover upright.

Judging notes:

- Snap rolls must be negative.
- Exit altitude is at a higher flight level.

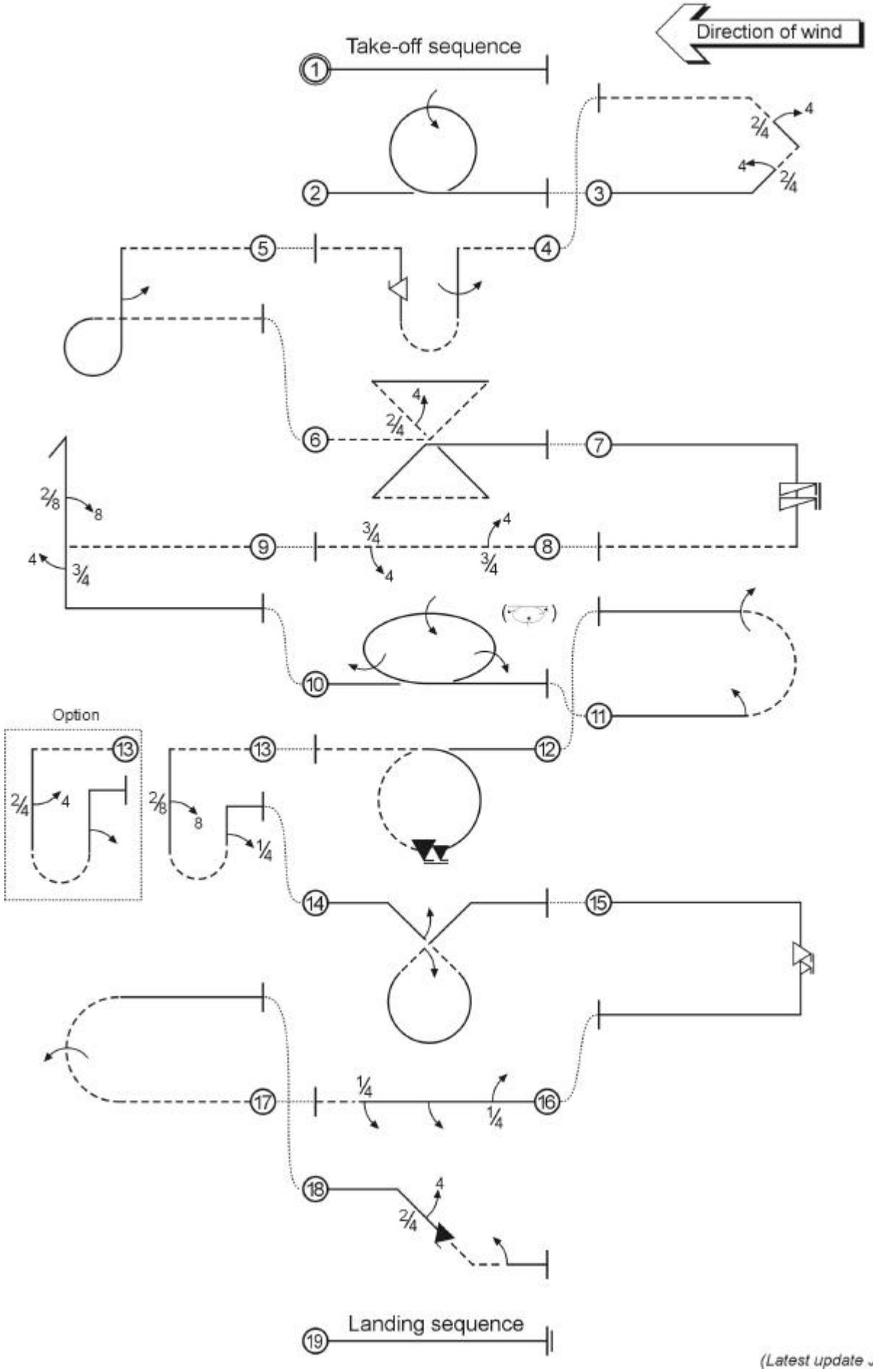
F-07.19 Landing sequence: See P-05.23.

PRELIMINARY SCHEDULE P-05 (from January 2004)



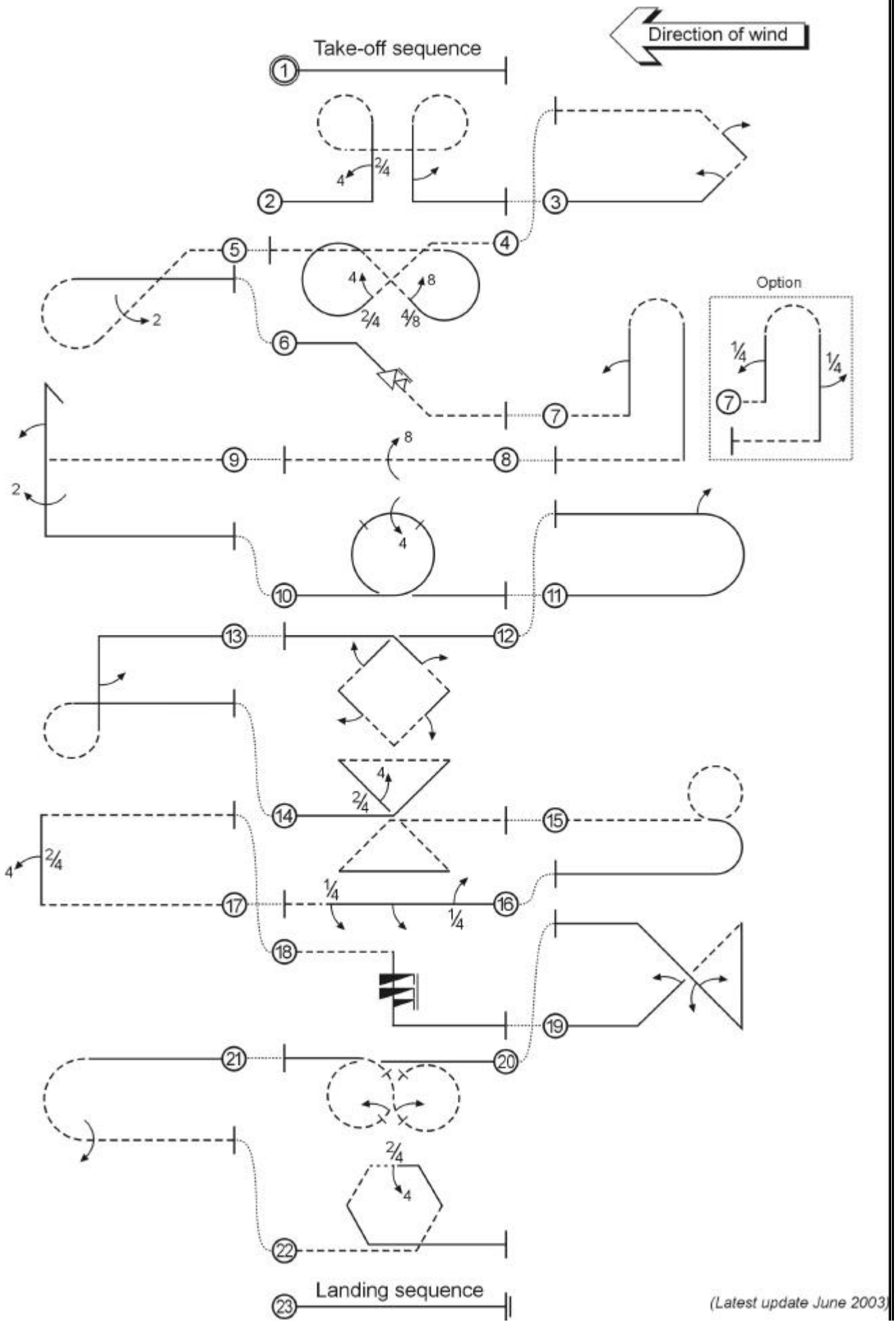
(Latest update June 2003)

FINALS SCHEDULE F-05 (from January 2004)



(Latest update June 2003)

PRELIMINARY SCHEDULE P-07 (from January 2006)



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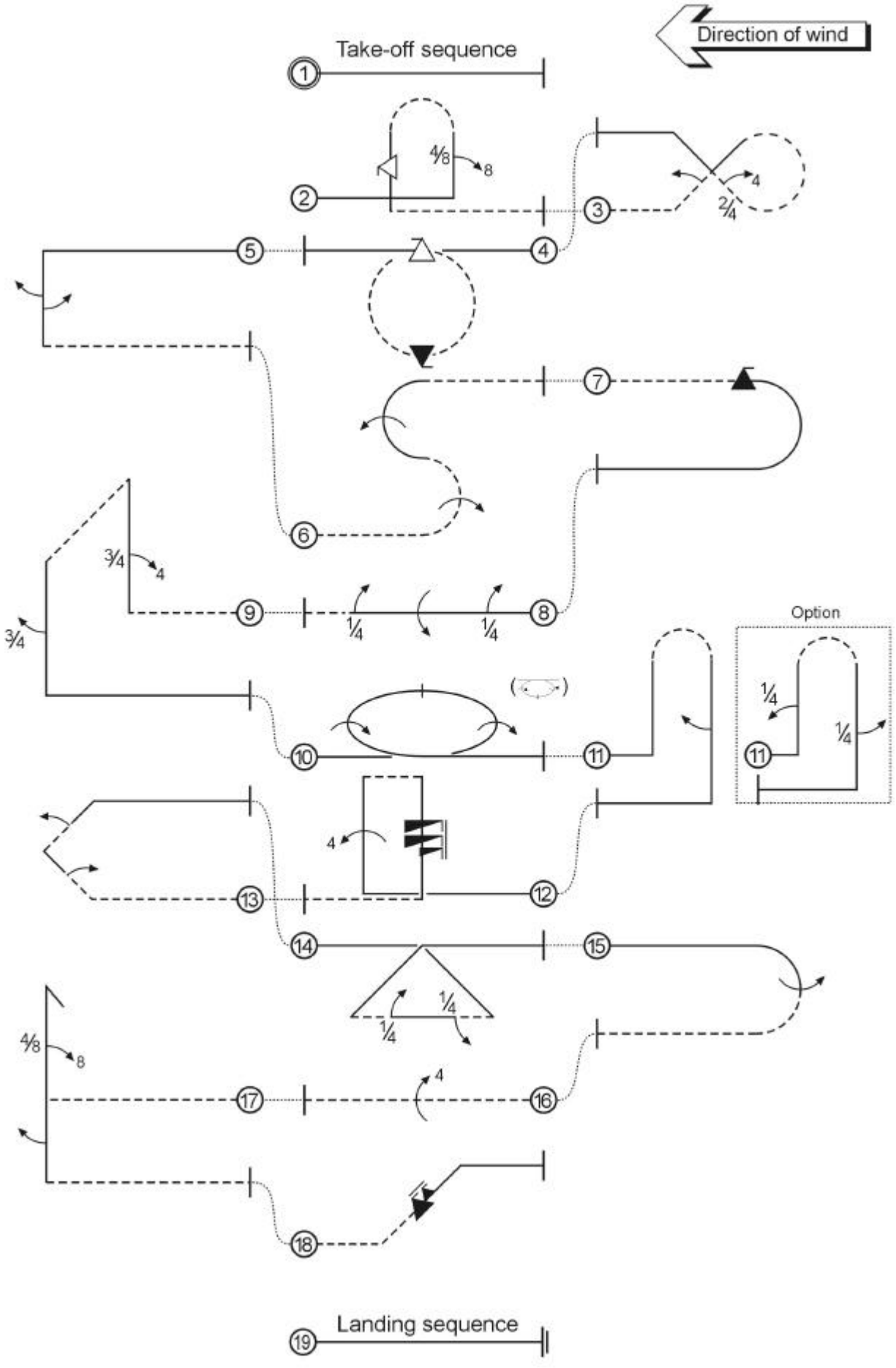
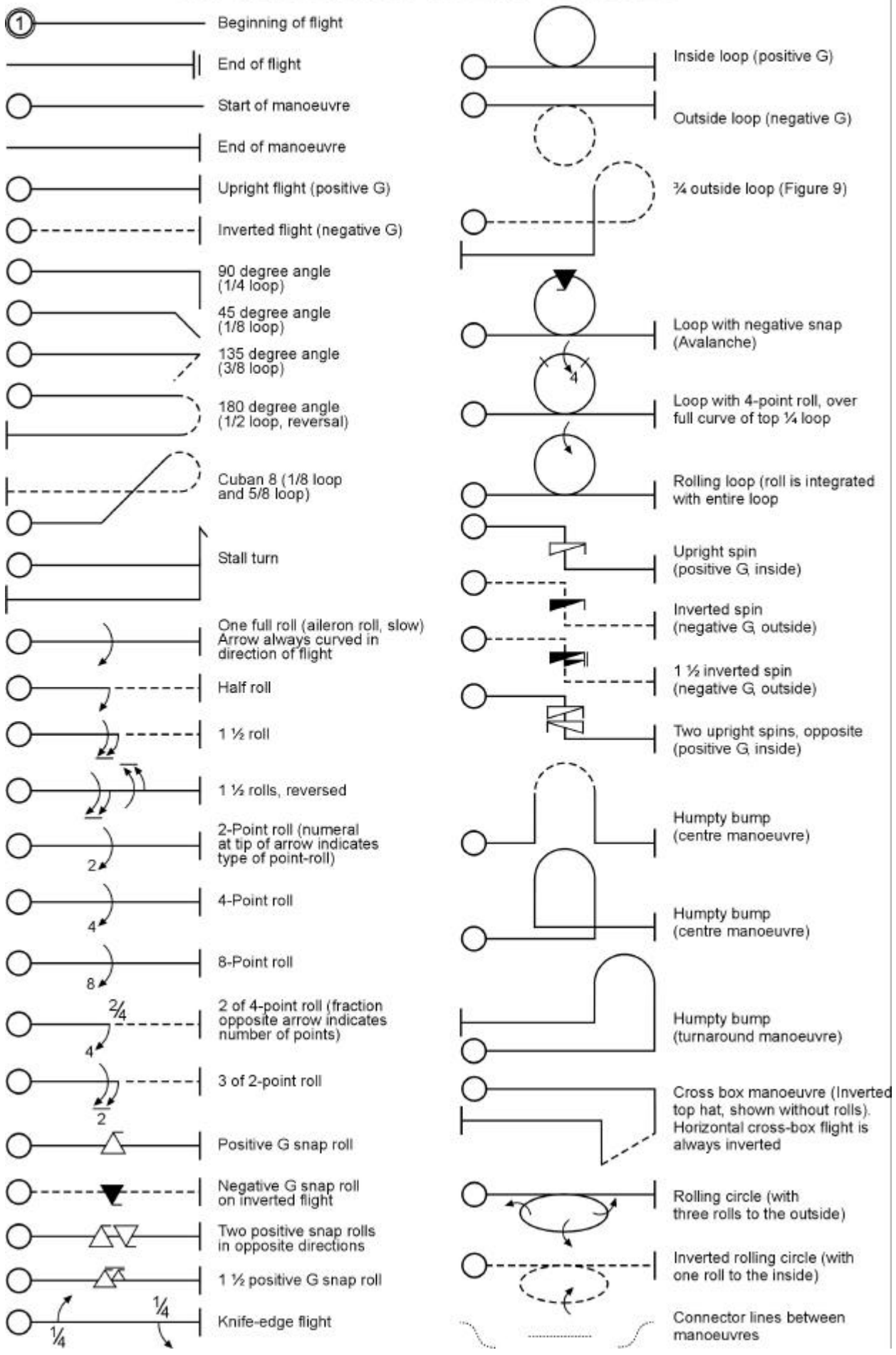


(Latest update June 2003)

EXPLANATION OF ARESTI SYMBOLS



ANNEX 5B

F3A - RADIO CONTROLLED AEROBATIC MODEL AIRCRAFT JUDGES' GUIDE

5B.1. PURPOSE

The purpose of the FAI F3A Judges' Guide is to furnish an accurate description of the major classes of aerobatic manoeuvres and their judging criteria as reference for use in developing a uniformly high, accurate, and consistent standard of judging.

5B.2. PRINCIPLES

The principles of judging the performance of a competitor in a R/C Aerobatic competition is based on the perfection with which the competitor's model aircraft executes the aerobatic manoeuvres as described in Annex 5A. The main principles used to judge the degree of perfection are:

1. Precision of the manoeuvre.
2. Smoothness and gracefulness of the manoeuvre.
3. Positioning or display of the manoeuvre.
4. Size of the manoeuvre, relative to the manoeuvring area and other manoeuvres in the flight.

The above requirements are listed in order of importance. However, all of them must be met for a manoeuvre to receive a high score.

5B.3. ACCURATE AND CONSISTENT JUDGING

The most important aspect of consistent judging is for each judge to establish his standard and then maintain that standard throughout the competition. It is advisable for the jury president, in conjunction with the contest director and the championship organiser to hold a conference prior to the start of the competition, in order to discuss judging and make the standards as uniform as possible. This is followed by some practice flights which all judges score simultaneously and privately. After these flights, the defects in each manoeuvre should be discussed by all judges and agreement reached about the severity of the defects. Once the contest is started, the individual judge must not alter his standard under any influence.

An accurate standard of judging is also very important. Being a consistent judge, whether high or low, is not good if the scores awarded are not a fair reflection of the manoeuvre performed.

5B.4. CRITERIA FOR JUDGING MANOEUVRES

In Annex 5A, a description of each manoeuvre is given, with judging notes with some manoeuvres. Each manoeuvre must be downgraded according to:

1. The type of defect.
2. The severity of the defect.
3. The number of times any one defect occurs, as well as the total number of defects.
4. The positioning of the manoeuvre.
5. The size of the manoeuvre, relative to the manoeuvring area and relative to other manoeuvres being flown.

A high score should be given only if no major defects are found and the manoeuvre is well positioned. When in doubt, give the lower score.

5B.4.1. ATTITUDE AND FLIGHT PATH

The flight path of a model aircraft is the trajectory of its centre of gravity. The attitude is the direction of the fuselage centre-line in relation to the flight path.

If not otherwise stated, all judging is based on flight path.

5B.4.2. THE 1 POINT/15 DEGREE RULE

This basic rule provides a general guide for downgrading deviations from defined manoeuvre geometry. One point must be subtracted for each approximate 15 degrees deviation. In general, lines can and must be judged more critically than deviations in yaw or roll.

5B.4.3. GRADING CRITERIA FOR THE INDIVIDUAL MANOEUVRES

These criteria are furnished to provide the judge with a guide for downgrading deviations from the defined manoeuvre geometry. The manoeuvres are divided into their different components: lines, loops, rolls, stall-turns, snap-rolls, spins and loop/roll combinations.

5B.4.3.1 LINES

All aerobatic manoeuvres are started and ended by a horizontal line. When no line is flown between two manoeuvres, the just-completed manoeuvre must be downgraded by 1 point, and the upcoming manoeuvre must be downgraded by 1 point.

The total length of a vertical or climbing line, as dictated by the performance of the model aircraft, is not a grading criterion. The performance of the model aircraft must not be allowed to influence a judge's mark.

All lines within a manoeuvre have a beginning and an end which define their length. They are preceded and followed by part loops. The length of a line should only be graded when a manoeuvre contains several lines with a given relationship, as in a square loop. If there is a minor mis-relation, 1 point is subtracted, and more points are subtracted for greater defects.

Whenever a type of roll is placed on a line, the length of the line before and after the roll must be equal. One point is subtracted for a reasonable difference, and two points for a greater difference. If there is a complete absence of a line before or after the roll, 3 points are subtracted.

5B.4.3.2. LOOPS

A loop must have, by definition, a constant radius, and must be flown in the vertical plane throughout. It starts and ends by a well defined line which, for a complete loop, is horizontal. For a part-loop, however, such lines may be in any other plane of flight as required by the particular manoeuvre being flown.

The loops and part-loops within one manoeuvre must have the same radius. Each occurrence of a slight difference in radius must downgrade the manoeuvre by 1 point, while more severe differences may downgrade it by 2 or 3 points for each occurrence.

Every loop or part-loop must be flown without interruption to the circular flight path. Every clearly seen segmentation must be downgraded by 1 point.

If the loop is not flown entirely in the vertical plane, i.e. it drifts closer or further from the judges, minor drift must be downgraded by 1 point, while more severe drift must be downgraded by several points.

In three-, four-, six-, and eight-sided loops, higher marks must not be awarded for flying tight, high G corners. The main criteria are that the loop must have the sides at the correct angles for the defined number of times, and all part-loops must have the same radius.

5B.4.3.3. ROLLS

Rolls may be flown as individual manoeuvres, or as parts of other manoeuvres. The following criteria apply to all rolls:

a) The rate of roll must be constant. Small variations in roll-rate must be downgraded by 1 point, while more severe variations must receive heavier downgrades. Slowing down the roll rate towards the end of a roll must be downgraded using the 1 point/15 degree rule.

b) The roll must have a crisp and well-defined start and stop. If a start or stop is badly defined, 1 point is subtracted for each.

c) All rolls flown on lines between part-loops must be placed on the middle of that line. For downgrading, see 4.3.1.

d) Point-rolls must have the same roll rate, and the points must be of equal duration on each point. One point is subtracted for slight variations, while more severe mis-timing is further downgraded. If one or more point is not visible, or there are more than the required number of points, the manoeuvre is severely downgraded by 5 or more points.

5B.4.3.4. **STALL-TURNS**

The criteria in this manoeuvre are mainly about lines. The lines must have exactly vertical and horizontal flight paths.

The model aircraft must pivot around its centre of gravity, in the yaw axis, for the manoeuvre to receive a high score. If the model aircraft does not pivot on the CG, but within a radius of 1/2 wingspan, one point is subtracted. For a radius of pivot up to one wingspan, 2 points are subtracted, and if the radius exceeds 1 ½ wingspan, the manoeuvre is severely downgraded. A radius of pivot of 2 wingspans or more is considered a wing-over and a zero score must be awarded. If the model aircraft should "torque-off" during the stall turn, a downgrade must be applied using the 1-point/15 degree rule. If the model aircraft flops forward or backward in a stall turn, a zero score must be awarded.

If the model aircraft shows a pendulum movement after the pivot, the manoeuvre is downgraded by one point. Drift of the model aircraft during the stalled condition must be ignored, provided the model aircraft does not drift outside the aerobatic zone.

The entry and exit must consist of part-loops with constant and equal radius.

Any types of rolls must be placed on the middle of the lines. The length of the vertical lines is not a judging criterion.

5B.4.3.5. **SNAP-ROLLS**

A snap-roll (or rudder roll) is a rapid autorotative roll where the model aircraft is in a stalled attitude.

Snap-rolls have the same judging criteria as axial rolls as far as start and stop of the rotation, and constant flight path through the manoeuvre is concerned.

At the start of a snap-roll, the fuselage attitude must show a definite break and separation from the flight path, before the rotation is started, since the model aircraft is supposed to be in a stalled condition throughout the manoeuvre, If the stall/break does not occur and the model aircraft barrel-rolls around, the manoeuvre must be zeroed. Similarly, axial rolls disguised as snap-rolls must be zeroed.

Snap-rolls can be flown both positive and negative, and the same criteria apply. If the model aircraft returns to an unstalled condition during the snap-roll, the manoeuvre is severely downgraded.

5B.4.3.6. **SPINS**

All spins begin and end with horizontal lines. In order to spin, the model aircraft must be stalled. The entry is flown in a horizontal flight path with the nose-up attitude increasing as the speed decreases. Drift of the model aircraft from the flight path at this point should not be downgraded, since it is in a near-stalled condition. However, severe yawing is cause for downgrading. A climbing flight path just prior to the spin must be downgraded, using the 1-point/15 degree rule. The nose then drops as the model aircraft stalls. Simultaneously as the nose drops, the wing also drops in the direction of the spin. Drift during the rotation of the spin should not be downgraded since the model aircraft is in a stalled condition, provided the model aircraft does not drift outside the aerobatic zone.

If the model aircraft does not stall or if the model aircraft is snap-rolled into the spin, the manoeuvre is zeroed. If the model aircraft slides into the spin (is loath to spin), the manoeuvre must be downgraded by using the 1/point per 15 degree rule. Forcing the model aircraft to spin in the opposite direction as the initial rotation must be severely downgraded.

After the defined number of turns, the stop of rotation is judged in the same manner as for a roll, i.e. one point downgrade for each 15 degree deviation of heading.

A vertical downward line of visible length must be held after the rotation stops. The pull- or push-out is judged like a part-loop and if followed by a part-roll, should be separated by a well-defined segment of straight flight. Remember that different models spin in different attitudes, and that the attitude is not to be taken into consideration, as long as the model aircraft is stalled. Any reversals in direction must be immediate, and if the model aircraft returns to an unstalled condition during the spin, the manoeuvre is severely downgraded.

5B.4.3.7. **LOOP/ROLL COMBINATIONS**

These combinations are used extensively in centre manoeuvres turn-around manoeuvres. They are very diversified, but all are combinations of loops, part-loops, rolls, point-rolls, part rolls, snap-rolls and lines. All judging criteria for these apply.

There are, however, some judging criteria which should be explained further. In the Immelmann turn and split S manoeuvres and variations, the half roll, snap-roll, point-roll, or full roll should be performed immediately after or before the half loop as required by the particular manoeuvre. A visible line in between the two components must downgrade the manoeuvre by 2 points.

On half Cuban eights and half reverse Cuban eights, the roll, point-roll, or snap roll should be placed on the middle of the line. The radii of the part-loops must all be the same.

In humpty-bumps, the radius of the part-loop on the top (or bottom) and the exit part-loop must be constant, and be the same as that of the entry part-loop. Falling forward (or tight radius) must be downgraded.

5B.4.4. **WIND CORRECTION**

All manoeuvres are required to be wind corrected in such a way that the shape of the manoeuvre as described in Annex 5A is preserved in the model aircraft's flight path. The exceptions to this grading criterion are in the stall turns, and spins, where the model aircraft is in a stalled condition.

5B.4.5. **POSITIONING**

The entire flight must be within the aerobatic zone to avoid being penalised. A centre manoeuvre must be flown with its centre 90 degrees in front of the judges' line. If the manoeuvre is flown off-centre, it must be downgraded according to the misplacement. This may be in the range of 1 to 4 points subtracted.

If an entire manoeuvre including entry and exit is flown out of the aerobatic zone, it must be zeroed. Downgrades for flying a manoeuvre partially out of the zone should be in proportion to the degree of infraction, i.e. a small part of the manoeuvre (10%) flown past the 60 degree line would call for a minor downgrade (10%), perhaps one point, while more of the manoeuvre (say 30% or 40%) flown past the 60 degree line must be downgraded more severely (30% or 40%), say three or more points. Also, violations of the 60 degree line that occur near the 150 metre line (i.e. approximately over the 60 degree flags) should be downgraded much less severely than violations along a line further out and more distant from the judges.

Vertical height should not exceed 60 degrees and downgrades for flying a manoeuvre partially out of the zone should be in proportion to the degree of infraction as stated above.

Flying so far out as to make evaluation of a manoeuvre difficult should be severely downgraded. The main criterion here is *visibility*. For a large, highly visible model aircraft, a line of flight approximately 175m in front of the pilot may be appropriate, while a smaller less visible model aircraft might have to be flown at say 140 to 150m. Manoeuvres performed on a line greater than approximately 175m in front of the competitor must be downgraded under any circumstances as even the keenest eye begins to lose perspective at this distance. Manoeuvres performed on a line greater than 200m in front of the competitor must be downgraded severely.

In general, turn-around manoeuvres are positioning manoeuvres. Therefore, entry and exit altitude need not be the same if the pilot wishes to make an altitude adjustment.

5B.4.6. **EXAMPLES**

An avalanche is entered in a slight climb, the flight path turns 15 degrees to one side after the snap and a wing is 15 degrees low during the exit. 10 – 1 – 1 – 1 = 7 points.

A 4-point roll is started late and ends up slightly off-centre and the third point is not visible. 10 – 1 – 6 = 3 points.

An Immelmann turn is not well-rounded, the half roll is started before the model aircraft reaches the top of the loop, with the wing 15 degrees low and the flight path of the model aircraft 20 degrees off heading. 10 – 1 – 2 – 1 – 2 = 4 points.

A snap-roll on a 45 degree downline appears to be nothing more than an axial roll with a wiggle of the tail of the model aircraft. 10 – 10 = 0 points.

On the downwind leg of a landing sequence, a knife-edge pass is performed. This must be considered as "hot-dogging". 10 – 10 = 0 points.

A square loop with half rolls has the first leg climbing 100 degrees. The model aircraft gallops in elevation across the top, stops the vertical downward half roll 15 degrees too early, is corrected, and the last half roll ends up 10 degrees to one side of the centre-line. 10 – 1 – 2 – 1 – 1 = 5 points.

On a top hat with ¼ rolls, the model aircraft is accidentally rolled in the wrong direction and the horizontal flight is performed upright instead of inverted. 10 – 10 = 0 points.

During the take-off sequence, the model aircraft runs off the runway, is retrieved by the helper and a successful take-off is performed. 10 – 10 = 0 points. Only one attempt at a manoeuvre is allowed and a second attempt at taking-off must be scored zero.

The competitor starts a flight by taking-off from left to right, completes the flight and discovers that the wind has changed, and lands from right to left. 10 – 10 = 0 points. This instance would indicate that the landing sequence was not followed. In some cases the contest director may call for a landing from the other direction if there were a strong change in wind direction, and safety would be compromised with a down-wind landing. In such a case, the landing would be scored a 10.

In the middle of a double Immelmann, which is manoeuvre number 12, a competitor experiences an engine cut and the manoeuvre is not completed. 10 – 10 = 0 points. The rest of the manoeuvres are also awarded zero points, including the landing sequence.

An otherwise flawless two-turn spin is about 45 degrees off-centre. This must be considered as a severe misplacement. 10 – 4 = 6 points.

During a stall turn in dead-calm conditions, the flight path of the model aircraft is exactly vertical, but the model aircraft is "skidded" 15% in the upline to ensure a turn. The model aircraft shows a pendulum movement after the stall turn, and the half roll in the downline is performed directly before the part-loop exit. 10 – 1 – 1 – 3 = 5 points.

A loop with a roll on top has the roll performed rapidly with no attempt by the competitor to integrate to roll with the top 90 degree quadrant of the loop. 10 – 3 = 7 points.

A half reverse Cuban eight is started too late, and the pilot squeezes the manoeuvre together by flying a 60 degree upline and making no line after the half roll. The manoeuvre still gets about halfway (50%) out of the zone. 10 – 1 – 3 – 5 (misplacement, going out of the zone) = 1 point.

During an inverted spin entered flawlessly, the model aircraft unstalls and makes the final 90 degree of rotation as a vertical axial roll. 10 – 6 = 4 points.

A competitor flies a flawless 8-point roll. 10 – 0 = 10 points. You will not see too many of these in a competition but a manoeuvre should be awarded a 10 if there are no detectable flaws that would otherwise downgrade it to a 9.

A competitor performs a near-perfect split-S, and the only flaw is a very slight, barely visible low wing on exit. 10 – 0 = 10 points. In some cases, an error may be so slight that a judge may want to consider giving a score of 10, rather than wait for the perfect manoeuvre to arrive.

A competitor performs a manoeuvre other than that stated on the score sheet. 10 – 10 = 0 points.

After this incident, the competitor performs the rest of the manoeuvres out of sequence, and no manoeuvres correspond to the manoeuvres stated on the score sheet, in the order in which they are listed. All manoeuvres affected in this way score 0 points.

During a figure M, the model aircraft disappears from view behind a low cloud, so that only one stall turn is visible. Score = N/O. The competitor will probably be awarded a reflight of the manoeuvre affected.

During an avalanche, a judge fails to notice the snap-roll at the top of the manoeuvre. Score = N/O. The score tabulators will enter the numerical average of the other judges' scores.

ANNEX 5G

F3A - RADIO CONTROLLED AEROBATIC MODEL AIRCRAFT

UNKNOWN MANOEUVRE SCHEDULES FOR FINAL FLIGHTS

5G.1 Unknown manoeuvre schedules shall be used in two of the four final flights for world or continental championships and shall be composed by the finalists. The composition of any unknown schedule shall be completed no less than 12 hours before the commencement of finals flights for unknown schedules.

5G.2 The composition of the unknown manoeuvre schedules shall be done by the finalists with each finalist nominating, in turn, an appropriate centre or turn-around manoeuvre from the approved list of manoeuvres. The order will be determined by random draw with the order repeating until the manoeuvre schedule is complete. The nominated manoeuvres must conform to the following criteria:

1. The entry of one manoeuvre must be matched to the exit of the previous manoeuvre, for entry altitude, entry attitude (level upright or level inverted flight), size of manoeuvres (wide as in a horizontal eight or narrow as in a stall turn) and direction of flight.
2. No duplication of manoeuvres.
3. No duplication of centre manoeuvres from the same manoeuvre group but excluding group 23 manoeuvres.
4. Spins are entered into the wind.
5. All horizontal rolling manoeuvres (4 pt. rolls, 8 pt. rolls, slow rolls, etc..) are flown in a downwind direction.
6. Snap rolls may be flown positive or negative, unless specified.
7. Three or four manoeuvres of each schedule must be K = 5.
8. Only 19 manoeuvres per unknown schedule, including take-off and landing sequence:
   a) Take-off sequence into wind.
   b) 9 centre manoeuvres (5 upwind, 4 downwind).
   c) 8 turn-around manoeuvres.
   d) Landing sequence into wind.

5G.3 Once an unknown schedule has been composed and checked for correctness it must receive the final approval of the jury and the contest director. Printed copies shall then be distributed to team managers, finalists, judges, jury members, and non-finalists who are scheduled to perform warm-up flights. A sufficient number shall be made available by the organisers for spectators.

5G.4 The judges shall receive instructions after the composition of the unknown schedule covering the unknown manoeuvres and to ensure that the judges are fully aware of the sequence of manoeuvres.

5G.5 Aresti drawings of the unknown schedules must be provided to finalists and judges.

5G.6 Finalists may not attempt practice flights of an unknown schedule between its composition and the finals flights neither with a flyers model aircraft nor via electronic flight simulator. Evidence of such practice shall be deemed cheating and shall lead to disqualification from the championships.

5G.7 In addition to the warm-up flight for the finals known schedule, at least two warm-up flights must be arranged for the unknown schedule. The unknown warm-up flights may be observed by the finalists and must be judged. Under no circumstances should the flight scores of any warm-up flights be tabulated.

5G.8 List of manoeuvres for composition of unknown schedules

5G.8.1 Centre manœuvres

(Only one manoeuvre from each number group per schedule)

1.1 Rolling loop with one roll (from bottom) (K5)
1.2 Rolling loop with one roll (from bottom) inverted entry (K5)
1.3 Loop with 8-point roll (from bottom) (K5)
1.4 Loop with 8-point roll (from bottom) inverted entry (K5)
1.5 Loop with 4-point roll (from bottom (K5)

1.6 Loop with 4-point roll (from bottom) inverted entry (K5)
2.1 Two loops with half rolls at top (from bottom) (K3)
2.2 Two loops with half rolls at top (from bottom) inverted entry (K4)
2.3 Two loops with half rolls at bottom (from top) (K4)
2.4 Two loops with half rolls at bottom (from top) inverted entry (K3)
2.5 Two loops with full roll first top, half roll second (from bottom) (K4)
2.6 Two loops with full roll first top, half roll second, inverted entry (from bottom) (K4)
2.7 Two loops with half roll first top, full roll second (from bottom) (K4)
2.8 Two loops with half roll first top, full roll second, inverted entry (from bottom) (K4)
2.9 Two loops with full roll first bottom, half roll second (from top) (K4)
2.10 Two loops with full roll first bottom, half roll second (from top) inverted entry (K4)
2.11 Two loops with half roll first bottom, full roll second (from top) (K4)
2.12 Two loops with half roll first bottom, full roll second (from top) inverted entry (K4)
3.1 Avalanche with full snap (from bottom) (K3)
3.2 Avalanche with full snap (from bottom) inverted entry (K3)
3.3 Avalanche with 1 1/2 snap (from bottom) (K4)
3.4 Avalanche with 1 1/2 snap, inverted entry (from bottom) (K4)
3.5 Avalanche with 1 negative snap (from top) (K4)
3.6 Avalanche with 1 positive snap (from top) inverted entry (K3)
4.1 Triangular loop with full roll (from bottom) (K4)
4.2 Triangular loop with full roll (from bottom) inverted entry (K4)
4.3 Triangular loop with 2/2pt roll (from bottom) (K4)
4.4 Triangular loop with 2/2pt roll (from bottom) inverted entry (K4)
4.5 Triangular loop with 2/4pt roll (from bottom) (K4)
4.6 Triangular loop with 2/4pt roll (from bottom) inverted entry (K4)
4.7 Triangular loop with snap roll (from bottom) (K4)
4.8 Triangular loop with snap roll (from bottom) inverted entry (K4)
4.9 Triangular loop with 1 1/2 snap roll (from bottom) (K4)
4.10 Triangular loop with 1 1/2 snap roll (from bottom) inverted entry (K4)
4.11 Triangular loop with 1/2 rolls (from bottom) (K3)
4.12 Triangular loop with 1/2 rolls (from bottom) inverted entry (K3)
4.13 Triangular loop (base at bottom) with half rolls in 45 degree legs (K3)
4.14 Triangular loop (base at bottom) with half rolls in 45 degree legs, inverted entry (K3)
4.15 Triangular loop (base at bottom) with 2/4pt rolls in 45 degree legs (K4)
4.16 Triangular loop (base at bottom) with 2/4pt rolls in 45 degree legs, inverted entry(K4)
4.17 Triangular loop (base at bottom) with 2/2pt rolls in 45 degree legs (K4)
4.18 Triangular loop (base at bottom) with 2/2pt rolls in 45 degree legs, inverted entry (K4)
4.19 Triangular loop from top (base at top) with half rolls in 45 degree legs (K4)
4.20 Triangular loop from top (base at top) with half rolls in 45 degree legs, inverted entry (K4)
4.21 Triangular loop from top (base at top) with 2/4pt rolls in 45 degree legs (K4)
4.22 Triangular loop from top (base at top) with 2/4pt rolls in 45 degree legs, inverted entry (K4)
4.23 Triangular loop from top (base at bottom) with half rolls in 45 degree legs (K4)
4.24 Triangular loop from top (base at bottom) with half rolls in 45 degree legs, inverted entry (K4)
4.25 Triangular loop from top (base at bottom) with 2/4pt rolls in 45 degree legs (K4)
4.26 Triangular loop from top (base at bottom) with 2/4pt rolls in 45 legs, inverted entry (K4)
4.27 Triangular loop from top (base at bottom) with 2/4pt roll at bottom (K4)
4.28 Triangular loop from top (base at bottom) with 2/4pt roll at bottom, inverted entry (K4)
4.29 Triangular loop from top (base at bottom) with full roll (K4)
4.30 Triangular loop from top (base at bottom) with full roll, inverted entry (K4)
5.1 Square loop with half rolls (K5)
5.2 Square loop with half rolls, inverted entry (K5)
5.3 Square loop with 2/4pt rolls (K5)
5.4 Square loop with 2/4pt rolls, inverted entry (K5)
5.5 Square loop with full snap over top (K4)
5.6 Square loop with full snap over top, inverted entry (K4)
5.7 Square loop from top with half rolls (K5)
5.8 Square loop from top with half rolls, inverted entry (K5)
5.9 Square loop from top with 2/4pt rolls (K5)
5.10 Square loop from top with 2/4pt rolls, inverted entry (K5)
5.11 Square loop from top with full snap at bottom (K4)
5.12 Square loop from top with full snap at bottom, inverted entry (K4)
6.1 Square loop on corner (K3)

6.2 Square loop on corner, inverted entry (K3)
6.3 Square loop on corner with half rolls in legs 1 & 3 (K4)
6.4 Square loop on corner with half rolls in legs 1 & 3, inverted entry (K4)
6.5 Square loop on corner with full roll in leg 1, half roll in leg 3 (K4)
6.6 Square loop on corner with full roll in leg 1, half roll in leg 3, inverted entry (K4)
6.7 Square loop on corner with four half rolls (K5)
6.8 Square loop on corner with four half rolls, inverted entry (K5)
6.9 Square loop on corner from top (K3)
6.10 Square loop on corner from top , inverted entry (K3)
6.11 Square loop on corner from top with half rolls in legs 1 & 3 (K4)
6.12 Square loop on corner from top with half rolls in legs 1 & 3, inverted entry (K4)
6.13 Square loop on corner from top with full roll in leg 1, half roll in leg 3 (K4)
6.14 Square loop on corner from top with full roll in leg 1, half roll in leg 3, inverted entry (K4)
6.15 Square loop on corner from top with four half rolls (K5)
6.16 Square loop on corner from top with four half rolls, inverted entry (K5)
7.1 Six sided loop (K4)
7.2 Six sided loop, inverted entry (K4)
7.3 Six sided loop from top (K4)
7.4 Six sided loop from top , inverted entry (K4)
8.1 Cobra roll with 2/4pt rolls (K3)
8.2 Cobra roll with 2/4pt rolls, inverted entry (K3)
8.3 Cobra roll with 2/2pt rolls (K3)
8.4 Cobra roll with 2/2pt rolls, inverted entry (K)3
8.5 Cobra roll from top with half rolls (K3)
8.6 Cobra roll from top with half rolls, inverted entry (K3)
8.7 Cobra roll from top with 2/4pt rolls (K3)
8.8 Cobra roll from top with 2/4pt rolls, inverted entry (K3)
8.9 Cobra roll from top with 2/2pt rolls (K3)
8.10 Cobra roll from top with 2/2pt rolls, inverted entry (K3)
9.1 Golf ball (45 degrees up, 3/4 inside loop, 45 degrees down, pull to level), (K3)
9.2 Golf ball, inverted entry (K3)
9.3 Golf ball with half rolls (K3)
9.4 Golf ball with half rolls, inverted entry (K3)
9.5 Golf ball with 2/4pt rolls (K3)
9.6 Golf ball with 2/4pt rolls, inverted entry (K3)
10.1 Cuban eight with 2/4pt rolls (K3)
10.2 Cuban eight with 2/4pt rolls, inverted entry (K3)
10.3 Cuban eight with full rolls (K4)
10.4 Cuban eight with full rolls, inverted entry (K4)
10.5 Reverse cuban eight (from bottom) with 2/4pt rolls (K4)
10.6 Reverse cuban eight (from bottom) with 2/4pt rolls, inverted entry (K4)
10.7 Reverse cuban eight (from bottom) with full rolls (K4)
10.8 Reverse cuban eight (from bottom) with full rolls, inverted entry (K4)
10.9 Cuban eight from top with half rolls (K3)
10.10 Cuban eight from top with half rolls, inverted entry (K3)
10.11 Cuban eight from top with 2/4pt rolls (K4)
10.12 Cuban eight from top with 2/4pt rolls, inverted entry (K4)
10.13 Cuban eight from top with full rolls (K4)
10.14 Cuban eight from top with full rolls, inverted entry (K4)
10.15 Reverse cuban eight from top with half rolls (K3)
10.16 Reverse cuban eight from top with half rolls, inverted entry (K3)
10.17 Reverse cuban eight from top with 2/4pt rolls (K4)
10.18 Reverse cuban eight from top with 2/4pt rolls, inverted entry (K4)
10.19 Reverse cuban eight from top with full rolls (K4)
10.20 Reverse cuban eight from top with full rolls, inverted entry (K4)
11.1 45 degree down with full snap roll (K3)
11.2 45 degree down with full snap roll, inverted entry (K3)
11.3 45 degree down with 1 1/2 snap roll (K3)
11.4 45 degree down with 1 1/2 snap roll, inverted entry (K3)
11.5 45 degree down with two 2/4 pt rolls reversed (K4)
11.6 45 degree down with two 2/4 pt. rolls reversed, inverted entry (K4)
11.7 45 degree down with two 4/8 pt. rolls reversed (K4)

11.8 45 degree down with two 4/8 pt. rolls reversed, inverted entry (K4)
11.9 45 degree up with 1 1/2 snap roll (K4)
11.10 45 degree up with 1 1/2 snap roll, inverted entry (K4)
11.11 45 degree up with full snap roll (K3)
11.12 45 degree up with full snap roll, inverted entry (K3)
11.13 45 degree up with two 2/4 pt rolls reversed (K4)
11.14 45 degree up with two 2/4 pt rolls reversed, inverted entry (K4)
11.15 45 degree up with two 4/8 pt rolls reversed (K4)
11.16 45 degree up with two 4/8 pt rolls reversed, inverted entry (K4)
12.1 Figure Z with half roll up (K3)
12.2 Figure Z with half roll up, inverted entry (K3)
12.3 Figure Z with 2/4pt roll up (K4)
12.4 Figure Z with 2/4pt roll up, inverted entry (K4)
12.5 Figure Z with 2/2pt roll up (K4)
12.6 Figure Z with 2/2pt roll up, inverted entry (K4)
12.7 Figure Z from top with half roll down (K3)
12.8 Figure Z from top with half roll down, inverted entry (K3)
12.9 Figure Z from top with 2/4pt roll down (K4)
12.10 Figure Z from top with 2/4pt roll down, inverted entry (K4)
12.11 Figure Z from top with 2/2pt roll (K4)
12.12 Figure Z from top with 2/2pt roll, inverted entry (K4)
13.1 Hourglass (K4)
13.2 Hourglass, inverted entry (K4)
13.3 Hourglass with half rolls up and down (K4)
13.4 Hourglass with half rolls up and down, inverted entry (K5)
13.5 Hourglass with 2/4pt rolls up and down (K5)
13.6 Hourglass with 2/4pt rolls up and down, inverted entry (K5)
13.7 Hourglass (middle entry, top first) (K4)
13.8 Hourglass (middle entry, top first) inverted entry (K4)
13.9 Hourglass (middle entry, top first), half roll down (K4_
13.10 Hourglass (middle entry, top first) half roll down, inverted entry (K4)
13.11 Hourglass (middle entry, top first) 2/4pt roll down (K5)
13.12 Hourglass (middle entry, top first) 2/4pt roll down, inverted entry (K5)
13.13 Hourglass (middle entry, bottom first) (K4)
13.14 Hourglass (middle entry, bottom first), inverted entry (K4)
13.15 Hourglass (middle entry, bottom first) half roll up (K4)
13.16 Hourglass (middle entry, bottom first) half roll up, inverted entry (K4)
13.17 Hourglass (middle entry, bottom first) 2/4pt roll up (K4)
13.18 Hourglass (middle entry, bottom first) 2/4pt roll up, inverted entry (K4)
13.19 Hourglass (top entry) (K4)
13.20 Hourglass (top entry), inverted entry (K4)
13.21 Hourglass (top entry) with half rolls down and up (K5)
13.22 Hourglass (top entry) with half rolls down and up, inverted entry (K5)
13.23 Hourglass (top entry) with 2/4pt rolls down and up (K5)
13.24 Hourglass (top entry) with 2/4pt rolls down and up, inverted entry (K5)
14.1 Vertical eight (from bottom) (K3)
14.2 Vertical eight (from bottom) inverted entry (K3)
14.3 Vertical eight (from bottom) with half rolls (K4)
14.4 Vertical eight (from bottom) with half rolls, inverted entry (K4)
14.5 Vertical eight (from bottom) with half roll after first half loop (K4)
14.6 Vertical eight (from bottom) with half roll after first half loop, inverted entry (K4)
14.7 Vertical eight (from middle) (K3)
14.8 Vertical eight (from middle) inverted entry (K3)
14.9 Vertical eight (from middle) with half roll (K3)
14.10 Vertical eight (from middle) with half roll, inverted entry (K3)
14.11 Vertical eight (from top) (K3)
14.12 Vertical eight (from top) inverted entry (K3)
14.13 Vertical eight (from top) with half rolls (K4)
14.14 Vertical eight (from top) with half rolls, inverted entry (K4)
14.15 Vertical eight (from top) with half roll after first half loop (K4)
14.16 Vertical eight (from top) with half roll after first half loop, inverted entry (K4)
15.1 Square horizontal eight (K5)

15.2 Square horizontal eight, inverted entry (K5)
15.3 Square horizontal eight (from top) (K5)
15.4 Square horizontal eight (from top) inverted entry (K5)
15.5 Square vertical eight (from bottom) (K5)
15.6 Square vertical eight (from bottom) inverted entry (K5)
15.7 Square vertical eight (from bottom) with half rolls (K5)
15.8 Square vertical eight (from bottom) with half rolls, inverted entry (K5)
15.9 Square vertical eight (from middle) (K5)
15.10 Square vertical eight (from middle) inverted entry (K5)
15.11 Square vertical eight (from middle) with half roll (K5)
15.12 Square vertical eight (from middle) with half roll, inverted entry (K5)
15.13 Square vertical eight (from top) (K5)
15.14 Square vertical eight (from top) inverted entry (K5)
15.15 Square vertical eight (from top) with half rolls (K5)
15.16 Square vertical eight (from top) with half rolls, inverted entry (K5)
16.1 Figure M with 3/4 rolls (K5)
16.2 Figure M with 3/4 rolls, inverted entry (K5)
16.3 Figure M with 3/4 pt rolls (K5)
16.4 Figure M with 3/4 pt rolls, inverted entry (K5)
16.5 Figure M with 3/4pt rolls up, 1/4 rolls down (K5)
16.6 Figure M with 3/4pt rolls up, 1/4 rolls down, inverted entry (K5)
• Centre half-loop is always flown negative (inverted)
17.1 Top hat with 2/4pt rolls (K4)
17.2 Top hat with 2/4pt rolls, inverted entry (K4)
17.3 Top hat with 2/2pt rolls (K4)
17.4 Top hat with 2/2pt rolls, inverted entry (K4)
17.5 Top hat from top with 2/4pt rolls (K4)
17.6 Top hat from top with 2/4pt rolls, inverted entry (K4)
17.7 Top hat from top with 2/2pt rolls (K4)
17.8 Top hat from top with 2/2pt rolls, inverted entry (K4)
18.1 Humpty bump, half roll up, 2/4pt roll down (K4)
18.2 Humpty bump, 1/2 roll up, 2/4pt roll down, inverted entry (K4)
18.3 Humpty bump, 2/4pt roll up, full snap down (K5)
18.4 Humpty bump, 2/4pt roll up, full snap down, inverted entry (K5)
18.5 Humpty bump from top, half roll down, 2/4pt roll up (K4)
18.6 Humpty bump from top, half roll down, 2/4pt roll up, inverted entry (K4)
18.7 Humpty bump from top, 2/4pt roll down, full roll up (K4)
18.8 Humpty bump from top, 2/4pt roll down, full roll up, inverted entry (K4)
19.1 2 1/2 turn spin, inverted exit (K3)
19.2 2 1/2 turn spin, inverted entry, upright exit (K3)
19.3 2 turn opposite spin (K4)
19.4 Two turn opposite spin, inverted entry (K4)
19.5 Three turn spin (K3)
19.6 Three turn spin, inverted entry (K3)
19.7 2 1/2 Turn spin, half roll exit (K3)
19.8 2 1/2 turn spin, half roll exit, inverted entry (K3)
20.1 Stall turn 3/4 roll up, 3/4pt roll down (K3)
20.2 Stall turn, 3/4 roll up, 3/4pt roll down, inverted entry (K3)
20.3 Stall turn 3/4 roll up, 3/4 pt roll down, inverted exit (K3)
20.4 Stall turn, 3/4 roll up, 1 1/4 snap roll down (K5)
20.5 Stall turn, 3/4 roll up, 1 1/4 snap roll down, inverted entry (K5)
20.6 Stall turn, 3/4 roll up, 1 1/4 snap roll down, inverted exit (K5)
20.7 Stall turn, 3/4pt roll up, 1 1/4 snap roll down (K5)
20.8 Stall turn, 3/4pt roll up, 1 1/4 snap roll down, inverted entry (K5)
20.9 Stall turn, 3/4pt roll up, 1 1/4 snap roll down, inverted exit (K5)
21.1 Double Immelmann with half rolls (K3)
21.2 Double Immelmann with half rolls, inverted entry (K3)
21.3 Double Immelmann with half roll first, full roll second (K4)
21.4 Double Immelmann with half roll first, full roll second, inverted entry (K4)
21.5 Double Immelmann with full rolls (K3)
21.6 Double Immelmann with full rolls, inverted entry (K3)
21.7 Double Immelmann from top, half rolls (K3)

21.8 Double Immelmann from top, half rolls, inverted entry (K3)
21.9 Double Immelmann from top, half roll first, full roll second (K4)
21.10 Double Immelmann from top, half roll first, full roll second, inverted entry (K4)
21.11 Double Immelmann from top with full rolls (K4)
21.12 Double Immelmann from top with full rolls, inverted entry (K4)
22.1 Rolling circle with one roll inside (K5)
22.2 Rolling circle with one roll inside, inverted entry (K5)
22.3 Rolling circle with one roll outside (K5)
22.4 Rolling circle with one roll outside, inverted entry (K5)
22.5 Rolling circle with 2 rolls inside (K5)
22.6 Rolling circle with 2 rolls inside, inverted entry (K5)
22.7 Rolling circle with 2 rolls outside (K5)
22.8 Rolling circle with 2 rolls outside, inverted entry (K5)
22.9 Rolling circle with 4 rolls inside (K5)
22.10 Rolling circle with 4 rolls inside, inverted entry (K5)
22.11 Rolling circle with 4 rolls outside (K5)
22.12 Rolling circle with 4 rolls outside, inverted entry (K5)

(More than one manoeuvre from the following group is allowed, but not two of the same manoeuvre with only the entry changed)

23.1 1 1/2 rolls reversed (K4)
23.2 1 1/2 rolls reversed, inverted entry (K4)
23.3 Two rolls reversed (K4)
23.4 Two rolls reversed, inverted entry (K4)
23.5 Four point roll (K4)
23.6 Four point roll, inverted entry (K4)
23.7 Eight point roll (K4)
23.8 Eight point roll, inverted entry (K4)
23.9 Two 3/4 pt. rolls reversed (K4)
23.10 Two 3/4 pt. rolls reversed, inverted entry (K4)
23.11 Two 2/2 pt. rolls reversed (K4)
23.12 Two 2/2 pt. rolls reversed, inverted entry (K4)
23.13 Two 2/4 pt. rolls reversed (K4)
23.14 Two 2/4 pt. rolls reversed, inverted entry (K4)
23.15 Slow roll (K3)
23.16 Slow roll, inverted entry (K3)
23.17 Knife edge flight (K4)
23.18 Knife edge flight, inverted entry (K4)
23.19 Reverse knife edge flight (K5)
23.20 Reverse knife edge flight, inverted entry (K5)
23.21 One horizontal snap roll (K3)
23.22 One horizontal snap roll, inverted entry (K4)
23.23 Two snap rolls reversed (K5)
23.24 Two snap rolls reversed, inverted entry (K5)
23.25 2/2pt roll, full snap roll opposite (K5)
23.26 2/2pt roll, full snap opposite, inverted entry (K5)
23.27 2/4pt roll, 1 1/2 snap roll opposite (K5)
23.28 2/4pt roll, 1 1/2snap roll opposite, inverted entry (K5)

5G.8.2 Turnaround manoeuvres

(maximum of two manoeuvres from each group per schedule)

A.1 Half square loop (K1)
A.2 Half square loop, inverted entry (K1)
A.3 Half square loop with half roll up (K2)
A.4 Half square loop with half roll up, inverted entry (K2)
A.5 Half square loop with 2/4pt roll up (K2)
A.6 Half square loop with 2/4pt roll up, inverted entry (K2)
A.7 Half square loop with 2/2pt roll up (K2)
A.8 Half square loop with 2/2pt roll up, inverted entry (K2)
A.9 Half square loop with full roll up (K2)
A.10 Half square loop with full roll up, inverted entry (K2)

A.11 Half square loop from top (K1)
A.12 Half square loop from top, inverted entry (K1)
A.13 Half square loop from top, half roll down (K2)
A.14 Half square loop from top, half roll down, inverted entry (K2)
A.15 Half square loop from top, 2/4pt roll down (K2)
A.16 Half square loop from top, 2/4pt roll down , inverted entry (K2)
A.17 Half square loop from top, 2/2pt roll down (K2)
A.18 Half square loop from top, 2/2pt roll down, inverted entry (K2)
A.19 Half square loop from top, full roll down (K2)
A.20 Half square loop from top, full roll down, inverted entry (K2)
A.21 Half square loop from top, full snap down (K3)
A.22 Half square loop from top, full snap down, inverted entry (K3)
B.1 Half loop (K1)
B.2 Half outside loop, inverted entry (K1)
B.3 Half outside loop from top (K1)
B.4 Half loop from top, inverted entry (K1)
C.1 Split "S" (half roll, half loop from top) (K2)
C.2 Half inside loop, half roll, from top, inverted entry (K2)
C.3 Half outside loop, full roll, from top (K2)
C.4 Half inside loop, full roll, from top, inverted entry (K2)
D.1 Immelmann turn (K2)
D.2 Immelmann turn, inverted entry (K2)
D.3 Immelmann turn, full roll (K2)
D.4 Immelmann turn, full roll, inverted entry (K2)
E.1 Figure 9 from bottom (K1)
E.2 Figure 9 from bottom, inverted entry (K1)
E.3 Figure 9 from bottom, half roll up (K2)
E.4 Figure 9 from bottom, half roll up, inverted entry (K2)
E.5 Figure 9 from bottom, 2/4pt roll up (K2)
E.6 Figure 9 from bottom, 2/4pt roll up, inverted entry (K2)
E.7 Figure 9 from bottom, 2/2pt roll up (K2)
E.8 Figure 9 from bottom, 2/2pt roll up, inverted entry (K2)
E.9 Figure 9 from bottom, full roll up (K2)
E.10 Figure 9 from bottom, full roll up, inverted entry (K2)
E.11 Figure 6 from middle (bottom first) (K1)
E.12 Figure 6 from middle (bottom first), inverted entry (K1)
E.13 Figure 6 from middle (bottom first), half roll up (K2)
E.14 Figure 6 from middle (bottom first), half roll up, inverted entry (K2)
E.15 Figure 6 from middle (bottom first), 2/4pt roll up (K2)
E.16 Figure 6 from middle (bottom first), 2/4pt roll up, inverted entry (K2)
E.17 Figure 6 from middle (bottom first), 2/2pt roll up (K2)
E.18 Figure 6 from middle (bottom first), 2/2pt roll up, inverted entry (K2)
E.19 Figure 6 from middle (bottom first), full roll up (K2)
E.20 Figure 6 from middle (bottom first), full roll up, inverted entry (K2)
E.21 Figure 9 from middle (top first) (K1)
E.22 Figure 9 from middle (top first), inverted entry (K1)
E.23 Figure 9 from middle (top first), half roll down (K2)
E.24 Figure 9 from middle (top first), half roll down, inverted entry (K2)
E.25 Figure 9 from middle (top first), 2/4pt roll down (K2)
E.26 Figure 9 from middle (top first), 2/4pt roll down, inverted entry (K2)
E.27 Figure 9 from middle (top first), 2/2pt roll down (K2)
E.28 Figure 9 from middle (top first), 2/2pt roll down, inverted entry (K2)
E.29 Figure 9 from middle (top first), full roll down (K2)
E.30 Figure 9 from middle (top first), full roll down, inverted entry (K2)
E.31 Figure 9 from middle (top first), full snap down (K3)
E.32 Figure 9 from middle (top first), full snap down, inverted entry (K3)
E.33 Figure 6 from top (K1)
E.34 Figure 6 from top, inverted entry (K1)
E.35 Figure 6 from top, half roll down (K2)
E.36 Figure 6 from top, half roll down, inverted entry (K2)
E.37 Figure 6 from top, 2/4pt roll down (K2)
E.38 Figure 6 from top, 2/4pt roll down, inverted entry (K2)

E.39 Figure 6 from top, 2/2pt roll down (K2)
E.40 Figure 6 from top, 2/2pt roll down, inverted entry (K2)
E.41 Figure 6 from top, full roll down (K2)
E.42 Figure 6 from top , full roll down, inverted entry (K2)
E.43 Figure 6 from top, full snap down (K3)
E.44 Figure 6 from top, full snap down, inverted entry (K3)
F.1 Half cuban eight (K2)
F.2 Half cuban eight, inverted entry (K2)
F.3 Half cuban eight, 2/4pt roll (K2)
F.4 Half cuban eight, 2/4pt roll, inverted entry (K2)
F.5 Half cuban eight, 2/2pt roll (K2)
F.6 Half cuban eight, 2/2pt roll, inverted entry (K2)
F.7 Half cuban eight with full roll (K2)
F.8 Half cuban eight with full roll, inverted entry (K2)
F.9 Half cuban eight with full snap roll (K3)
F.10 Half cuban eight with full snap roll, inverted entry (K3)
F.11 Half cuban eight with 1 1/2 snap roll (K3)
F.12 Half cuban eight with 1 1/2 snap roll, inverted entry (K3)
F.13 Half cuban eight from top (K2)
F.14 Half cuban eight from top, inverted entry (K2)
F.15 Half cuban eight from top, 2/4pt roll up (K2)
F.16 Half cuban eight from top, 2/4pt roll up, inverted entry (K2)
F.17 Half cuban eight from top, 2/2pt roll up (K2)
F.18 Half cuban eight from top, 2/2pt roll up, inverted entry (K2)
F.19 Half cuban eight from top, full roll up (K2)
F.20 Half cuban eight from top, full roll up, inverted entry (K2)
F.21 Half reverse cuban eight (K2)
F.22 Half reverse cuban eight, inverted entry (K2)
F.23 Half reverse cuban eight, 2/4pt roll (K2)
F.24 Half reverse cuban eight, 2/4pt roll, inverted entry (K2)
F.25 Half reverse cuban eight, 2/2pt roll (K2)
F.26 Half reverse cuban eight, 2/2pt roll, inverted entry (K2)
F.27 Half reverse cuban eight with full roll (K2)
F.28 Half reverse cuban eight with full roll, inverted entry (K2)
F.29 Half reverse cuban eight with full snap roll (K3)
F.30 Half reverse cuban eight with full snap roll, inverted entry (K3)
F.31 Half reverse cuban eight with 1 1/2 snap roll (K3)
F.32 Half reverse cuban eight with 1 1/2 snap roll, inverted entry (K3)
F.33 Half reverse cuban eight from top (K2)
F.34 Half reverse cuban eight from top, inverted entry (K2)
F.35 Half reverse cuban eight from top, 2/4pt roll down (K2)
F.36 Half reverse cuban eight from top, 2/4pt roll down, inverted entry (K2)
F.37 Half reverse cuban eight from top, 2/2pt roll down (K2)
F.38 Half reverse cuban eight from top, 2/2pt roll down, inverted entry (K2)
F.39 Half reverse cuban eight from top, full roll down (K2)
F.40 Half reverse cuban eight from top, full roll down, inverted entry (K2)
G.1 Two turn spin (K2)
G.2 Two turn spin, inverted entry (K2)
G.3 2 1/2 turn spin (K2)
G.4 2 1/2 turn spin, inverted entry (K2)
H.1 Stall turn, half rolls (K2)
H.2 Stall turn, half rolls, inverted entry (K2)
H.3 Stall turn, half roll up, 2/4pt roll down (K2)
H.4 Stall turn, half roll up, 2/4pt roll down, inverted entry (K2)
H.5 Stall turn, full roll up, half roll down (K2)
H.6 Stall turn, full roll up, half roll down ,inverted entry (K2)
H.7 Stall turn, 2/4pt roll up, half roll down (K2)
H.8 Stall turn, 2/4pt roll up, half roll down, inverted entry (K2)
H.9 Stall turn, 2/2pt roll up, 2/4pt roll down (K2)
H.10 Stall turn, 2/2pt roll up, 2/4pt roll down, inverted entry (K2)
H.11 Stall turn, half roll up, full snap down (K4)
H.12 Stall turn, half roll up, full snap down, inverted entry (K4)

H.13 Stall turn, 3/4pt roll up, 1/4 roll down (K3)
H.14 Stall turn, 3/4pt roll up 1/4 roll down, inverted entry (K3)
H.15 Stall turn, 3/4 roll up, 1 1/4 snap down (K4)
H.16 Stall turn 3/4 roll up, 1 1/4 snap down, inverted entry (K4)
J.1 Top hat, 3/4 roll up, 1/4 roll down (K2)
J.2 Top hat, 3/4 roll up, 1/4 roll down, inverted entry (K2)
J.3 Top hat, 3/4pt roll up, 3/4 roll down (K2)
J.4 Top hat, 3/4pt roll up, 3/4 roll down, inverted entry (K2)
J.5 Top hat, 3/4pt roll up, 3/4 pt roll down, inverted exit (K2)
J.6 Top hat, 3/4pt roll up, 3/4pt roll down, inverted entry and exit (K2)
J.7 Top hat, 1/4 roll up, 1/4 roll down (K2)
J.8 Top hat, 1/4 roll up, 1/4 roll down, inverted entry (K2)
J.9 Top hat, 1/4 roll up, 1/4 roll down, inverted exit (K2)
J.10 Top hat, 1/4 roll up, 1/4 roll down, inverted entry and exit (K2)
J.11 Top hat from top, 3/4 roll down, 3/4pt roll up (K3)
J.12 Top hat from top, 3/4 roll down, 3/4pt roll up, inverted entry (K3)
J.13 Top hat from top, 3/4 roll down, 1/4 roll up (K2)
J.14 Top hat from top, 3/4 roll down, 1/4 roll up, inverted entry (K2)
J.15 Top hat from top, 1/4 roll down, 3/4pt roll up (K2)
J.16 Top hat from top, 1/4 roll down, 3/4pt roll up, inverted entry (K2)

- Horizontal (cross-box) flight is always flown inverted.

K.1 45 degree up, 2/4pt roll, half loop (inside or outside), full roll down (K3)
K.2 45 degree up, 2/4pt roll, half loop (inside or outside), full roll down, inverted entry (K3)
K.3 45 degree up, 2/2pt roll, half loop (inside or outside), 2/4pt roll down (K3)
K.4 45 degree up, 2/2pt roll, half loop (inside or outside), 2/4pt roll down, inverted entry (K3)
K.5 45 degree up, full roll, half loop (inside or outside), 2/4pt roll down (K3)
K.6 45 degree up, full roll, half loop (inside or outside), 2/4pt roll down, inverted entry (K3)
K.7 45 degree up, 2/2pt roll, half loop (inside or outside), full snap roll down (K4)
K.8 45 degree up, 2/2pt roll, half loop (inside or outside), full snap roll down, inverted entry (K4)
L.1 Humpty bump (pull, pull, push) half roll up, 2/4pt roll down (K3)
L.2 Humpty bump (push, push, pull) half roll up, 2/4pt roll down, inverted entry (K3)
L.3 Humpty bump (pull, pull, pull) half roll up, 2/2pt roll down (K3)
L.4 Humpty bump (push, push, push) half roll up, 2/2pt roll down, inverted entry (K3)
L.5 Humpty bump (pull, pull, push) 2/4pt roll up, half roll down (K3)
L.6 Humpty bump (push, push, pull) 2/4pt roll up, half roll down, inverted entry (K3)
L.7 Humpty bump (pull, pull, push, or pull, push, push) 1/4 roll up, 3/4 roll down (K3)
L.8 Humpty bump (push, pull, pull, or push, push, pull) 1/4 roll up, 3/4 roll down, inverted entry (K3)
L.9 Humpty bump (pull, pull, pull) 3/4pt roll up, 1/4 roll down (K3)
L.10 Humpty bump (push, pull, pull) 3/4pt roll up, 1/4 roll down, inverted entry (K3)
L.11 Humpty bump with roll options, (half roll up or 1/4 roll up and down) (K2)
L.12 Humpty bump with roll options, (half roll up or 1/4 roll up and down) inverted entry (K2)
M.1 Humpty bump from top, half roll down (push, push, push) (K3)
M.2 Humpty bump from top, half roll down, inverted entry (pull, pull, pull) (K2)
M.3 Humpty bump from top, 2/4pt roll down, half roll up (push, push, pull) (K3)
M.4 Humpty bump from top, 2/4pt roll down, half roll up, inverted entry (pull, pull, push) (K3)
M.5 Humpty bump from top, 2/4pt roll down, 2/2pt roll up (push, push, push) (K3)
M.6 Humpty bump from top, 2/4pt roll down, 2/2pt roll up, inverted entry (pull, pull, pull) (K3)
M.7 Humpty bump from top, 1/4 roll down, 3/4 roll up (push, push, push) (K3)
M.8 Humpty bump from top, 1/4 roll down, 3/4 roll up, inverted entry (pull, push, push) (K3)
M.9 Humpty bump from top, 1/4 roll down, 3/4 roll up, inverted entry and exit (pull, push, pull) (K3)
M.10 Humpty bump from top, 1/4 roll down, 3/4 roll up, inverted exit (push, push, pull) (K3)

ANNEX 5L

F3M - NEW PROVISIONAL CLASS

5.L.1. CLASS F3M – LARGE AEROBATIC POWER MODEL AIRCRAFT

5.L.1.1. Definition of a Large Radio Controlled Aerobatic Power Model Aircraft

Model aircraft, but not a helicopter, which is aerodynamically manoeuvred by control surface(s) in attitude, direction, and altitude by a pilot on the ground using radio control.

The model aircraft must be a scaled-down version of a full-size aircraft that is able to perform aerobatics. The competitor must prove this by providing a dossier to the contest director, including a minimum of a three-view drawing and a photograph of the full-size aircraft.

5.L.1.2. Definition of a competition for model aircraft class F3M

A competition for model aircraft class F3M is based on three tasks:

- One task of a known schedule, valid for two years.
- One task of an unknown schedule. This unknown schedule is given to each pilot before the task, without any possibility of practising the schedule. The difficulty of this task will be equivalent to that of the known schedule.
- A freestyle schedule of the competitor's choice.

5.L.1.3. General Characteristics of a large R/C Aerobatic Power Model Aircraft

Minimum overall span for monoplanes ..... 2.1 m

Minimum overall span for biplanes..... 1.8 m

Maximum flying weight without fuel..... 20 kg

Paragraph B.3.1. of section 4b (Builder of Model Aircraft) is not applicable to class F3M.

For Power source limitations, Noise rule, and Radio Equipment: See 5.1.2

To be eligible to compete, the competitor or his helper/team manager must submit the following documentation, before the start of the competition:

a- An accurate three-view drawing of the subject aircraft (home made drawings by the competitor or other draftsman are not acceptable).

b- The dimensions are considered on the top view and side view of the subject aircraft.

c- The scale of the model aircraft is calculated from the wing span.

d- All dimensions may be checked. A tolerance of +/- 10% is allowed.

e- The area of control surfaces compared to fixed surfaces will not be considered. Example: only the outline of the wing, stabiliser and fin will be considered, not the ailerons, elevator, or rudder, but the concept of moving surfaces must be the same as on the subject aircraft. (Aileron perhaps in two parts, moving part of the fin for aerodynamic balance, etc. Trim tabs are forbidden, if not on the full-size aircraft.)

f- The competitor must be able to provide any technical data for technical checking. If the dimensions are not in accordance with the rules, the model aircraft is not allowed to fly and the competitor is disqualified.

5.L.1.4. **Definition and number of helpers**: see 5.1.3

5.L.1.5. **Number of flights**: Each competitor has the right to a minimum of three official flights (one known schedule + one unknown schedule + one freestyle schedule).

5.L.1.6. **Definition of an attempt**: see 5.1.5.

5.L.1.7. **Number of attempts**: see 5.1.6.

5.L.1.8. **Definition of an official flight**: see 5.1.7.

5.L.1.9. **Marking:**

Each manoeuvre may be awarded marks, in whole number increments, between 10 and 0 by each of the judges during the flight. These marks are multiplied by a coefficient that varies with the difficulty of the manoeuvre. Any manoeuvre not completed shall be scored zero (0). Manoeuvres must be performed where they can be seen clearly by the judges. If a judge, for some reason outside the control of the competitor, is not able to follow the model aircraft through the entire manoeuvre, he may set the «Not Observed» (N.O.) mark. In this case, the judge's mark for that particular manoeuvre will be the average of the numerical marks given by the other judges. Centre manoeuvres should be performed in the centre of the manoeuvring area while turn around manoeuvres should not extend past a line 70 degrees left and right of centre. Vertical height should not exceed 60 degrees. Also, manoeuvres should be performed along a line of approximately 150m in front of the competitor. Infractions to this rule will be cause for downgrading by each judge individually and in proportion to the degree of infraction. The manoeuvring area will be clearly marked with white vertical poles, a minimum of 100mm in diameter and a minimum of 4m high, placed on centre, and at 70 degrees each side of centre on a line 150m in front of the competitor. Flags and/or streamers of contrasting colour should be mounted on the poles to improve visibility. White (or contrasting) lines originating at the competitor's position and extending outward at least 50m will also be used to mark the centre and extreme limits (70 degrees left and right of centre) of the manoeuvring zone. Audible and visual signals to indicate violations of the manoeuvring zone are not to be employed.

The judges shall be seated no more than 10m, and not less than 7m behind the competitor's position (the apex of the 70 degree lines) and within an area described by the extension of the 70 degree lines to the rear of the competitor.

At the conclusion of the flight, each judge will independently consider if the in-flight sound level of the model aircraft is too loud. If a majority of the judges consider the model aircraft too loud, the flight score will be penalised 10 points for each counting judge.

If a model aircraft is in the opinion of the safety steward or the judges, unsafe or being flown in an unsafe manner, they may instruct the competitor to land the model aircraft.

The scores given by each judge for each competitor shall be made public at the end of each round of competition.

5.L.1.10. **Classification**:

Classification will be done considering the sum of the three scores: known, unknown, and freestyle.

In the case where two flights of each schedule have been completed, the sum of the best known, the best unknown, and the best free-style scores will be considered.

In the case where three flights have been completed, only the best score of the repeated flight (known, unknown, and free-style) will be added to the single other flight score.

Example: one known, two unknowns, and a free-style have been completed: Classification is done by adding the known score and the free-style score to the best score of the two unknown flights.

The final classification is done by the sum of the three considered flight scores in each category, multiplied by the following coefficients:

Known 35%
Unknown..... 45%
Freestyle 20%

1000 points will be awarded to the competitor obtaining the highest total for his three retained flight scores. The scores are then normalised to 1000 points as described below:

$$\text{Points } x = \frac{S_X}{S_W} \times 1000$$

Points Sx = Points given to competitor x

Sx = Score of Competitor x

Sw = Score of Winner

The TBL statistical averaging system is not to be applied for the moment. However, as soon as possible, the organisers of competitions for this class may start to use scoring software using the TBL algorithm.

5.L.1.11. **Judging**:

The criteria to be applied for judging the manoeuvres in this class, are identical to class F3A. However, the judges will have to consider the dimensions and inertia of the model aircraft. The manoeuvres must be flown slower than with F3A model aircraft, but should be more realistic.

The organiser must appoint a panel of five judges. For each manoeuvre, only three scores are counted, the lowest and the highest scores being discarded.

5.L.1.12. **Organisation for Large R/C Aerobatic Model Aircraft Contests**

For transmitters and frequency control, see section 4b, paragraph B.8.

The draw for flight order will be done for the first task (known, unknown, or freestyle). For the subsequent tasks, the flight order will start at 1/6, 1/3, 1/2, 2/3 and 5/6 down the list."

During the flight, the competitor must stay in front of the judges in the designated area and under the supervision of the Flight Line Director and safety steward.

Competitors must be called at least five minutes before they are required to occupy the starting area.

If his frequency is clear, the competitor will be given his transmitter when he occupies the starting area so that he can perform a radio check. Utmost care must be taken by the competitor in the starting area, to not disturb the concentration of the competitor who may be flying.

If there is a frequency conflict the competitor must be allowed a maximum of one minute for a radio check before the start of the 3minute starting time. The timer will notify the competitor when the minute is finished, and immediately start the 3-minute starting time.

5.L.1.13. **Execution of manoeuvres**

The manoeuvres must be executed during an uninterrupted flight in the order in which they are listed on the score sheet. The competitor may make only one attempt at each manoeuvre during the flight. The pilot has three minutes to start his motor, and eleven minutes to complete his flight; both the three minutes and the eleven minutes to start when the competitor is given permission to start his motor.

The model aircraft must take-off and land unassisted, that is, no hand launched flights. If any part of the model aircraft is dropped during the flight, scoring will cease at that point and the competitor must be instructed to land his model aircraft immediately.

The direction of the manoeuvres is determined by the heading of the model aircraft during the take-off.

The flight ends when the landing sequence is completed.

Scoring will cease with the expiration of the eleven-minute limit time.

After the known flying schedule has been completed, the competitor is not allowed a free pass, and the landing must follow immediately. Any free passes will result in a zero score for the landing.

The model aircraft must land in the landing area, defined by a 50 metres diameter circle, or within two lines marked on the runway and separated by 100 metres if the runway is wider than 10 metres.

The landing point is considered as the first point where the model aircraft touches the ground. Landing out of the landing area, or a crash will result in a zero score for the landing.

The landing sequence is completed when the model aircraft has run for 10m or comes to a stop within 10 metres.

5.L.1.14. **Schedules of manoeuvres**.

a- The **known schedule** is valid for a two-year period.

b- The **unknown schedule** is given to the competitors in the evening preceding the competition day, or on the morning of the competition day, with no possibility of practice flying. In a proven case of a competitor having practised the unknown schedule, the competitor must be disqualified.

This schedule must be completely new, unknown, and equal in difficulty factor to the known schedule.

For each manoeuvre, judges and competitors must refer to the F3A rules that define all manoeuvres, and errors to be avoided. The same basic criteria of judging are to be used for dimensions of manoeuvres and judging of longitudinal distance (but 70° on each side, and about 150m in distance).

Before the beginning of the task of the unknown schedule, the judging co-ordinator will brief the judges and the competitors to clearly explain the manoeuvres, and what is expected from the competitors.

Knowledge of the Aresti cryptographic system is highly recommended to all competitors and judges.

c- Freestyle schedule:

Freestyle schedules give a competitor the opportunity to demonstrate his own skill and the qualities of his model aircraft. There are no rules governing the composition of the schedules. However, safety is of prime importance.

The model aircraft flown by a competitor in the freestyle task may be different from the one flown for the two other schedules, provided this model aircraft conforms to the general characteristics of the F3M class.

The maximum duration of a freestyle flight is five (5) minutes, from the take-off signal, to the landing. The competitor will be notified at one minute before the end of the five-minute period.

After the end of the five-minute period, the judges cease to consider any further manoeuvres that may have been performed. If the model aircraft is still airborne, it must be landed immediately, otherwise the judges will mark a zero score for the criteria “Technicality of the manoeuvres” (K2).

Marking criteria

Judging of the Freestyle task comprises five elements. Each element contains several criteria, with marks ranging from 10 to 0. Each mark is multiplied by a difficulty coefficient (K-Factor).

Originality: Three criteria:

New Manoeuvres: K= 2

The use of completely new manoeuvres, or manoeuvres not often used, or a diverse range of manoeuvres.

Enhancers. Smoke producing devices, or streamers. K=1 . The use of these devices should be used only to accentuate or emphasise some manoeuvres. Improper or inefficient use, even if impressive, should not result in full marks being given.

Harmony with music: K= 3
If there is musical accompaniment, the flying and the manoeuvres should be in complete harmony with the music, and the music must not be used only as background.

Harmony and Rhythm: Two criteria

Setting of the manoeuvres: K= 2

The schedule must be well structured, with good placement and positioning of the manoeuvres, giving judges the best visibility of the entire performance. Safety is of prime importance.

Sequence of manoeuvres: K= 2. The entire flight must retain the interest of judges, with a natural flow from start to finish, with coherent matching of manoeuvres.

Performing of the manoeuvres: Two criteria

Technicality of the manoeuvres: K= 2 . Complicated and technically challenging manoeuvres must be awarded higher marks, provided there is not a lack of quality in their execution. Simple and less complex manoeuvres should attract fewer marks.

Quality: K= 2. The entire flight must be devoid of "missed" manoeuvres, and must exhibit all-round good quality. The fact that it is a freestyle schedule must not allow the performance to become sub-standard in technicality and quality. It is not intended to be a circus performance.

Safety of the flight:

Safety: The impression must be created with the judges that the competitor is in absolute control of the model aircraft. Never should the safety of persons or equipment be endangered during a flying performance.

Diversity: K= 2

The competitor must avoid repetitive use of the same manoeuvres, and only in exceptional circumstances will repeat manoeuvres be tolerated to emphasise a particular passage in the music.

5.L.1.15. **Safety**

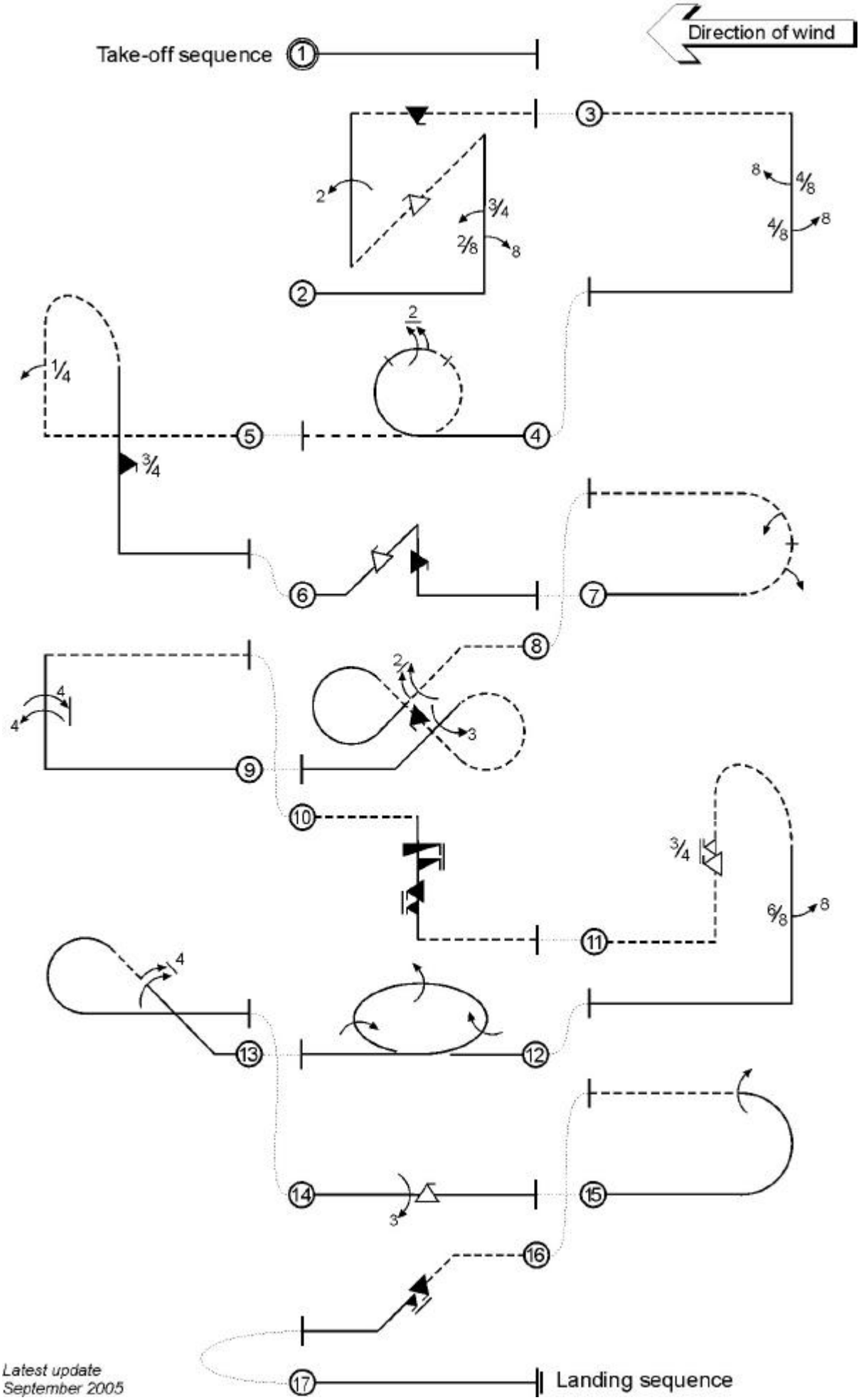
The contest director will nominate a safety line officer/steward. This officer/steward is in charge of safety and will be located within hearing distance from the competitor. The safety steward must observe the model aircraft and the competitor's actions during a flight, and is empowered to instruct a competitor to terminate his flight and to land his model aircraft immediately if necessary during a safety conflict.

During the Freestyle schedule, the distance between the manoeuvring area and the competitor must be a minimum of 20m. Any manoeuvre performed at a distance closer than 20m to the competitor will score zero marks.

Near the 20m line, model aircraft should be flown either parallel to the public line, or away from it.

The manoeuvring area frame defined for known and unknown schedules is not imposed on the Freestyle schedule. However, any flying behind the competitor will attract an immediate instruction by the safety steward for the competitor to terminate his flight, and the entire flight will score zero points.

F3M KNOWN SCHEDULE (2004/2005)



Known schedule manœuvres

	K-Factor
01 – Take-off Sequence	1
02 – Inverted figure N with rolls in each leg, exit inverted	6
03 – Half square loop, two 4/8 points rolls opposite down	3
04 – Loop, 3/2 points roll at the top	4
05 – Push-pull-pull humpty bump, ¼ roll up, ¾ snap down	4
06 – 45 degrees up, one positive snap, one negative snap down	5
07 – Inside rolling half loop with two half rolls, exit inverted	5
08 – Inside outside Cuban eight from top, 3/2 points roll in first leg, one negative snap in second leg, 3 points roll in third leg	6
09 – Half square loop, two four points rolls opposite up, exit inverted	4
10 – 1-1/2 turn inverted spin, then 1-1/2 negative snap opposite, exit inverted	5
11 – Push-pull-pull humpty bump, 1-3/4 snap up, 6/8 points roll down	4
12 – Rolling circle with 3 rolls reversed, first roll inside	5
13 – Half reverse Cuban eight, 6/4 points roll	4
14 – Three points roll, one positive snap opposite	5
15 – Immelmann, full roll, exit inverted	3
16 – 45 degrees down, 1-1/2 negative snap	5
17 – Landing sequence	1
Total K-factor	70

F3M - RADIO CONTROLLED AEROBATIC MODEL AIRCRAFT

DESCRIPTION OF MANOEUVRES

01 – **Take-off Sequence:** The model aircraft is placed on the runway, takes off, then turns 90 degrees toward the line defined by the upwind and downwind marker. When approximately over this line, the model aircraft turns 270 degrees for a downwind trim pass. When approximately even with the downwind marker the model aircraft initiates a 180-degree turn, reversal, or other turn-around manoeuvre of the competitor's choice.

Judging Notes:

- Take-off sequence not followed, zero points.
- Model aircraft passes behind the judges' line (zero line), zero points.
- Only two scores, a zero or a 10, may be awarded for the take-off sequence.

02 – **Inverted figure N with rolls in each leg, exit inverted:** Pull to a vertical upline and perform two points of an eight point roll, then perform three fourths of a roll in the opposite direction, push to a 45 degrees downline and perform a positive snap roll over the centre flag, pull to a vertical upline and perform a two point roll, pull to inverted flight and perform a negative snap roll over the centre flag, exit inverted.

Judging Notes:

- The first snap must be positive, and the second snap must be negative.
- In the first vertical leg, the roll direction is optional, but the second roll must be in opposite direction.

03 – **Half square loop, two 4/8 points rolls opposite down:** Pull to a vertical downline and perform four points of an eight point roll, followed by four points of an eight point roll in the opposite direction, then pull to recover upright.

Judging Notes:

- The first roll direction is optional, but the second roll must be in opposite direction.
- The two point- rolls must be in the centre of the vertical leg.

04 – **Loop, 3/2 points roll at the top:** Pull up and execute a half loop, at the top perform three points of a two point roll, push and complete a half outside loop to recover inverted

Judging Notes:

- The three points of a two-point roll are centred at the top of the loop.
- The loop is round with three points of a two-point roll integrated with the loop.

05 – **Push-pull-pull humpty bump, ¼ roll up, ¾ snap down, exit inverted:** Push to a vertical upline and execute a quarter roll, pull and complete a half inside loop to a vertical downline, perform a ¾ negative snap roll, pull to recover upright.

Judging Notes:

- Half loop at top must be inside loop.
- Rolls must be centred on the vertical legs
- Entry and exit altitude need not be the same.

06 – **45 degrees up, one positive snap, one negative snap down:** Pull to a 45 degrees upline and perform a positive snap roll, push to a vertical downline and perform a negative snap roll, pull to recover upright

Judging Notes:

- The vertical downline is over the centre flag.
- The first snap must be positive, and the second snap must be negative.

07 – **Inside rolling half loop with two half rolls, exit inverted:** Pull up and complete a half loop with two half rolls in opposite direction and integrated with the entire half loop, exit inverted.

Judging Notes:

- The roll rate must be constant.
- No hesitation between the two half rolls.
- The half loop must be in the vertical plane.

08 – **Inside-outside Cuban eight from top, 3/2 points roll in first leg, one negative snap in second leg, 3 points roll in third leg:** Pull to a 45 degree inverted downline and perform three points of a two point roll, then perform three fourths of an inside loop. On the second 45-degree inverted downline, perform a negative snap roll followed by three fourths of an outside loop. On the third 45-degree downline perform a three-point roll, then pull to recover upright.

Judging Notes:

- The rolls must be centred.
- The lines must be 45 degree and the crossing in the centre.

09 – **Half square loop, two four points rolls opposite up, exit inverted:** Pull to a vertical upline and complete a half square loop. On the upline perform a four-point roll in either direction then immediately perform a four-point roll in the opposite direction. Exit inverted

Judging Notes:

- The rolls should be centred.
- Hesitation between rolls is very brief.

10 – **1-1/2 turn inverted spin, then 1-1/2 negative snap opposite, exit inverted:** From an inverted horizontal line perform a 1-1/2 turn inverted spin then 1-1/2 negative snap roll in the opposite direction. Push to recover inverted.

Judging Notes:

- The spins and the snap rolls must be in opposite direction.
- The snap roll must be a negative snap roll.

11 – **Push-pull-pull humpty bump, 1-3/4 snap up, 6/8 points roll down:** Push to a vertical upline and execute 1-3/4 positive snap roll then pull through a half inside loop to a vertical downline. On the downline perform six points of an eight-point roll, pull to recover upright.

Judging Notes:

- Half loop at top must be inside loop.
- Rolls must be placed on the middle of the lines.
- Entry and exit altitude need not be the same.

12 – **Rolling circle with 3 rolls reversed, first roll inside:** From horizontal, perform a rolling circle with three rolls in alternate directions, with the first roll to the inside.

Judging Notes:

- Constant roll rate.
- Immediate reversals.
- Constant radius of circle (i.e. circle is wind corrected).
- Entry and exit at the same point.
- Manoeuvre should be downgraded if the circle is too large and too far out.

13 – **Half reverse Cuban eight, 6/4 points roll:** Pull to a 45 degree upline, execute six points of a four point roll, then pull and complete five eighths of an inside loop to recover upright.

Judging Notes:

- The roll must be placed on the middle of the 45 degree upline.

14 – **Three points roll, one positive snap opposite:** On a horizontal line perform a three point roll, followed by a positive snap roll in the opposite direction.

Judging Notes:

- Manoeuvre should project a straight horizontal line throughout.
- The points must be of 120 degree.
- The roll and the snap roll must be in opposite direction.
- The entire manoeuvre must be centred.

15 – **Immelmann, full roll, exit inverted:** Perform half of an inside loop, followed immediately by one aileron roll. Exit inverted.

Judging Notes:

- There is no hesitation between the half loop and the roll.

16 – **45 degrees down, 1-1/2 negative snap:** Pull to a 45 degree downline and perform 1-1/2 negative snap roll. Pull to recover upright.

Judging Notes:

- The snap roll is over the centre flag.

17 – **Landing Sequence:** At reduced power execute a 180 degree level or descending turn into the wind. Fly a descending approach to the runway touching down in the landing zone. The landing sequence is complete when the model aircraft has either rolled 10 meters or comes to rest.

Judging Notes:

- Model aircraft does not follow landing sequence, zero points.
- If any landing gear leg retracts on landing, zero points.
- If the model aircraft lands outside the landing zone, zero points. The landing zone is designated by a circle of 50m radius or lines across a standard runway spaced 100 metres apart where the runway is at least 10m wide.
- Only two scores, a zero or a ten, may be awarded for the landing sequence.

ANNEX 5M

F3P – NEW PROVISIONAL CLASS

5.M.1. CLASS F3P – INDOOR AEROBATIC POWER MODEL AIRCRAFT

5.M.1.1 Definition of a R/C Indoor Aerobatic Power Model Aircraft

Model Aircraft, but not a helicopter, which flies indoors (usually a hall) and is aerodynamically manoeuvred by control surface(s) in attitude, direction, and altitude by a pilot on the ground using radio control.

5.M.1.2 General Characteristics of R/C Indoor Aerobatic Power Model Aircraft

Maximum total weight.....500g

External parts that protrude which could be considered dangerous, (i.e. landing gear struts, shaft tips etc.) must be covered in order to avoid injuries.

Power source limitations: Any suitable power source may be utilised except those generating any kind of exhaust emission. Electric powered model aircraft are limited to a maximum of 42 Volts for the propulsion circuit.

Paragraph B.3.1. of Section 4b (Builder of Model aircraft) is not applicable to class F3P.

Radio equipment shall be of the open loop type (i.e. no electronic feedback from the model aircraft to the ground). Auto-pilot control utilising inertia, gravity or any type of terrestrial reference is prohibited. Automatic control sequencing (pre-programming) or automatic control timing devices are prohibited.

Example: Permitted:

1. Control rate devices that are manually switched by the pilot.
2. Any type of button or lever control that is initiated and terminated by the pilot
3. Manually operated switches to couple control functions.

Not permitted:

1. Snap buttons with automatic timing mode.
2. Pre-programming devices to automatically perform a series of commands.
3. Auto-pilots for automatic wing levelling.
4. Propeller pitch change with automatic timing mode.
5. Any type of voice recognition system.
6. Any type of learning function involving manoeuvre to manoeuvre or flight to flight analysis.

5.M.1.3 Definition and Number of Helpers

A helper may be a Team Manager, another competitor or an officially registered supporter. Each pilot is permitted one helper during the flight.

5.M.1.4 Number of Flights

Competitors have the right to the same number of flights. Only completed rounds will be counted.

5.M.1.5 Definition of an Attempt

There is an attempt when the competitor is given permission to start.

Note: If the motor fails to start within the one (1) minute allowed, the competitor must immediately make room for the next competitor. If the motor stops after the take-off has begun, but before the model aircraft is airborne, it may be restarted within the one (1) minute starting period.

5.M.1.6 Number of Attempts

Each competitor is entitled to one (1) attempt for each official flight.

Note: An attempt can be repeated at the contest director's discretion only when for any unforeseen reason outside the control of the competitor the model aircraft fails to start (e.g. there is radio

interference). Similarly, in a flight that is interrupted by any circumstance beyond the control of the competitor, the competitor is entitled to have a reflight, but only manoeuvres affected and the unscored manoeuvres that follow will be judged.

5.M.1.7 Definition of an Official Flight

There is an official flight when an attempt is made whatever the result.

5.M.1.8 Marking

Each manoeuvre may be awarded marks, in whole number of increments, between 10 and 0 by each of the judges during the flight. These marks are multiplied by a coefficient that varies with the difficulty of the manoeuvre. Any manoeuvre not completed shall be scored zero (0). Manoeuvres must be performed where they can be seen clearly by the judges. If a judge, for some reason outside the control of the competitor, is not able to follow the model aircraft through the entire manoeuvre, he may set the "Not Observed" (N.O.) mark. In this case, the judge's mark for that particular manoeuvre will be the average of the numerical marks given by the other judges. Centre manoeuvres should be spaced equally above the centre line of the manoeuvring area, with turn around manoeuvres at the left or right of it. Infractions of this rule will be cause for downgrading by each judge individually and in proportion to the degree of infraction.

AeroMusicals are judged for flying style, artistic quality, and overall performance, in marks of 0.5 increments between 10 and 0 by each of the judges for the overall flight.

Judges shall be seated on a line parallel to the longest wall of the hall and in the middle between its side walls, while viewing the opposite longest wall.

The manoeuvring area is limited by the floor, ceiling, and walls of the hall, as well as by the safety line (the line that the judges are seated on). A model aircraft must never cross this safety line. The centre line of the manoeuvring area stretches from the safety line (perpendicular) to the opposite long wall, and is positioned in the middle between the side walls. The recommended dimensions of the hall should be about 40 x 20 metres in length and width and between 8 to 12 metres in height.

Audible and visual signals to indicate violations of the manoeuvring area are not to be employed.

If a model aircraft is unsafe in the opinion of judges or being flown in an unsafe manner, they may instruct the competitor to land.

The scores given by each judge for each competitor shall be made public at the end of each round of competition.

5.M.1.9 Classification

Each competitor will have three (3) official flights. All scores (summary of marks of each flight) will be normalised to 1000 points as described below. Only scores of fully completed rounds may be used for classification. Individual placing is determined for each competitor by the sum of points of his best two (2) rounds counting.

$$Points_X = \frac{S_X}{S_W} \times 1000$$

$Points_X$ = points awarded to competitor X

S_X = score of competitor X

S_W = score of winner of round.

5.M.1.10 Judging

For each competition in F3P, there must be a minimum of three (3), and a maximum of five (5) judges, plus one timer.

For larger events, there might be several groups of judges.

Each judge has to assess each manoeuvre and any other relevant action of the competitor individually and independently from the other judges. The criteria for judging are contained in the Schedules of Manoeuvres and the Judge's Guide (Appendix 5B, SC 4a).

To avoid errant judging, it is recommended that training flights be performed, before the beginning of official flying. These training flights are judged and tabulated according to the regulations, but the results are not made public.

5.M.1.11 Organisation for R/C Indoor Aerobatic Contests

For transmitter and frequency control see Section 4b, Para. B.8. The draw for the flight order will be done for each flight line, except when possible, frequency will not follow frequency, nor team member follow team member. Also team members on separate flight lines will be separated by at least two competitors.

For flights two, the flight order will start in the middle of the original flight draw and then from the beginning to the middle. For flights three, the flight order is the same as the original draw, but in reverse.

During the flight, the competitor must stay in proximity of the judges and under the supervision of the Flight Line Director.

Competitors must be called at least five (5) minutes before they are required to occupy the starting area.

If his frequency is clear the competitor will be given his transmitter when he occupies the starting area so that he can perform a radio check. If there is a frequency conflict he must be allowed a maximum of one (1) minute for a radio check before the start of the one (1) minute starting time. The timer will notify the competitor when the minute is finished and immediately start timing the one (1) minute starting time.

5.M.1.12 Execution of Manoeuvres

The manoeuvres must be executed during an uninterrupted flight in the order that they are listed on the score sheet. The direction of take-off is the competitor's choice. The direction of each manoeuvre is determined as a result of the take-off direction.

In schedules with turn around manoeuvres, there is no unjudged flying between the first manoeuvre after the take-off and the last manoeuvre before landing.

In AeroMusicals, judging is done for the entire flight, without interruption.

If the model aircraft touches the floor, ceiling, walls, or any structures or fixtures of the hall, or crosses the safety line during a manoeuvre, this manoeuvre is scored ZERO.

In AeroMusicals, this rule only applies regarding the safety line.

The competitor may make only one attempt at each manoeuvre during the flight. The pilot has one (1) minute to start his motor and five (5) minutes to complete his flight, both the one (1) minute and the five (5) minutes to start when the competitor is given permission to start.

In AeroMusicals the competitor has to signal the operator of the music his wish to start the music within the first (1) minute.

The duration of the music must be 120 +/- 5 seconds. Judging of the flight starts with its beginning.

The model aircraft must take-off and land unassisted, that is, no hand launched flights. If any part of the model aircraft is dropped or if it comes to stand still during the flight, scoring will cease at that point and the model must be landed immediately.

In AeroMusicals, this rule only applies regarding the take-off.

The flight ends when the landing sequence is completed. Scoring will cease with the expiration of the five (5) minutes time limit.

In AeroMusicals the flight ends at the stop of the music, or 125 seconds after it had started. At least then the model aircraft has to be landed.

5.M.1.13 Schedule of Manoeuvres

The schedule F3P-A is for expert pilots in Indoor Aerobatic Power Model Aircraft.

The schedule F3P-AM is for competitors to demonstrate their artistic performances in Indoor Aerobatic Power Model Aircraft in conjunction with music. It is recommended that competitors in F3P-AM have to go through a pre-qualification in F3P-A first.

5.M.1.14 Description of Manoeuvres for Indoor Aerobatic Power Model Aircraft

All manoeuvres are judged on flight path and will start and finish in straight and level upright or inverted flight. Centre manoeuvres will start and finish on the same heading, while turn-around manoeuvres will finish on a heading 180° to entry. When appropriate, entry and exit of centre manoeuvres will be at same altitude. Positioning adjustments in altitude are allowed in turn-around manoeuvres.

All manoeuvres which have more than one loop or part of loops will have the loops or part loops of the same diameter and in case of consecutive loops, in the same place. Similarly all manoeuvres which have more than one continuous roll will have the same roll rate. All manoeuvres which have more than one point roll will have the same roll rate, and points will be of equal duration. All consecutive rolls on a horizontal line will be at the same altitude and heading.

All manoeuvres with rolls, part of rolls or snap rolls, or combination of same, will have lines of equal length before and after the rolls or combinations except in Immelman or Split S families. Snap rolls that are not snap rolls (i.e. barrel rolls) will be scored zero. Spins that are spiral dives or have a snap roll entry will be scored zero.

Any violation of above will be reason for downgrading, in addition to the violations referred to in the judging notes listed in the manoeuvre descriptions and downgrades noted in the Judges Guide (F3A Annex 5B) and the official judging training video. Note that these lists are not all-inclusive.

SCHEDULE F3P-A	**K-Factor**
A1. Take-off Sequence	2
A2. Reverse Cuban Eight	4
A3.1/4 Roll, Half Circle, 1/4 Roll	3
A4. Looping with 1/2 Roll	4
A5. Turn with horizontal 1/2 Roll	3
A6. Triangle Loop with 1/2 Roll	5
A7. Half Circle inverted	2
A8. Rolling Circle with 1/1 integrated Roll	5
A9. Top Hat with two 1/4 Rolls	4
A10. 2/4 Points Roll	3
A11. Push-Push-Pull Humpty-Bump	3
A12. Torque-Roll	6
A13. Landing Sequence	2
	46

A01. Take-off Sequence:

Place the model aircraft on the floor and take-off in parallel to the security line. After having reached a reasonable height, turn 90° away from the security line, fly a straight line, turn again 90° and fly a line in opposite to the take-off direction until having crossed the centre line. Turn 180° towards the security line; fly a line in parallel to the security line until having crossed the centre line and turn 180° away from the security line.

Judging Notes:

- Until the end of the straight line after the first 90° turn, the model must be climbing all the way.
- Only two scores, a Zero (0) or a Ten (10), may be awarded for the take-off sequence.

A02. Reverse Cuban Eight (Centre manoeuvre)

Pull to a 45° upline perform half a roll, pull through a 3/4 inside loop into another 45° upline and perform a second half roll, pull through a 5/8 inside loop into level exit.

A03. 1/4 Roll, Half Knife-Edge Circle, 1/4 Roll (Turn-around manoeuvre)

Perform a quarter roll, fly a half horizontal circle in knife-edge flight and perform a second quarter roll. Exit level.

Judging Notes:

- The circle has a constant radius.
- The altitude must not vary during the entire manoeuvre.
- There must be no lines between the quarter rolls and the half circle.

A04. Loop with 1/2 Roll (Centre manoeuvre)

Pull and perform a loop with half a roll integrated on its top. Exit inverted.

A05. Stall-Turn, 1/2 Roll (Turn-around manoeuvre)

Push to a vertical upline, followed by a stall-turn. After the downline push into level inverted flight and perform half a roll. Exit level.

Judging Notes:

- Radius of stall-turn more than1-1/2 wingspan: Score Zero (0)

A06. Triangular Loop with 1/2 Roll (Centre manoeuvre)

Pull to 45° upline, pull through a 3/8 inside loop into straight, level line, perform half a roll in its middle, push through a 3/8 outside loop into 45° downline and push to horizontal inverted flight. Exit inverted.

A07. Half Circle Inverted (Turn-around manoeuvre)

Perform half a circle in inverted flight. Exit inverted.

Judging Notes:

- The circle has a constant radius.
- The altitude must not vary during the entire manoeuvre.

A08. Rolling Circle with 1/1 Roll Integrated (Centre manoeuvre)

Perform a 360° circle with an integrated full roll. Exit inverted.

Judging Notes:

- The circle has constant radius.
- The altitude must not vary during the entire manoeuvre
- The roll rate must be constant.

A09. Top Hat with two 1/4 Rolls (Turn-around manoeuvre)

Pull to a vertical upline, perform a quarter roll and pull to horizontal inverted flight. Pull to a vertical dowline, perform another quarter roll and pull to level. Exit level.

A10. 2/4-Point-Roll (Centre manoeuvre)

Perform two points of a four-point roll on a straight, level line. Exit inverted.

A.11 Push-Push-Pull Humpty-Bump (Turn-around manoeuvre)

Push to a vertical upline, push through a half outside loop into a vertical downline and pull to level. Exit level.

A12. Torque-Roll (Centre manoeuvre)

From level flight reduce flying speed until the models' longitudinal axis is in a vertically hovering attitude. Perform one roll in this position and then accelerate the model back into level flight. Exit level.

Judges Notes:

- The altitude and distance must not vary during the entire manoeuvre.

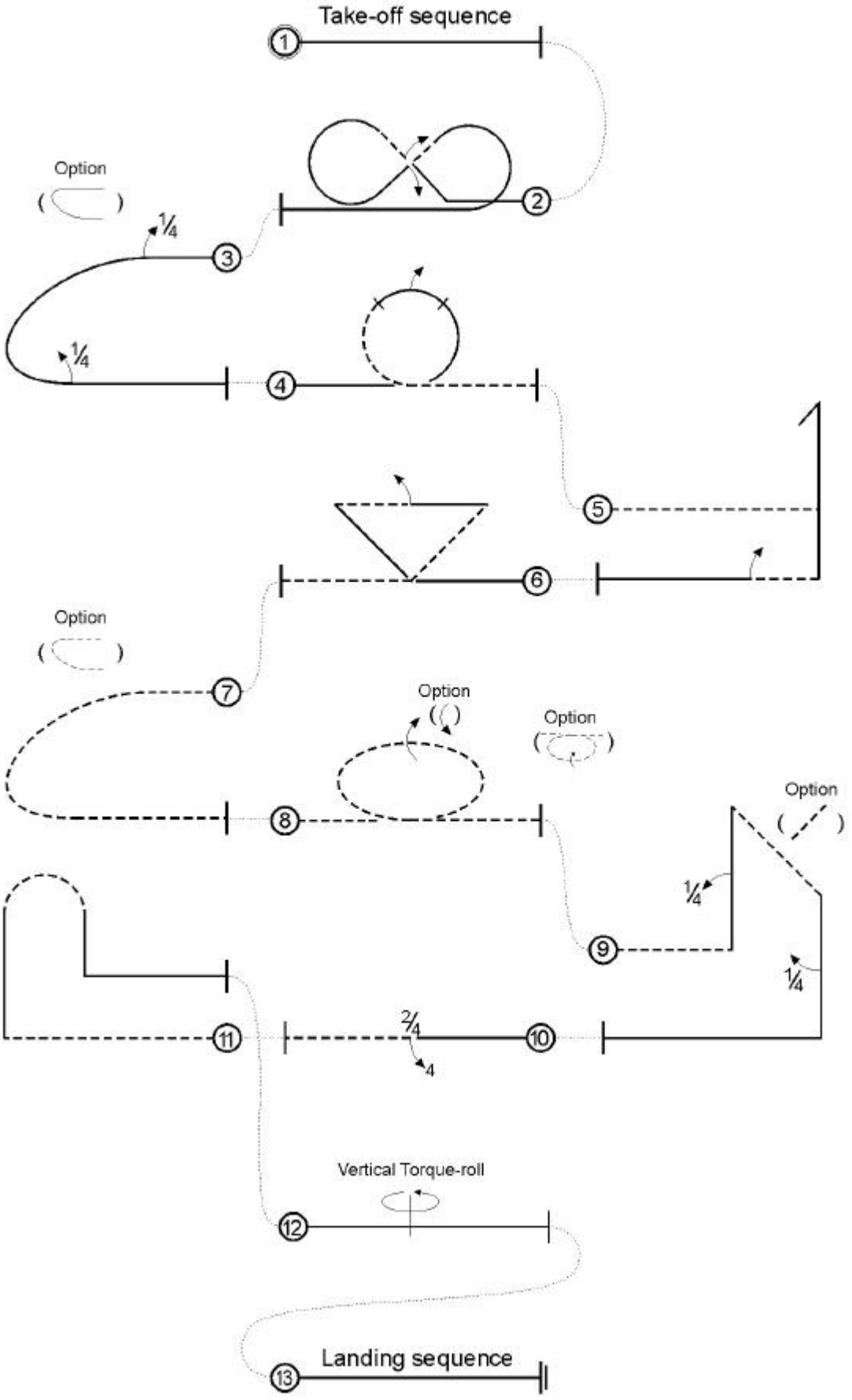
A13. Landing Sequence

Turn 180° away from the security line and fly a line in opposite to the take-off direction until having crossed the centre line, turn 180° towards the security line, touch down the model gently on a straight line in parallel to the security line and let the model roll straight until stop.

Judges Notes:

- From crossing the centre line on the model must not climb anymore.
- Only two scores, a Zero (0) or a Ten (10), may be awarded for the take-off sequence.

CLASS F3P - INDOOR AEROBATIC POWER MODEL AIRCRAFT
SCHEDULE F3P-A



Aresti drawings by Bob Skinner in CorelDraw 9. February 2005

SCHEDULE F3P-AM

AM1. Take-off

AM2. Freestyle (freely composed sequence of manoeuvres choreographed to music of the competitor's choice.)

AM3. Landing

AM01. Take-off Sequence

Place the model aircraft on the floor and take-off in parallel to the security line

AM02. Freestyle

A sequence of manoeuvres, freely composed by the competitor and flown in harmony to simultaneously played music of his choice. Any possible flight manoeuvres may be flown and "show effects" presented, as long as safety is not compromised and conformity to the rules is met. It is allowed to perform different programs in conjunction with different music in each round. The performance is judged for the entire flight from start to end and in accordance to the following three criteria:

1 Flying Style

- Precision of manoeuvres
- Utilisation of flight performance scope
- Variety of manoeuvres

2 Artistic Quality

- Synchronisation to music
- Continuity of Schedule
- Sequence of quiet and dynamic phases

3 Overall Impression

- Utilisation of manoeuvring area
- Positioning

Judges Notes:

Other than in class F3A although accompanied by its basic rules, AeroMusicals (AM) mostly focuses on spectator and media efficacy. This is why the performances should be extraordinarily spectacular and entertaining under these aspects.

For the Judges it is recommended to make "pencil"-notes right away during the presentation. So corrections are still possible in course of the flight. All three criteria have to be marked simultaneously and evenly.

Although it is subjective, judging the presentations has to follow the judging guide and judging notes. Bias in favour of, or against, particular persons, models, music pieces etc must not influence the judging.

1 Flying Style

The flying skills of the pilot count herein. Flight sections and manoeuvres should be precise in the sense of F3A. The pilot is to demonstrate that he safely governs his model in any position. (Judges Guide F3A Annex 5B)

In addition, the pilot is to utilise the full flight performance scope of his model. Fast and slow flying, snap manoeuvres, hovering etc. The manoeuvres should show positive as well as negative "g"-portions: loops, rolls, snaps, spins, stall-turns, tailslides, hovering, torque-rolls, flat circles, Lomcevacs, circles, etc. Frequent repetition of the same manoeuvre has to be downgraded respectively. Manoeuvres should be

positioned in parallel or rectangular to the security line. Poorly governed, unplanned or casually flown manoeuvres, will be downgraded. The same applies to phases less extraordinarily attractive.

2 Artistic Quality

The music (choreography) has to enhance the presentation and to create a complimentary atmosphere. The flight performance should be synchronised with the music and must not be a "3D-sketch" with background music. On the other hand the music must not detract from the presentation. The selected music piece(s) should contain fast-slow, soft-loud and dramatic sections. The manoeuvres should follow the music and end with it. Music pieces with little contrast, variety or tempi result in downgrades.

3 Overall impression

A well made combination of flying style-music-entertainment is desired. The performance should be orientated towards judges and spectators, although risky flying towards judges and spectators will result in downgrades.

AM03. Landing Sequence

Touch the model down gently on a straight line parallel to the security line and let the model roll straight until stopped.

An explanation of the Aresti diagrams is in F3A Annex 5A and the Judge's Guide is in F3A Annex 5B.