

NZMAA FLYING RULES

Section 10: Radio Control Aerobatics

1. **APPLICABILITY**

- 1.1 R/C Aerobatics classes flown in New Zealand include the FAI International class of F3A which is flown to the rules in the latest edition of the FAI Sporting Code. There are two domestic (non-FAI) classes: Sportsman and Advanced.
- 1.2 A contestant may enter only one class at a given contest.
- 1.3 The winner of Sportsman at the Nationals can no longer fly Sportsman at any level. Exemptions to this may be obtained by applying in writing to the R/C Aerobatics Special Interest Group giving reasons for the request.
- 1.4 A newcomer will normally start at the Sportsman level but may advance by self promotion. Similarly, provided rule 1.3 is complied with, a flier may revert from Advanced to Sportsman.
- 1.5 No member (or past member) of a New Zealand representative team at an F3A International competition may fly in a lower class. Exemptions to this may be obtained by applying in writing to the R/C Aerobatics Special Interest Group giving reasons for the request.

**Amendment: 1 Dec 2002*

2. **FLYING RULES**

- 2.1 **FAI Rules.** The FAI rules presented at Section 10A of these NZMAA Flying Rules also form the basis for the Sportsman and Advanced classes. The following additions/changes to the FAI rules apply to *all three* NZ classes:
- 2.1.1 Add to FAI rule 5.1.5 "Definition of an Attempt":
... but no take off points will be awarded, with the exception of New Zealand Sportsman, where repeat take off may be scored, provided the 3 minute start time is observed.
- 2.1.2 Add to FAI rule 5.1.12 "Execution of Manoeuvres":
... with the expiration of Sportsman. All Sportsman manoeuvres called shall be judged provided they are flown in the correct sequence. Manoeuvres may be omitted but should be replaced by a blank pass to maintain the sequence. This pass must be called as: "Manoeuvre Omitted". In the event of incomplete sequence the landing will still be judged.
- 2.2 **Normalising.** The final result of all contests in New Zealand will be determined by a normalised total. If only one round is flown, it will be used to determine the winner. If two to five rounds are flown, the one lowest round will be dropped. If six or more rounds are flown, the two lowest rounds will be dropped.
- 2.3 **Safety.** Flying over or at spectator areas or pits is deemed hazardous and may be grounds for disqualification. All pilots with transmitters must stand in the assigned area, which is not to be in the pits or in the approach, landing or take off paths. The

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contest director may suspend any contestant from flying if he considers his flying hazardous or his model or radio apparatus unsafe.

2.4 NZ TEAM SELECTION.

2.4.1 The R/C Aerobatics Special Interest Group is responsible for selecting F3A teams to represent NZ at International Competition. Please contact the SIG for team selection details at least a full 12 months ahead of the international contest you are interested in attending.*

*Amendment: 1 Dec 2001

3. SPORTSMAN

3.1 General: (Note that the FAI guidelines also apply)

Sportsman is the entry-level class to precision R/C aerobatics. It can be seen as an extension of the NZMAA wings program and gives R/C fliers an opportunity to improve their R/C flight skills and aerobatics competence. The schedule is designed using manoeuvres that demonstrate three basic fundamentals of aerobatic flight - lines, loops and rolls. The manoeuvres shall be executed as follows:

- a. All manoeuvres are centred directly in front of the judges line
 - b. All manoeuvres begin and end with a clearly visible section of straight and level flight.
 - c. All manoeuvres must be clearly announced prior to commencement by the pilot or caller.
 - d. All manoeuvres must have a clear announcement of commencement and completion. Judges will only score announced manoeuvres between calls of 'Commence' and 'Complete'
 - e. The schedule must be flown in sequence as described in Execution of manoeuvres
- 2.1.2

3.1.1 Competition Format:

a. To enter, competitors must register their name, class and frequency. This enables a draw to be made to determine flying order and frequency separation. A pilot's briefing will be held immediately prior to commencement of the contest and will explain the rules for the day, manoeuvre centres and ready box location. Line directors will then answer questions. Time permitting, a demonstration flight of the schedule will follow for the benefit of both contestants and judges.

b. The contest will consist of a number of 'rounds' flown during the day, a contestant order will be posted prior to commencement of each round. A line director will advise each contestant when to move to the ready box area, and when to start the motor. The contestant will require a helper/caller to assist with the start, place the aircraft on the flight line, call the manoeuvres during the schedule, and retrieve the aircraft at the conclusion of the flight.

c. The Sportsman sequence is flown as a series of centre manoeuvres one to each upwind and downwind pass. Provided there is neither a call of 'Commence', nor the aircraft flown past centre, the pilot may manoeuvre the aircraft to position it to his/her satisfaction prior to execution of the manoeuvre. However all manoeuvres must be completed within the allocated flight time.

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3.2 Sportsman Schedule:

1. Take-Off Sequence: The model must stand still on the ground with the motor running without assistance and shall then take off. The takeoff run must be straight and the model shall lift gently from the ground and climb at a gradual angle. When sufficient altitude has been gained the model must be turned 90 degrees away from the judges, followed by a 270 degree turn to finish heading downwind in front of the judges. This will be scored one to ten, unlike F3A.

Downgrades:

1. Model does not track straight and lift off smoothly.
2. First turn not exactly 90 degrees.
3. Second turn not exactly 270 degrees.
4. Climb angle not constant.

2. Double Stall Turn: The double stall turn commences with the model in straight and level flight. The model flies through the centre of the box then executes a quarter loop into a vertical climb and executes a stall turn through 180 degrees (in either direction), then flies vertically down, pulls through a half loop into a second vertical climb, executes a second stall turn (in either direction), then flies vertically down and then pulls through a final quarter loop to level flight.

**Amendment: 1 Dec 2002*

Downgrades:

1. Model not vertical before and after stall turns.
2. Stall turns not exactly 180 degrees.
3. Bottom of half inside loop not level with entry.
4. Changes in heading during half inside loop.

3. Cuban Eight: The model starts in straight and level flight, flies through centre, pulls up into an inside loop, continues until heading downwards at 45⁰, does a half roll followed by another inside loop. At 45⁰ downwards the model does another half roll and recovers at the same altitude and heading as the entry.

Downgrades:

1. Loops not round and the same size.
2. Flight path not at 45⁰ at the start and finish of the rolls.
3. Rolls not superimposed on centre.
4. Changes in heading during loops and rolls.

4. Three Inside Loops: The model flies straight and level then pulls up on centre and completes three inside loops recovering at the same altitude and heading as the entry.

Downgrades:

1. Loops not same size and superimposed.
2. Wings not level.
3. Changes in heading during loops.

5. Slow Roll: The model starts in straight and level flight, then rolls slowly through one complete rotation, equally spaced about the centre marker. The model recovers on the same altitude and heading as the entry. The approximate time of the roll is to be three to five seconds.

Downgrades:

1. Changes in heading.
2. Changes in altitude.
3. Roll rate not constant.
4. Model does not roll exactly 360 degrees.

6. One Outside Loop: The model flies straight and level then half rolls to inverted, then pushes up into a single outside loop on centre, recovering in level flight inverted. There is then another pause; the model half rolls to upright and the manoeuvre is completed.

Downgrades:

1. *Loop not round.*
2. *Wings not level.*
3. *Changes in heading during loop or half rolls.*
4. *Half rolls not exactly 180 degrees.*
5. *Model pauses for more than one second before and after the loop.*

7. Three Horizontal Rolls: The model starts in straight and level flight then rolls at a uniform rate through three complete rotations, finishing in level flight on the same heading and altitude as the entry. The model should pass through centre inverted during the second roll. The approximate time of the rolls to be three to five seconds.

Downgrades:

1. *Changes in heading.*
2. *Changes in altitude.*
3. *Roll rate not constant.*

8. Three Turn Spin: The model establishes a heading and with reduced power, the model is held in a slightly nose high attitude until it stalls and commences to spin. The model auto rotates through three complete turns, pauses in a nose down attitude, then recovers on the same heading but at a lower altitude than the entry.

Downgrades:

1. *Entry not level.*
2. *Snap roll at entry (scores zero).*
3. *Does not make three turns. Less than 2½ or more than 3¼ turns scores zero.*
4. *Spiral dive more than ½ turn scores zero.*
5. *Entry not on centre.*

Note: If initial entry to a spin is not smooth or the spin itself is jerky and uncertain, this is not a reason for downgrading, it is an indication that the spin is a true spin. A spiral dive is indicated by its smoothness and increasing airspeed. During a spin the airspeed does not increase appreciably.

9. Rectangular Approach: The model flies into wind over the landing circle in straight and level flight and completes an approach for the landing consisting of four clearly defined 90° turns and four straight legs, the first two legs to be flown at constant altitude. During the third 90° turn (onto the base of the second cross-wind leg) the model must commence a gradual descent which must remain constant throughout the rest of the approach. A landing must be off the approach or a zero will be given for any subsequent landing.

Downgrades

1. *Turns not exactly 90 degrees.*
2. *Straight legs not well defined.*
3. *Changes in altitude prior to the third leg*
4. *Descent not constant*

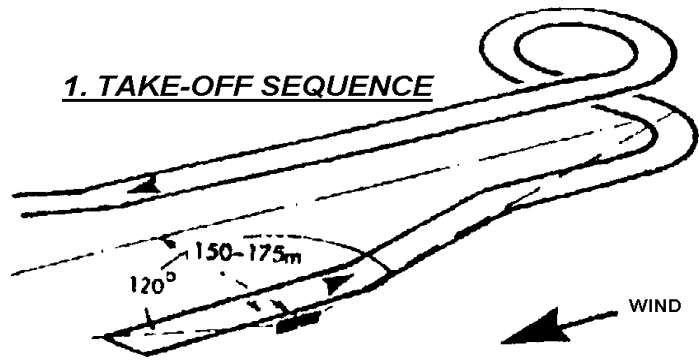
10. Landing: This is a continuation of the rectangular approach and is judged from a height of about two metres. The model flares smoothly to touch the ground in the landing zone with no bounces or changes in heading and rolls to a stop.

Downgrades

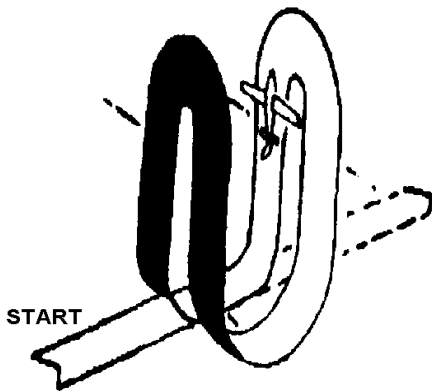
1. *Descent not constant.*
2. *Model does not flare and touch down smoothly.*
3. *Landing not within the defined landing area.*
4. *Changes in heading during the descent or roll out.*

**NZMAA
SPORTSMAN
PATTERN**

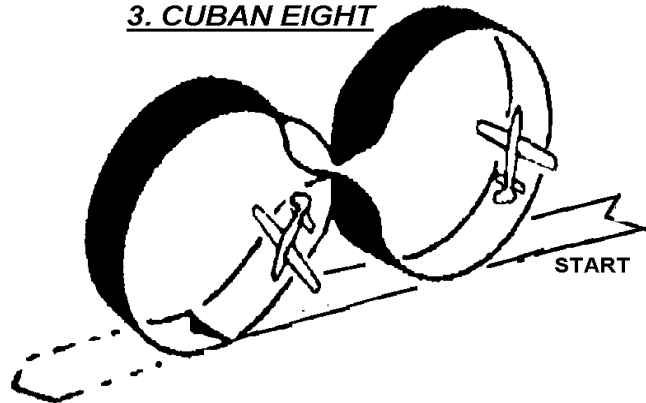
1. TAKE-OFF SEQUENCE



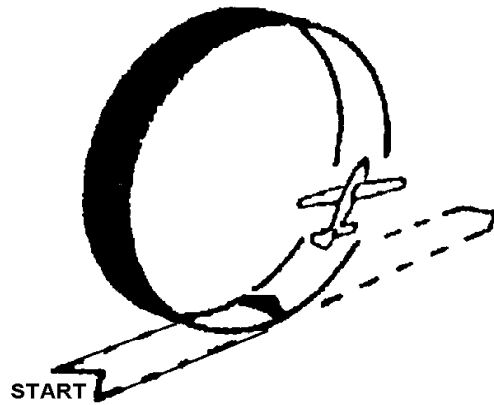
2. DOUBLE STALL TURN



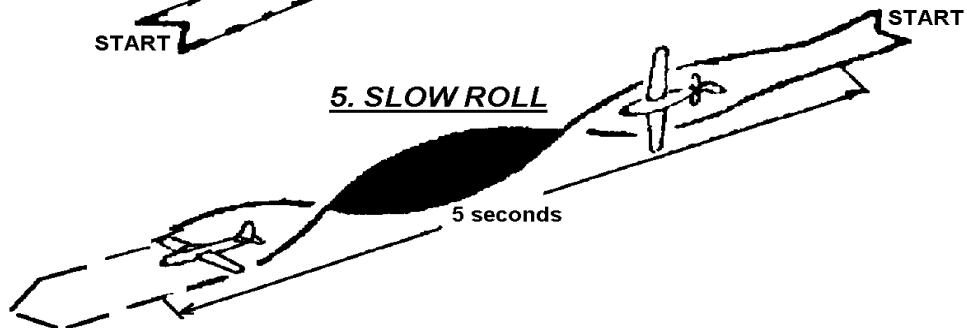
3. CUBAN EIGHT



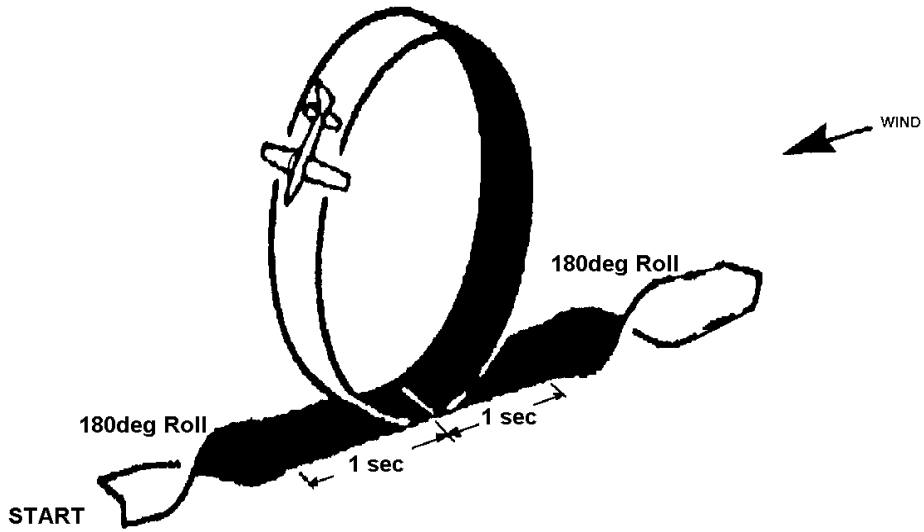
4. THREE INSIDE LOOPS



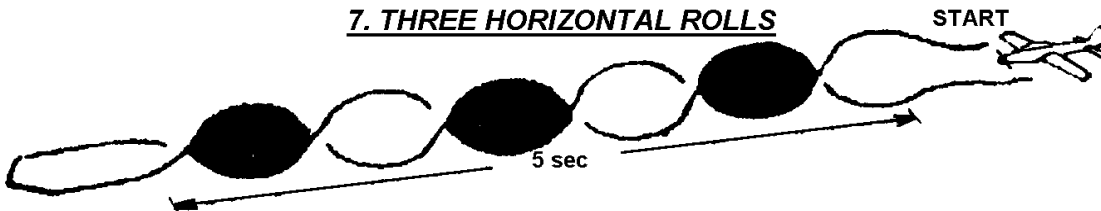
5. SLOW ROLL



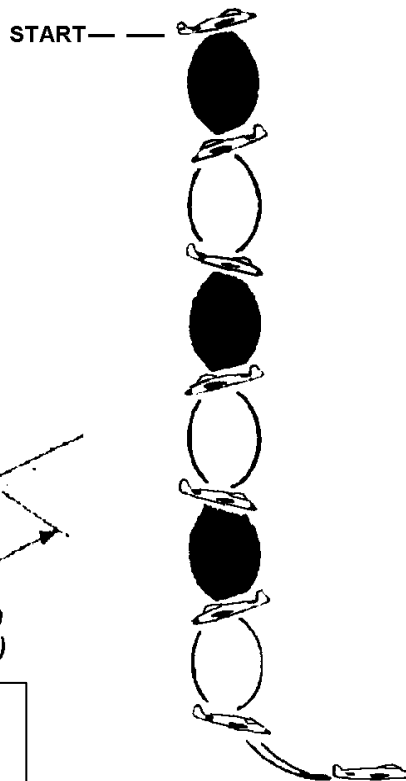
6. ONE OUTSIDE LOOP



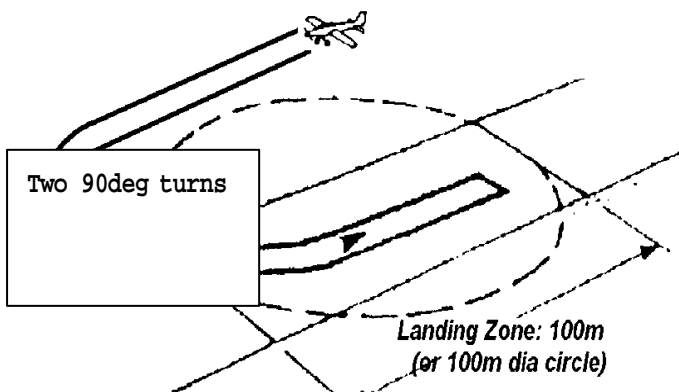
7. THREE HORIZONTAL ROLLS



8. THREE TURN SPIN



9/10. APPROACH & LANDING



Note: Approach starts into wind.
Drawing above is shown after first two 90deg turns have been completed

4. ADVANCED (Note that the FAI guidelines also apply)

4.1 Schedule

1. Take-Off Sequence: The model 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 turns 270 degrees for a downwind trim pass. When approximately even with the downwind marker, the model initiates a 180 degree turn, reversal, or other turn around manoeuvre of pilot's choice

Downgrades:

1. Model does not follow the take-off sequence; zero points.

Note: Only two scores, a zero or a ten, may be awarded for the take-off sequence.

2. Square Loop: The model flies straight and level, into wind, past centre and pulls up into an inside square loop.

Downgrades:

1. Loop not square.
2. Corners not of equal radius.
3. Changes in heading.
4. Wings not level.

3. 1/2 Reverse Cuban Eight: Model pulls up 45 degrees, does a half roll, then completes a three-quarter inside loop.

Downgrades:

1. Model not at 45 degrees before and after half roll.
2. Changes in heading during half roll.
3. Half roll not on centre of 45 degree line.

4. Slow Roll: Model rolls slowly through one complete revolution, left or right

Downgrades:

1. Changes in heading.
2. Changes in altitude.
3. Roll rate not constant.
4. Model does not roll exactly 360 degrees.

5. 1/2 Square Loop With 1/2 Roll In Vertical: Model pulls vertical, executes a half roll then pushes to recover in level flight at a higher altitude than entry.

Downgrades:

1. Wings not level during 1/2 loops.
2. Flight path not vertical at start and finish of 1/2 roll.
3. Roll not exactly 180 degrees.

6. Reverse Top Hat (Push Pull): From level flight, the model pushes, before the centre line, to vertical downward flight path then pulls to level flight, flies through the centre then pulls again to vertical upward flight path and pushes over the top to level flight at the same height as the entry.

Downgrades:

1. Vertical and horizontal legs not the same length.

2. Model does not fly straight and level upright.
3. Corners not of equal radius.

7. **½Square, ½Roll Down:** Model pushes vertical, executes a half roll then pulls to recover in level flight at a lower altitude than entry.

Downgrades:

1. Wings not level during ¼loops.
2. Flight path not vertical at start and finish of ½roll.
3. Roll not exactly 180 degrees.

8. **Four Point Roll:** Model rolls through 360 degrees, left or right, hesitating at each 90 degree point. At each hesitation, wings are parallel or vertical to the horizon.

Downgrades:

1. ¼rolls more or less than 90 degrees.
2. Model does not hesitate after each ¼roll.
3. Roll rate not constant.
4. Changes in altitude or heading.

9. **Stall Turn:** Model pulls up into a vertical flight path, stall turns through 180 degrees to a vertical dive, then pulls up to recover in level flight

Downgrades:

1. Flight path not vertical at start and finish of stall turn.
2. Stall turn not exactly 180 degrees.
3. Radius of entry and exit quarter loops not equal.

10. **Avalanche:** Model pulls up into an inside loop, at the top it executes a complete positive or negative snap roll*, recovers to complete the loop and finishes in level flight

Downgrades:

1. Loop not round.
2. Changes in heading during loop.
3. Wings not level during loop.
4. Snap roll not 360 degrees.
5. Roll not snap roll; zero.

*Note: *A snap roll is an auto rotation in the horizontal axis, the model rolls very rapidly with a nose high angle of attack (positive or negative). If the model rolls along its axis it is not a snap roll.*

11. **½Square, ½Roll on Exit:** Model executes a half inside square loop then half rolls to upright level flight.

Downgrades:

1. Wings not level during ¼loops.
2. Flight path not horizontal at start and finish of ½roll.
3. Roll not exactly 180 degrees.

12. Humpty Bump From Top (Push, ½Roll, Pull, ½Roll, Push): Model pushes to vertical, half rolls, pulls through half inside loop to vertical, performs another half roll then pushes to level flight.

Downgrades:

1. *Flight path not vertical at start and finish of rolls.*
2. *Rolls not exactly 180 degrees.*
3. *Radius of quarter loops and half loop not same.*

13. Spit S: Model half rolls to inverted, then immediately executes half an inside loop to level flight at a lower altitude than entry.

Downgrades:

1. *Changes in heading during half loop or half roll.*
2. *Half loop not immediately after half roll.*
3. *Half loop not of constant radius.*

14. Reverse Cuban Eight: Model pulls up into a 45 degree climb, half rolls, executes a ¾loop, half rolls to inverted and loops back to level flight at the same point as entry.

Downgrades:

1. *Loops not round and same size.*
2. *Flight path not at 45 degrees at start and finish of rolls.*
3. *Changes in heading during loops and rolls.*

15. Humpty Bump With Options: Model pulls up into a vertical flight path, executes a half roll (or optionally a quarter roll) up, pushes or pulls through a half loop to vertical flight path, pauses (or executes the second quarter roll) then recovers into level flight.

Downgrades:

1. *Flight path not vertical at beginning and end of half roll (or ¼ rolls).*
2. *Half roll not exactly 180 degrees (or 90 degrees for quarter rolls).*
3. *Half loop not round.*

16. Two Rolls Opposite: Model does one full roll in each direction. The second roll must immediately follow the first. Upright level flight between the rolls occurs at the centre-line.

Downgrades:

1. *Changes in altitude or heading during the rolls.*
2. *Rolls not exactly 360 degrees.*
3. *Second roll does not immediately follow the first roll.*
4. *Roll rate not constant.*

17. Immelmann: Model pulls up and completes a half inside loop then immediately half rolls to recover in level flight at a higher altitude than entry.

Downgrades:

1. *Changes in heading during half loop or half roll.*
2. *Half roll not immediately after half loop.*
3. *Half loop not of constant radius.*

18. Three Turn Spin: The model establishes a heading and with reduced power it is held in a slightly nose high attitude until it stalls and commences to spin. The model auto rotates through three complete turns, pauses in a nose down attitude, then recovers on the same heading but at a lower altitude than the entry.

Downgrades:

1. *Entry not level.*
2. *Snap roll at entry scores zero.*
3. *Does not make three turns. (Less than 2½ or more than 3½ scores zero.)*
4. *Spiral dive more than ¼ turn scores zero.*

Note: If initial entry to a spin is not smooth or the spin itself is jerky and uncertain this is not a reason for downgrading; it is an indication that the spin is a true spin. A spiral dive is indicated by its smoothness and increasing airspeed; during a spin the airspeed does not increase appreciably.

19. Landing Sequence: At reduced power, the model executes a 180 degree level or descending turn to a downwind heading, flies a downwind leg, then turns 180 degrees into the wind. Model flies a descending approach to the runway to touch the ground in the landing zone. The landing sequence is complete when the model has either rolled 10 meters or comes to rest. The landing zone is designated by a circle of 50 meters radius, or by lines across a standard runway spaced 100 meters apart where the runway is at least 10 meters wide.

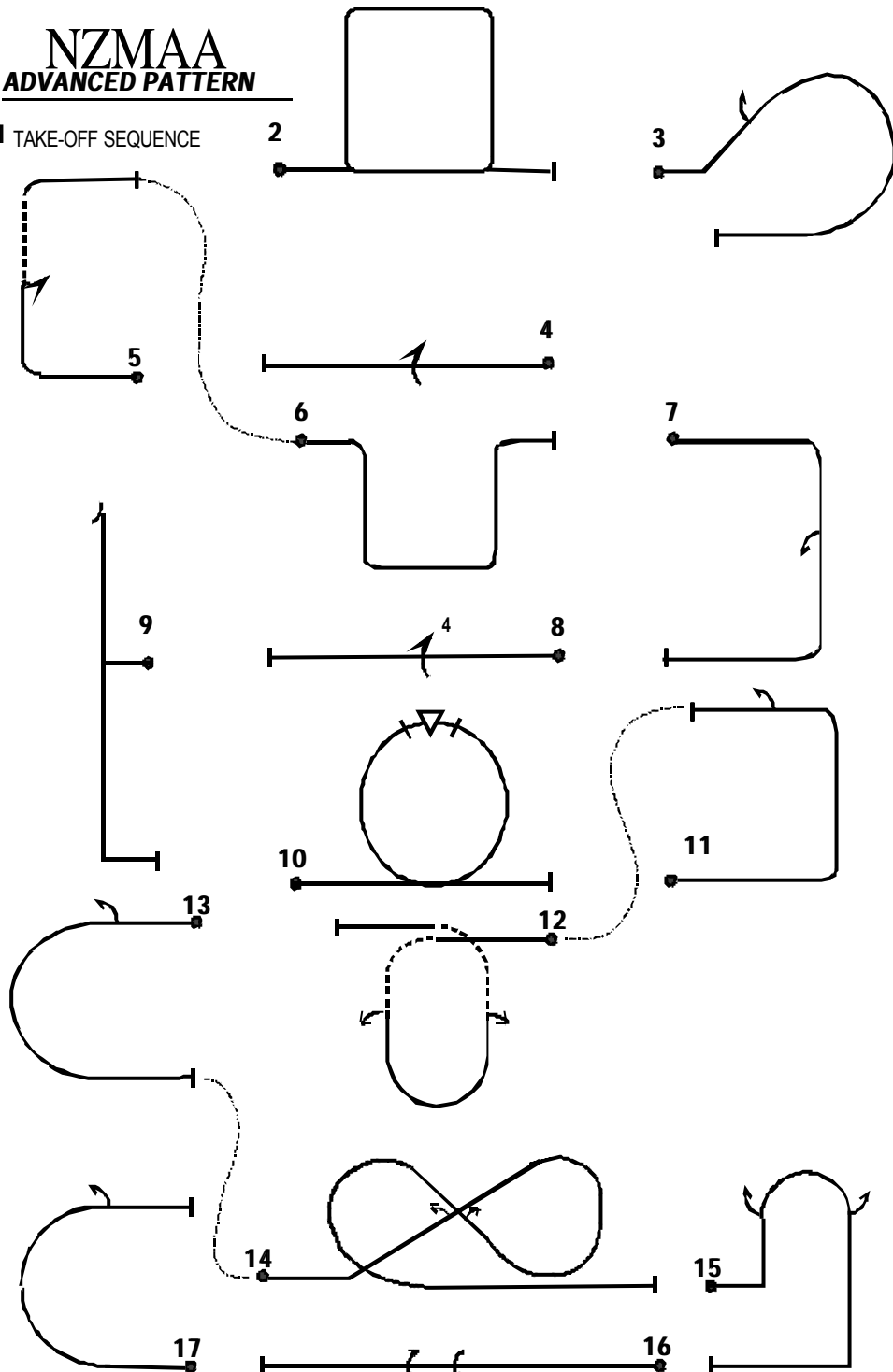
Downgrades:

1. *Model does not follow landing sequence, zero points.*
2. *If any landing gear leg retracts on landing, zero points.*
3. *If model lands outside the landing zone, zero points.*

Note: Only two scores, a zero or a ten, may be awarded for the landing sequence.

**NZMAA
ADVANCED PATTERN**

1 TAKE-OFF SEQUENCE



- | | |
|--------------------------|----------------------|
| 1. Take-Off Sequence | 10. Avalanche |
| 2. Square Loop | 11. 1/2 Sq, 1/2 Roll |
| 3. 1/2 Reverse Cuban 8 | 12. Humpty Bump |
| 4. Slow Roll | 13. Split S |
| 5. 1/2 Sq, 1/2 Roll | 14. Rev Cuban 8 |
| 6. Rev Top Hat | 15. Humpty Bump |
| 7. 1/2 Sq, 1/2 Roll down | 16. 2 Rolls Opposite |
| 8. 4 Point Roll | 17. Immelmann |
| 9. Stall Turn | 18. 3 Turn Spin |
| | 19. Landing Sequence |

19 LANDING SEQUENCE

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