RADIO CONTROL PRECISION AEROBATICS
RULE BOOK
2016 - 17

Forward

The Radio Control Precision Aerobatics rulebook has been updated to reflect changes made to the rules by both FAI (found at www.fai.org/fai-documents) and the Precision Aerobatics Committee. This is the official document governing Precision Aerobatics in Canada.

The intent to any set of rules is to have a pre-determined guideline by which you can attend an event and reasonably know what to expect. If the rules are such that they are unreasonable or unmanageable then there is a pre-determined path to change or update those rules to reflect what the group of persons who utilize them needs.

The content of this rulebook is only as effective as the ability and dedication of its users to understand and apply its regulations. It is not perfect, but it should reflect the actual practice of Radio Control Model Aerobatics in Canada. Should you have any questions or suggestions to enhance the rules or the book, contact your local committee member or the Chairman.

Canadian Advanced and Masters pattern schedules follow the American schedules and are on a two-year cycle. Our Sportman and Intermediate schedules do not follow the American schedules. They are changed on an as-needed basis and, for the 2016-2017 year, will remain unchanged.

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PART A: F3A R/C AEROBATIC POWER MODEL AIRCRAFT

Section 1: General Rules

1.0 Scope of Rules

These rules are published by the Precision Aerobatics Committee of the Model Aeronautics Association of Canada. They define the standard by which contests held in Canada should be operated.

For these rules to be effective as a standard, the Contest Director should do his/her best to apply the rules to their Precision Aerobatics contest. Particularly at MAAC sanctioned contests, if these rules are not to be applied then the advertising for the contest should reflect the changes that will be made.

Section 2: Contest Operation provides a guideline for the operation of contests. There should be some flexibility, which will allow a smaller local contest to proceed without being bound to the more rigid format of a larger, or FAI competition.

1.1 Competitor Eligibility

All pilots at MAAC Charter Clubs are required to produce a valid membership card for either MAAC or AMA. These numbers must be recorded on the entry form of the contestant.

Should a competitor turn up without proof of valid membership in either MAAC or AMA they may be enrolled on the spot by a MAAC Charter Club. The appropriate membership forms are available from MAAC and can be sent with your Sanction forms should you request it. When the competitor completes the application for membership and pays the fee the Contest Director should co-sign the form noting the time and date of the application.

Should a MAAC member turn up without proof of membership, this application process should be completed and upon receipt of the application MAAC HQ will return the check to anyone who is already a member. This process will protect both the member and the club in the event of an unplanned incident.

1.2 Characteristics of Radio Controlled Aerobatics Models

1.2.1 Definition of Radio Controlled Power Model

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

1.2.2 Prefabrication of the Model

No restrictions.

1.2.3 Construction Parameters of the Model

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 utilized except those requiring solid propellants, gaseous or liquefied gaseous fuels. Electric powered models have no restriction on voltage or current for the propulsion circuit. Model aircraft using electric motors, as a power source, shall be weighed without batteries used for those motors.

1.2.4 Noise Restrictions

The maximum noise level will be 96 dB measured at three meters from the centerline of the model placed on the ground at the flying site. With the model running at full power, measurement will be taken 90 degrees to the flight path on the right hand side, downwind from the model. 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 three meters to the model or microphone. The noise measurement will be made prior to each flight.

In the event that a model 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 shall be impounded by the flight line official immediately following the flight. No modification or adjustment to the model shall be permitted (other than refueling). The model shall be re-tested by a second noise steward using a second noise meter and in the event that the model fails the re-test, the score for the preceding flight shall be 0.

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.

The equipment used for measurement should comply with International Electronic Commission on document No. 179, "Precision Noise Level Instruments".

1.2.5 Radio Equipment

Radio Equipment shall be of the open loop type (i.e., no electronic feed-back from the model to the ground). Autopilot control utilizing inertia, gravity or any type of terrestrial reference is prohibited. Automatic control sequencing (preprogramming or automatic control timing devices are prohibited.

Examples:

Permitted:

a) Control rate devices that are manually switched by the pilot.

b) Any type of button or lever control that is initiated and terminated by the pilot.

c) Manually operated switches to couple control functions.

Not Permitted:

a) Snap buttons with automatic timing mode.

b) Preprogramming devices to automatically perform a series of commands.

c) Autopilots or Gyro devices for any automatic controls or functions.

1.2.6 Identification of Model

All models entered in a Radio Control Precision Aerobatics competition shall be identified by the contestant's MAAC (or AMA) number permanently attached in an easily visible location on the model. Both stroke and width shall be such as to be readily recognizable.

1.2.7 Number of Aircraft

The contestant may enter two aircraft and fly either one as he sees fit. Radio equipment and engine may be changed at any time. This means that a contestant may bring two aircraft to the ready line for an official attempt - providing the second aircraft is on a frequency consistent with the flight line in question. Substitution of the second aircraft must be one within the three minute starting time.

1.3 Safety Requirements

Consideration of safety for spectators, contest personnel and other contestants is of the utmost importance in this event, and the following safety provisions must be observed.

1.3.1 General Inspection

All models must pass a general safety inspection by the Contest Director or his representative before they are allowed to compete.

1.3.2 Control of Aircraft

If any part of a manoeuvre is performed over a controlled spectator area, pit area, parking area, etc., the contestant shall receive a zero score for that manoeuvre. Continued flying of any sort over a controlled spectator area, pit area, parking area, etc., shall result in the flight being disqualified by the judge(s) provided the contestant has been warned at least once.

Inability to control the aircraft on the ground, or dangerous flying of any sort, or poor sportsmanship of any kind shall be grounds for disqualification of the aircraft of contestant involved.

1.3.3 Propellers

Either acorn type nuts or spinners with a minimum radius of 1/8" shall protect all propeller shafts.

Metal propellers are prohibited.

1.4 MAAC Radio Control Precision Aerobatics Progression System

Competitors may move up from one class to the next higher class at any time they desire. A competitor may not move back a class unless s/he has not placed 1st, 2nd or 3rd in any contests for 1 full year, at which time s/he may move back 1 class only. A competitor may not move back a class more than once every three full years.

Section 2: Contest Operation

This section contains the guidelines for running a Precision Aerobatics Contest.

Section 2.0 contains the general rules for how to run your contest. Section 2.1 is specific to a Team Trial, and Section 2.2 contains suggestions for setting up your field.

2.0 General Contest Operations

This section contains the generic rules that will apply to all contests run in Canada. These are meant as a guideline and are subject to local conditions.

In the event of a conflict between rules, the rule specific to the level of the contest will take precedence.

2.0.1 Number of Helpers

Each pilot is allowed two helpers. One may be present during start of motor, to carry airplane out, and to retrieve airplane, while the other calls the manoeuvres.

2.0.2 Definition of an Attempt

There is an attempt when the competitor is given permission to start and:

a) When the pilot announces the takeoff manoeuvre;

b) When the model fails to commence the takeoff manoeuvre within the 3 minutes allowed for the competitor; and

c) If the motor stops after the pilot has announced the start of takeoff and before the model is airborne, it may be started (within the 3-minute period). However, no points will be awarded for the subsequent takeoff manoeuvre.

2.0.3 Number of Attempts

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

An attempt can be repeated at the judge's (or CD's) discretion only when for any unforeseen reason outside the control of the competitor; the model fails to make a start. (e.g. There is radio interference.)

When a flyer is instructed to land the aircraft during a flight by the Contest Director or his/her representative for reasons outside the control of the competitor, it shall be the competitor’s decision whether to start the entire flight over or to continue from the point of the last completed and judged manoeuvre.

2.0.4 Definition of an Official Flight

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

2.0.5 Marking

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

Landing outside the landing zone is considered unsafe and will be penalized with the loss of 10 points from the flight score for each counting judge.

Note: The landing zone may be designated by:

a) A circle of 50 meters (165 feet) radius, or

b) Lines across a standard runway spaced 100 meters (328 feet) apart, where the runway is at least 10 meters (32 feet) wide.

If any manoeuvre is not completed as described or is unrecognizable as described, the manoeuvre shall receive a score of zero.

In Sportsman, the scoring is 10 for each manoeuvre with no K factor. For Intermediate, Advanced, Expert and FAI, the scoring is 10 for each manoeuvre with K factors as indicated on the manoeuvre lists.

If two or more judges are used, all scores are added together for each manoeuvre then multiplied by the K factor where applicable. If 4 or more judges are used, then the high and low scores are discarded and the remaining scores are added for each manoeuvre and multiplied by the K factor where applicable.

In all classes, the manoeuvres must be flown in the order as listed on the score sheet. Manoeuvres flown out of sequence will receive an automatic ZERO score.

Manoeuvres not flown as marked (i.e., two loops instead of three) will receive an automatic ZERO score.

2.0.6 Marking Sportsman

Each manoeuvre may be awarded marks between 0 and 10 by each of the judges during flight. Any manoeuvre not completed should be scored 0.

In Sportsman, two dead passes are allowed in addition to the one after takeoff and the one before landing.

The pilot or his/her helper must announce the beginning and completion of each manoeuvre.

2.0.7 Marking Intermediate, Advanced, Masters and FAI

With the exception of FAI, each manoeuvre may be awarded marks between 0 and 10 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 should be scored 0. All marking for FAI is governed by the FAI sporting code, which can be found on the FAI website at http://www.fai.org/fai-documents.

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.

Each judge gives a mark for each manoeuvre during a flight. Assuming the highest mark 10 at the start of each manoeuvre, every defect is subject to downgrade of the mark in whole numbers (or in half numbers for slight defects, but in sum resulting in up-rounded whole numbers). For example, if the score is 6.5 the scoring will be rounded to 7.0. The judge will have the option of rounding or can record the score with the half point and the scoring program will round the number up.

Center manoeuvres should be performed in the center of the manoeuvring area while turnaround manoeuvres should not extend past a line 60° left or right of center. Vertical height should not exceed 60 degrees.

Manoeuvres should be performed along a line a flight not more than approximately 150 meters in front of the judges. Infractions of this rule will be cause for downgrading by each judge individually and in proportion to the degree of infraction.

The maneuvering area will be clearly marked with white vertical poles, a minimum of 100 mm. in diameter and a minimum of 4 meters high, placed on center and 60 degrees each side of center on a line 150 meters will also be used to mark the extreme limited (60° left and right of center) of the manoeuvring zone. Audible or visual signals to indicate violations of the manoeuvring zone are NOT to be employed.

The judges should be seated not more than 10 meters 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 score the model for in-flight noise level, indicating if the model is too noisy, the flight score will be penalized 5 points for each counting judge.

Note: The above paragraph is optional at local contests and should be advertised if it to be imposed.

2.0.8 Pilot's Briefing

The Contest Director should review and comment on all of the following items:

a) Local rules, safety, spectator's area;

b) Review list(s) of flyers/judges, if applicable;

c) Define the number of attempts per round for all classes;

d) State the time limits in effect for all classes;

e) If fly-offs are to be held, CD to review and comment;

f) Time allowed between flights;

g) Dead pass rule.

2.0.9 Field Procedures and Flight Line Rules

The procedures listed in Section 2.0.9 are suggestions that may be altered at the discretion of the event director or CD to suit local conditions.

All contestants shall be set up in a "Pit Area" assigned by C/D so that they may be under his immediate control.

There will be no testing of transmitters during the flying period of the contest except that which has the approval of the C/D. Any unauthorized use will be grounds for immediate disqualification of the person involved.

It is strongly suggested that the C/D impound, in an appropriate area, the contestant's transmitter prior to the commencement of flying. Should a contestant register after flying has commenced, his transmitter should be impounded at the time of registration. All transmitters are to be re-impounded after each flight.

The flight line order shall be determined by the position of contestants' names on a flight list(s) maintained by the flight line coordinator(s). The list(s) shall include all classes and frequencies as are necessary. The contestant shall have his name on the list only once at any one time, unless scale is being flown from the same flight list. Since many contestants act as mechanics for other contestants, positions between contestants may be traded only once (with the approval of the compatibility of adjacent contestant frequencies). In an effort to speed up the flight lines, the frequencies will be distributed as evenly as possible between flight lines; in addition, (wherever possible), contestants with identical frequencies will not follow each other on the flight line in question but rather, will be separated by a contestant on a different frequency.

Unless stated otherwise, at the pilot's briefing session at the start of the contest, the flight line list shall carry over from day to day. Contestants will obviously not be listed on the flight line in order of entry; preference (low on the flight line list or as requested) should be given to flyers that pre-register in order of receipt of entry forms.

No flight line information shall be posted until it has been seen and checked by the CD.

The flight line coordinator should carry out the following procedure:

a) Numbers 1, 2, and 3 on the flight list should be in ready boxes with their aircraft, equipment and one helper if desired.

b) As each flight is completed, each contestant shall move his aircraft to the next lower "ready box" number. When ready, box No. 1 is vacated by the contestant going to fly.

c) The flight line coordinator will then fill No. 3 box from his flight list and warn the next contestant to get ready.

d) It is strongly recommended that two flight lines and lists be used.

e) Should a contestant oppose flying simultaneously with another, he may only change position at the discretion of the flight line coordinator. The flight line coordinator's decision shall be final.

f) Should a contestant not be ready to fly when his turn comes up, he may lose the flight of the round in question, subject to the discretion of the C.D. Contest Directors and flight line coordinators should discourage the habit of allowing a flyer "to drop to the bottom of the flight line', as this wastes time and disrupts the order of the flight line sequence.

There shall be no limit on the number of flights (other than that imposed by time available.

Flying shall be done in the area of sky as designated by the CD or judge(s): wind, sun, other flight line, spectator's area, etc., shall be taken into consideration.

2.0.10 Score Sheets

It is mandatory that score sheets be used so that the score for each individual manoeuvre may be recorded.

No scores can be changed after a score has been entered and the flight has ended.

The score sheets must be returned to the contestant after the total score has been recorded. This will allow him to see how well he has done each manoeuvre in the eyes of the judges. (He may also check the score sheet for errors and comments.)

Flyers are not permitted to have the score sheet in their possession from the time the flight commences until the scores have been entered or tabulated.

Any disputes regarding the scoring of a manoeuvre should be brought to the attention of the CD immediately after they are noticed.

Incorrect totaling of the score must be brought to the attention of the recorder immediately.

When computer scoring is used it is recommended that the tear away portion of the score sheet be attached to the raw score printout. This will ensure the scores on the score sheet match the scores in the computer.

2.0.11 Officials

The recommended officials for a contest are as follows:

a) Contest Director

b) Recorder (for entries and scores) One recorder for each judge for Intermediate, Advanced, Expert and FAI classes.

c) Transmitter Controller (for impounding area)

d) Flight line coordinator

e) Three judges per flight line (2 or more)

f) One timekeeper per flight line

g) One runner per flight line (to transport scores from judges to recorder)

h) Enough people to relieve and rotate each other

If flyer/judges are to be used, the flyers that are selected to judge will be notified when and where they are to judge via a list posted in a prominent location before the start of the first round. Except in the instance of a valid excuse, failure to judge, or late arrival for the start of a round, could be reason for disqualification. Flyers unable to judge should so indicate in writing when registering.

2.0.12 Disputes

Any grievances must be brought to the attention of the C.D. or his representatives immediately. His decisions or interpretations are final. If a contestant is not satisfied with a decision, he may write to the R/C Precision Aerobatics Committee Chairman, giving full details, so that further rules, changes, interpretations, etc., may if necessary, be incorporated into the rule book.

It is realized that due to unforeseen circumstances, problems do arise at a contest; in such cases the C.D. of that contest has the final say. This type of problem should be noted in the CD's report and decision made.

If a Contest Director fails to file a report of a contest within two weeks from the date of the contest, his Contest Director's license shall be revoked.

A copy of the Contest Director's contest report must be sent to the R/C Precision Aerobatics Committee chairman.

2.0.13 Late Arrival

Should a contestant enter late and have missed a flight (or round), he/she may not pick it up.

2.0.14 Fly-Offs

Where the winners of a Precision Aerobatic competition are to be determined by final fly-offs involving contestants that qualify in earlier round, the C.D. or event directors shall clarify the following points at the pilot's briefing session before commencement of the qualifying rounds:

a) How many pilots will qualify for the fly-offs.

b) In the event of a tie for the last qualifying position: Ties are broken by the next highest flight score, not already used in the calculations of placings.

c) In the event one or more of the qualifiers decides not to fly or is unable to fly in the fly-offs, these remaining qualifying positions will NOT be filled by non-qualifying contestants.

d) The minimum number of rounds to be flown and the manner in which winner will be selected – best 1 of 1, 1 of 2, 2 of 2, 2 of 3, 3 of 3, etc.

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

2.0.16 Scoring

For scoring of PA contests with 4 or less rounds, best 3 scores will be used to determine standings. When there are more than 4 rounds, the best 4 scores will be used to determine standings. Note: a minimum of 3 rounds must be completed to make a contest official.

2.1 Team Trials

2.1.1 The Team Trials is a contest, which is used to select the pilots who will represent Canada in Official International Competitions sanctioned by the FAI. The Canadian Team Trials follow the current FAI Preliminary (P-xx) round for choosing the Canadian National Team.

2.1.2 The deadline for registrations for any Team Trials competition will be a minimum of 30 days prior to the date of competition. The Contest Director for any Team Trials competition will email the list of competitors to all registered competitors and the Pattern Committee Chair at least two (2) weeks prior to the competition.

2.1.3 Judging requirements will be left at the discretion of the CD, however no less than 3 judges will be utilized.

2.1.4 The current Preliminary schedule as defined in the FAI Sporting Code will be used at the Team Trials competition in the above format. To ensure continuity with International Competition and prove an ability to meet such criteria, the rules specified in the FAI Sporting Code will be strictly adhered to.

2.1.5 The inability to meet any of the FAI Sporting Code rules at a Team Trials will be documented in detail and forwarded to MAAC headquarters and the Chairman of the Precision Aerobatics Committee.

2.1.6 FAI - F3A team members must qualify previous to the Team Trials, by competing in 4 qualifying events. The qualifying events will be in a 2-year period preceding the team trials, with no less than 1 event in each year. A qualifying event is a MAAC sanctioned Precision Aerobatics event with a minimum of 3 FAI pilots, and excludes the Team Trials. The onus is on the individual competitor to prove he/she has met this requirement to the Team Trials contest director at the time of the Team Trials.

The qualification for the Team Trials may be waived for a pilot who is unable to meet the qualification standards but believes they have sufficient experience to attend the Team Trials. The pilot who wishes to attend the Team Trials without proper qualification must submit a letter detailing their reasoning to be allowed to participate to the committee chairman at least two months prior to the event. The committee chairman shall respond with his/her decision in writing no later than one month prior to the event.

2.1.7 The Contest Director is to complete a CD's Report and forward a copy to MAAC headquarters and the Chairman of the Precision Aerobatics Committee within 10 days of the conclusion of the contest.

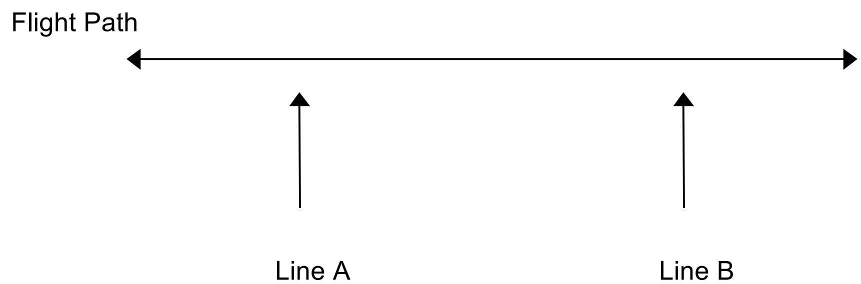
2.1.8 The team can be comprised of 3 open members and 1 junior. All pilots are considered 'Open'. 'Junior' are young pilots as defined as per FAI rules for the applicalbe world championship.

2.1.9 At the team selection event, the top 3 (or 4 if sufficient junior and open members are participating) will form the team regardless of finish order. The remaining highest finishing open or junior pilots will be considered reserve pilots should one or more team members be unable to attend.

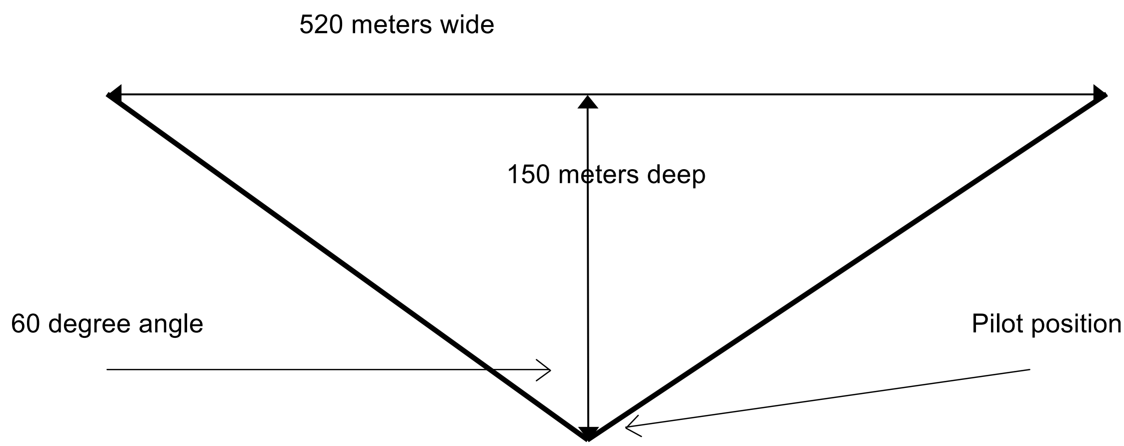
2.1.10 The Team Manager will be selected by the team pilots at the earliest possible time after the Team Trials.

2.2 Field Setup

It is suggested that contest directors be prepared to operate two flight lines. In the event that both are not needed the CD can decide which is to be used.



Turnaround flight is performed in a box, which is approximately 520 meters wide and 150 meters deep. It is a good idea to mark the two lines running at 60 degrees from the apex in a contrasting color to allow the pilot, who stands at the apex, the ability to visualize the edges of the box.



2.3 Judge and Recorder Positioning

Judges are required for all events. Most judges will desire to have a recorder so as not to miss something that happens in the sky while writing down the previous score. Use the appropriate number of judges and recorders as suits you conditions.

Judges should be positioned about 5 to 15 feet behind the pilot and mechanic, inside a triangle, which would be prescribed by extending the lines denoting the ends of the box. They should be close enough that they can hear the mechanic call the manoeuvres, but far enough away that the pilot and mechanic cannot hear the score for each manoeuvre passed to the recorder.

This diagram is a guide. Adjust the actual positioning to suit your local needs.

	P			P	
	M			M	
J	J	J	J R	J R	J R
R	R	R			

2.4 Transmitter Impound

Although a transmitter impound is not a requirement, most CD's would not consider running a contest without using one. Even with an impound in force during your contest, it is a good idea for the impound attendant to utilize a standard MAAC Frequency Control Board to track the frequencies in use.

The attendant should also have a copy of the flight rotation to allow him to identify a frequency conflict before it arrives. Usually with only one flight line this would not be a problem, however when using more than one flight line it is common to have to make the occasional shift in flight order due to frequencies.

Section 3: Judging Guidelines

3.0 Purpose

The purpose of this 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 standard of judging.

3.1 Principles

The principles of judging an aerobatic model should be based on the perfection with which the model executes the aerobatic manoeuvres as described in Annex 5A. The main principles used to judge the degree of perfection are:

a) Precision of the manoeuvre.

b) Smoothness and gracefulness of the manoeuvre.

c) Positioning or display of the manoeuvre.

d) Size of the manoeuvres relative to the maneuvering 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.

3.2 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 contest. It is advisable for the contest director or the organizer to hold a conference prior to the start in order to discuss judging and make the standards as uniform as possible. This is effected by means of 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 defects. Once the contest is started, the individual judge should 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.

3.3 Criteria for Judging Manoeuvres

In Section 5.0, a description of each manoeuvre is given along with a partial listing of possible downgrades. Each manoeuvre should be downgraded according to:

a) The type of defect;

b) The severity of the defect;

c) The number of times any one defect occurs, as well as the total number of defects;

d) The positioning of the manoeuvre;

e) The size of the manoeuvre relative to the 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.

3.3.1 Attitude and Flight Path

The flight path of a model is the trajectory of its center of gravity. The attitude is the direction of the fuselage centerline in relation to the flight path.

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

3.3.2 The 1 Point/15 Degree Rule

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

3.3.3 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.

3.3.4 Lines

All aerobatic manoeuvres are started and ended by a horizontal line. When no line is flown between two manoeuvres, the upcoming manoeuvre should be downgraded by 2 points.

The total length of a vertical or climbing line, as dictated by the performance of the model, is not a grading criterion. The model's performance 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 misrelation, 1 point is subtracted; 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. If there is a complete absence of a line before or after the roll, 2 points are subtracted.

3.3.5 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 will be horizontal but for a part-loop however, such lines may be in any other plane of flight as required by the particular manoeuvre being flown.

The part-loops within one manoeuvre must have the same radius. A slight difference in radius should downgrade the manoeuvre by 1 point, while a more severe difference may downgrade it by 2 or 3 points.

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

If the loop is not flown entirely in the vertical plane, i.e. it drifts to one side, a minor drift should be downgraded by 1 point, while a more severe drift should be downgraded by several points.

In a hesitation loop, such as a square loop, higher marks should not be awarded for flying tight, high g corners. The criteria is the loop should be hesitated by a visible line the defined number of times and all part-loops should have the same radius.

3.3.6 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 should be downgraded by 1 point, while more severe variations receive heavier downgrades.

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 hesitate with equal time on each point. 1 point is subtracted for slight variations, while more severe mistiming 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 (5 or more points).

3.3.7 Stall Turns

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

The maximum allowable radius of the pivot is 1/2 wingspan. If the radius exceeds 1-1/2 wingspan, the manoeuvre is severely downgraded. If the model shows a pendulum movement after the pivot, it is downgraded by one point.

The entry and exit must consist of part-loops with even 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 criteria.

3.3.8 Rolls

A snap roll is a rapid auto-rotative roll where the model 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.

Since the model is in a stalled condition throughout the manoeuvre, the attitude and flight path must show a definite break before the rotation is started. If the stall does not occur and the model barrel rolls around, the manoeuvre is zeroed.

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

3.3.9 Spins

All spins begin and end by horizontal lines. In order to spin, the model must be stalled. The entry is flown in a near horizontal flight path with the nose-up attitude increasing as the speed decreases. The nose then drops as the model stalls. Simultaneously as the nose drops the wing also drops in the direction of the spin.

If the model does not stall or if the model is snap-rolled into the spin, the manoeuvre is zeroed.

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 near vertical downward line of visible length must be held after the rotation stops. The pull or push-out is judged like a part-loop. Remember that different models spin in different attitudes, and that the attitude is not to be taken into consideration as long as the model is stalled.

3.3.10 Loop/Roll Combinations

These manoeuvres are the most widely used turn-arounds. They are very diversified, but all are combined of loops, 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, the half roll should be flown immediately after the half loop. A visible line in between should be downgraded by 2 points.

One Half Cuban 8's and Half Reverse Cuban 8's, the roll should be placed on the middle of the line. The radius of the 1/8 loop should be the same as the 5/8 loop.

In Humpty-Bumps, the loop on the top must be of reasonable size and have a constant radius. Falling forward (or tight radius) should be downgraded.

3.3.11 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's flight path.

3.3.12 Positioning

The entire flight must be within the aerobatic zone to avoid being penalized. The middle manoeuvre should be flown with its center 90 degrees in front of the judges' line. If the manoeuvre is flown off-center, it will 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 should 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 flown past the 60 degree line would call for a minor downgrade, perhaps up to one point, while most of the manoeuvre flown past the 60 degree line should be downgraded more severely, say three or more points. Also, violations of the 60 degree line that occur near the 150 meter 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.

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

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

3.3.13 Hot-Dogging

The execution of free-style aerobatic manoeuvres or "hot-dogging" during the allowed free passes after takeoff and before landing is specifically prohibited. Contestants may manoeuvre the aircraft as necessary for trim purposes, and may employ any simple 180-degree turnaround manoeuvre of their choice to position the aircraft for landing or entry into the manoeuvring area. If, in the judges opinion, a prohibited manoeuvre has been performed during the allowed free passes the following manoeuvre shall be scored zero.

3.4 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.

A Square Rolling Loop has the first leg climbing 100 degrees. Gallops in elevation across the top, stops the vertical downward 1/2 roll 15 degrees too early, corrects it, and ends up 15 degrees to one side after the bottom half roll. 10 - 1 - 2 - 1 - 1 = 5 points.

An otherwise flawless slow roll is about 45 degrees off-center. This must be considered as a severe misplacement. 10 - 4 = 6 points.

A Half Reverse Cuban 8 is started too late, and the pilot “squeezes" the manoeuvre together by flying a 60-degree line and making no line after the half roll. The manoeuvre still gets about halfway out of the zone. 10 - 1 - 2 - 3 (misplacement, going out of the zone) = 4 points.

During an inverted spin entered flawlessly, the model un-stalls and makes the final 90-degree of rotation as a vertical barrel roll. 10 - 6 = 4 points.

A competitor flies a flawless 4 Point Roll, 10 - 0 = 10 points. You will not see too many of these in a competition but the manoeuvre should be awarded a 10 if there are no flaws that would otherwise downgrade it to a 9.

Section 4: Aerobatic Sequences

4.1 F3A Sportsman

	Manoeuvre		K	Description Reference
1	Takeoff (upwind)	Upwind	1	5.1
	Enter Box		- -	
2	Straight Flight Out (upwind)	Upwind	1	5.2
3	Procedure Turn	Turnaround	1	5.3
4	Straight Flight Back (downwind)	Downwind	1	5.4
	Exit Box		- -	
	Enter Box		- -	
5	One Loop (upwind)	Upwind	1	5.5
6	One Immelmann (turn)	Turnaround	2	5.6
7	Split “S” (downwind)	Downwind	2	5.7
	Exit Box		- -	
	Enter Box		- -	
8	One Horizontal Roll (downwind)	Downwind	1	5.8
9	Half Reverse Cuban Eight (turn)	Turnaround	2	5.9
10	Cobra Without Rolls (upwind)	Upwind	1	5.10
	Exit Box		- -	
	Enter Box		- -	
11	Straight and Level Flight (downwind)	Downwind	1	5.11
12	Half Cuban Eight (turn)	Turnaround	2	5.12
13	Straight and Level Flight (upwind)	Upwind	1	5.11
14	Stall Turn	Turnaround	1	5.13
	Exit Box		- -	
	Enter Box		- -	
15	Rectangular Approach (upwind)	Upwind	1	5.14
16	Landing (upwind)	Upwind	1	5.15
			20	

4.2 F3A Intermediate

	Manoeuvre		K	Description Reference
1	Takeoff		1	5.1
2	Reverse Cuban 8	Upwind	2	5.16
3	Pull Push Pull Humpty Bump, 1/2 Roll Down	Turnaround	2	5.17
4	2 Point Roll	Downwind	2	5.18
5	Stall Turn	Turnaround	1	5.13
6	3 Inside Loops	Upwind	3	5.19
7	Half Reverse Cuban 8	Turnaround	1	5.9
8	2 Horizontal rolls	Downwind	2	5.20
9	Half Cuban 8	Turnaround	2	5.12
10	Stall turn w 1/4 rolls up and down (center manoeuvre)	Upwind	2	5.21
11	Immelmann turn	Turnaround	2	5.6
12	One Outside Loop	Downwind	2	5.22
13	Split S	Turnaround	2	5.7
14	Square Loop	Upwind	2	5.23
15	Landing		1	5.15
			27	

4.3 F3A Advanced

	Manoeuvre		K	Description Reference
1	Takeoff	Upwind	1	5.24
2	Figure M with 1/4 Rolls	Upwind	4	5.25
3	1/2 Cuban 8 with Full Roll, Exit Inverted	Turnaround	2	5.26
4	Triangle Loop with Positive Snap Roll on Top, Exit Inverted	Downwind	4	5.27
5	1/2 Square Loop, Full Roll Up	Turnaround	2	5.28
6	Cuban 8 from Top, 2 of 4 Point Roll First, Two 1/2 Rolls Reversed, Exit Inverted	Upwind	4	5.29
7	1/2 Loop from Top	Turnaround	1	5.30
8	Three Horizontal Rolls	Downwind	3	5.31
9	1/2 Square Loop, 2 of 4 Point Roll Up	Turnaround	2	5.32
10	Two Turn Spin	Upwind	3	5.33
11	Humpty Bump with Options (1/2 Roll Up or 1/4 Rolls Up and Down)	Turnaround	2	5.34
12	Slow Roll	Downwind	3	5.35
13	Top Hat, 3/4 Roll Up, 1/4 Roll Down	Turnaround	2	5.36
14	Double Immelmann with 2 Point Roll First, Full Roll Second	Upwind	4	5.37
15	1/2 Reverse Cuban 8 with 2 of 4 Point Roll	Turnaround	2	5.38
16	Four Point Roll	Downwind	4	5.39
17	Stall Turn, 1/2 Roll Up, 1/2 Roll Down	Turnaround	2	5.40
18	Avalanche	Upwind	3	5.41
19	Landing	Upwind	1	5.42
			49	

4.4 F3A Masters

	Manoeuvre		K	Description Reference
1	Takeoff	Upwind	1	5.43
2	Pyramid Loop from Top (Base at Bottom), 1/2 Roll on Both 45's, Snap Roll on Bottom	Upwind	5	5.44
3	Reverse Goldfish, 2 of 4 Point Roll on First 45, Full Roll on Second	Turnaround	2	5.45
4	Knife Edge Humpty, 1/4 Roll Up and Down, 1/2 Knife Edge Loop Across Top, Exit Inverted	Downwind	4	5.46
5	Reverse Sharks Tooth, Negative Snap Roll on 45	Turnaround	4	5.47
6	Loop, 1/2 Roll Integrated Over the Top 90 Degrees, Exit Inverted	Upwind	5	5.48
7	Humpty Bump with Options (1/2 or 1/4 Rolls Up and Down)	Turnaround	2	5.49
8	6 of 4 Point Roll, Exit Inverted	Downwind	4	5.50
9	Stall Turn, 4 Point Roll Up, 1/2 Roll Down	Turnaround	3	5.51
10	Eye Catcher with 1/2 Rolls	Upwind	4	5.52
11	2 1/2 Turn Spin	Turnaround	2	5.53
12	Bow Tie, Two 2 of 4 Point Rolls Reversed on First 45, 1 1/2 Roll on Second 45, Exit Inverted	Downwind	4	5.54
13	Stall Turn, 3/4 Roll Up, 1/4 Roll Down	Turnaround	2	5.55
14	Cobra Roll, 4 or 8 Point Rolls on 45 Degree Lines	Upwind	4	5.56
15	Top Hat, 3 of 4 Point Roll Up, 1/4 Roll Down	Turnaround	2	5.57
16	Square Loop, 1/2 Roll in Vertical Legs, 2 of 4 Point Roll in Horizontal Legs	Downwind	5	5.58
17	1/2 Reverse Cuban 8, Full Roll on 45, Exit Inverted	Turnaround	2	5.59
18	Roll Combination, 2 of 8 Point Roll, Full Roll, 2 of 8 Point Roll, All Rolls Opposite	Upwind	5	5.60
19	Landing	Upwind	1	5.61
			61	

4.5 FAI Preliminary & Final

At MAAC local competitions a minimum of 4 rounds of the current F3A Preliminary schedule "P–xx" shall be flown. The decision to fly F3A Finals schedule "F-xx" in local (i.e. non-championship or team trial events) competitions shall be left at the discretion of the CD.

Should the CD decide to fly the Finals schedule, it is suggested the format used be as follows:

- Four (4) rounds of the Preliminary schedule are to be flown on the first day of the competition.
- The highest three (3) of these four (4) rounds are to be carried over to the second day of competition.

- During the second day of competition, no less than two flights of the Finals schedule are to be flown.
- The carryover of the three highest Preliminary rounds flown, and the highest of the two Finals rounds flown are to be combined for a total of four scores to determine the winner of the event.

At MAAC National and Team Selection Competitions, the FAI class shall fly the current FAI-F3A Preliminary schedule “P-xx”. Scoring will be done as per 2.0.16.

Section 5: Description of Manoeuvres

Section 5 provides descriptions and downgrades for all manoeuvres. Beside each description is a code that indicates the sequence that uses the manoeuvre. The codes are as follows:

S - Sportsman

I - Intermediate

A - Advanced

M - Masters

All manoeuvres will start and finish in straight and level flight. Center manoeuvres will start and finish on the same heading while turn-around manoeuvres will finish on a heading 180 degrees to entry.

All manoeuvres that have more than one loop or part loop will have the loops or part loops the same diameter, similarly all manoeuvres that have more than one roll will have the same roll rate. All consecutive rolls will be at the same altitude and heading.

All manoeuvres with ½ rolls and ¼ rolls will have short pauses of equal length before and after the rolls unless noted otherwise.

Any violation of the above will be reason for downgrading in addition to the downgrades listed in the manoeuvres descriptions.

5.1 Takeoff - S.1, I.1

The model must stand still on the ground with the motor running, without being held, and must then take off. The takeoff run should be straight, the model should lift gently from the ground and climb at a gradual angle. The takeoff is completed when the model is approximately two meters from the ground.

Downgrades:

- Model does not stand still when released.
- Changes heading during takeoff and climb.
- Model jumps from ground.
- Retouches ground after becoming airborne.
- Too steep a climb angle.
- Gallops in elevation during climb.

5.2 Straight Flight Out - S.2 (Upwind)

The model will be flown in an absolutely straight and level path into the wind for three to five seconds centered in front of the judges (center line).

Downgrades:

- Deviates left or right.
- Does not hold constant altitude.
- Gallops in elevation.
- Not centered on takeoff or center line.

5.3 Procedure turn - S.3

After the Straight Flight Out, model makes a 90° turn in the direction away from the flight line and then a 270° turn in the opposite direction back to the reverse flight path of the Straight Flight Out.

Downgrades:

- First turn not exactly 90°.
- Opposite turn not exactly 270°.
- Changes in altitude during turns.
- Turns not smooth and circular.
- Does not head back over exact outgoing path.

5.4 Straight Flight Back - S.4 (Downwind)

The model flies straight and level on the same line and altitude as the Straight Flight Out.

Downgrades:

- Deviates left or right.
- Does not hold constant altitude.
- Gallops in elevation.
- Straight flight lines not the same.
- Not centered in front of Judges (center line).

Note: Each of the manoeuvres (i.e. Straight Flight Out, Procedure Turn and Straight Flight Back) should be judged as separate maneuvers.

5.5 One Inside Loop - S.5 (Upwind)

Model flies straight and level, pulls up and performs one complete loop and finishes at the same altitude and direction.

Downgrades:

- Not a smooth and level entry.
- Not round.
- Changes heading during loop.
- Exits at a different altitude.
- Exit not smooth and level or model gallops.

5.6 Immelmann Turn - S.6 (Upwind), I.11, A.7

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:

- Changes in heading during half loop or half roll.
- Half roll not immediately after half loop.
- Half loop not of constant radius.

5.7 Split S – S.7, I.13

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

Downgrades:

- Changes in heading during half loop or half roll.
- Half loop not immediately after half roll.

- Half loop not constant radius.

5.8 One Horizontal Roll - S.8 (Downwind)

Model rolls through 360° on a straight and level path.

Downgrades:

- Model varies in altitude.
- Model not level on entry or exit.
- Roll not 360°.
- Model changes heading.

5.9 Half Reverse Cuban Eight – S.9, I.7

Model pulls into a 45-degree climb, half rolls, and then executes part of a loop back to level flight.

Downgrades:

- Model not at 45 degrees before commencing half roll.
- Changes in heading in roll.
- Half roll not exactly 180°.
- Loop not round
- Half roll not on center of 45-degree line.

5.10 Cobra without Rolls - S.10 (Upwind)

Model pulls up to 45-degree upline, Push to a 45-degree downline, then pulls to recover in level Flight.

Downgrades:

- Up and Downlines not 45 Degrees
- Maneuver off center
- Radius's not equal.

5.11 Straight and Level Flight - S.11 (Downwind), S.13 (Upwind)

The model flies straight and level.

Downgrades:

- Deviates left or right.
- Does not hold constant altitude.
- Gallops in elevation.
- Maneuver off center.

5.12 Half Cuban Eight – S.12, I.9

Model pulls up and commences an inside loop, when at 45 degrees inverted model does a half roll then pulls up to recover in level flight.

Downgrades:

- Loop not round.
- Model not at 45 degrees before and after half roll.
- Changes in heading during half roll.
- Half roll not on center of 45-degree line.

5.13 Stall Turn - S.14, I.5

Model pulls up into a vertical flight path, stall turns through 180° to a vertical dive, then pulls up to recover in level flight.

Downgrades:

- Flight path not vertical at start and finish of stall turn.
- Stall turn not exactly 180°.
- Radiuses of entry and exit ¼ loops not equal.

5.14 Rectangular Approach - S.15

The manoeuvre commences with the model flying straight and level into wind over the takeoff line, a turn of 90 degrees, a crosswind leg, a second turn of 90 degrees, a downwind leg, a third turn of 90 degrees, a crosswind leg, a fourth turn of 90 degrees and straight flight towards the point of touchdown. The first three legs will be at constant altitude, the descent to touchdown will commence after the second crosswind leg. The maneuver is completed just prior to two meters from the ground.

Downgrades:

- Legs of rectangle are not straight.
- The 90° turns are not smooth, precise or sharp.
- Turns more or less than 90 degrees.
- Gallops in elevation.
- If model does not land after approach, ZERO points.

5.15 Landing - S.16, I.15

The model flares smoothly to touch the ground within the landing circle with no bouncing or changes in heading and rolls to a stop. Landing maneuver will start two meters from the ground. The landing maneuver ends when the aircraft comes to a rest or has rolled 10 meters, whichever comes first.

Downgrades:

- Model impacts the ground due to lack of flare.
- Model bounces after touchdown.
- Wings not level.
- Changes in heading.
- If model ends on its back, ZERO points.
- If any under-carriage leg retracts on landing, ZERO points.
- If any part comes off the model on landing, ZERO points.

5.16 Reverse Cuban Eight – I.2

Model pulls up into a 45° climb, half rolls, executes a 3/4 loop, half rolls to inverted and loops back to level flight at the same point as entry.

Downgrades:

- Loops not round and same size.
- Flight path not at 45° at start and finish of rolls.
- Changes in heading during loops and rolls.
- Half rolls not 180 degrees.
- Half rolls not on center of 45-degree lines.

5.17 Pull-Push-Pull Humpty Bump, ½ Roll Down – I.3

Model pulls into a vertical attitude, pauses, then pushes into a half outside loop, executes a half roll, and then recovers into level flight.

Downgrades:

- Upline and downline not vertical.
- Half loop not round and same diameter as ¼ loops.
- Half roll not exactly 180°.

5.18 2 Point Roll - I.4

Model rolls through 360º in either direction, hesitating when inverted.

Downgrades:

- ½ rolls more or less than 180º.
- Model does not hesitate after half rolls.
- Roll rates not constant.
- Changes in attitude.

5.19 Three Inside Loops - I.6

Model pulls up and executes three consecutive loops, all loops should be round and superimposed.

Downgrades:

- Loop not round.
- Loops not superimposed.
- Wings not level during loops
- Changes in heading during loops

5.20 2 Horizontal Rolls - I.8

Model rolls at a uniform rate through 2 complete revolutions in either direction.

Downgrades:

- Changes in heading during rolls
- Changes in altitude during rolls
- Roll rates not constant.
- Model does not do exactly 2 rolls

5.21 Stall Turn, 1/4 Roll Up and Down – I.10

Model pulls up into a vertical flight path, performs a 1/4 roll, stall turns through 180° to vertical, performs a second ¼ roll then pulls up to recover in level flight.

Downgrades:

- Flight path not vertical at start and finish of rolls and stall turn
- Rolls and stall turn not exactly 90° and 180° respectively
- Radiuses of entry and exit ¼ loops not equal

5.22 One Outside Loop (From the Top) - I.12

Model pushes over and executes outside loop. The one loop should be round.

Downgrades:

- Loop not round
- Wings not level during loop

- Changes in heading during loop

5.23 Square Loop - I.14

Model pulls up and executes a square loop.

Downgrades:

- Loop not square
- Sides of square not same size
- Changes in heading
- Wings not level
- Radiuses not equal

5.24 Takeoff Sequence (U) - A.1

The takeoff maneuver will be scored in one point increments from 10 to 0. The model is smoothly accelerated to takeoff speed. When flying speed is reached it gently lifts off the ground and climbs at a gradual angle. The lift off should be within one meter of center for maximum points. (Measured as one meter each side of center) The aircraft must not deviate in track during takeoff but will change heading after liftoff to maintain a straight track with the takeoff roll. The maneuver is complete when the model is approximately 2 meters (6-1/2 feet) from the ground.

It is not necessary for the model to stand still on the ground with the engine running without being held before the takeoff begins. It is also not necessary for the model to reach 2 meters in the same distance as the takeoff roll. The takeoff should not be downgraded for wing dips caused by air turbulence unless the wings are not immediately leveled.

Downgrades:

- Model jumps from the ground
- Lift off is not within one meter each side of center
- Model retouches the ground after becoming airborne
- Steep climb angle
- Model gallops in elevation during climb
- Track not maintained through completion of maneuver
- Wings not level at any time
- Throttle not smoothly accelerated
- Model passes behind the judge's line, scored zero (0) points

5.25 Figure M with 1/4 Rolls Up and Down (U) - A.2

Perform 1/4 inside loop before center to an upward vertical track (up line), hesitate, perform1/4 roll, hesitate, perform a stall turn through 180 degrees to a downward vertical track (down line), hesitate, perform 1/4 roll, hesitate, perform a half outside loop on center to a vertical track (up line), hesitate, perform 1/4 roll, hesitate, performs a stall turn through 180 degrees to a downward vertical track (downline), hesitate, perform 1/4roll, hesitate, perform 1/4 inside loop and finish in level upright flight in the same direction as the beginning of the maneuver. Bottom of center half outside loop and Entry and Exit altitudes are to be the same.

Downgrades:

- Model not level at start and finish
- Track does not become exactly vertical
- Model track not vertical at start and finish of stall turn
- Pivot radius greater than 1/2 wingspan
- Pendulum movement after stall
- Loop segments not round with same size and radius

- Rolls not centered on vertical tracks
- Under or over rotation of prescribed roll elements. Apply “One Point per 15 Degree Rule”
- Bottom of center half outside loop and entry and exit altitudes not the same
- Center half loop not an outside loop; score is zero (0)

5.26 Half Cuban 8 with Full Roll on 45, Exit Inverted (T) - A.3

From upright perform 5/8 inside loop to a 45 degree downline. On this line hesitate, perform a full roll, hesitate, and then perform a one 1/8 outside loop to level inverted flight in the opposite direction.

Downgrades:

- Loop segments not round and of equal radius
- Changes in track during loop segments or during prescribed roll
- Over or under rotation on roll elements. Apply “One Point per 15 Degree Rule”
- Loop segments not round with same size and radius
- 45 degree downline not at 45 degrees. Apply "One Point per 15 Degree Rule"

5.27 Triangle Loop with Positive Snap Roll on top, exit inverted (D) - A.4

From inverted flight, perform 1/8 outside loop to a 45 degree upline, hesitate, perform 3/8 outside loop to level flight, hesitate, performs a positive Snap Roll, hesitate, perform 3/8 outside loop, hesitate, perform 1/8 outside loop to level inverted flight at the same altitude as entry.

Downgrades:

- Upline and/or downline not 45 degrees
- Upline and downline not of equal length
- Loop segments not round and of equal size and radius.
- Roll elements not centered on line
- Over or under rotation of prescribed roll. Apply “One Point per 15 Degree Rule”
- Changes in track during loop segments

5.28 Half Square Loop with Full Roll Up (T) – A.5

From inverted flight, perform 1/4 outside loop to a vertical track (up line), hesitate, perform a full roll, hesitate perform 1/4 outside loop to recover in level upright flight in the opposite direction as entry at a higher altitude.

Downgrades:

- Corner loop segments not of equal radius
- Model upline track not vertical before and after prescribed roll
- Prescribed roll not on middle of vertical line
- Over or under rotation of roll element. Apply “One Point per 15 Degree Rule”
- Changes in track in loop segments or during prescribed roll
- Roll rate not constant

5.29 Cuban 8 from Top, 2 of 4 Point Roll First, Two 1/2 Rolls Reversed Second, Exit Inverted (U) – A.6

From upright, perform 5/8 outside loop to a 45 degree upline. On this line, hesitate, perform a 2 of 4 point roll, hesitate, perform 5/8 outside loop to a 45 degree upline. On this line hesitate, perform two 1/2 rolls reversed, hesitate, perform 1/8 inside loop to level inverted flight.

Downgrades:

- Loop segments not round and of equal radius
- Changes in track during loop segments or during prescribed roll
- Roll elements not centered on 45 degree downline
- Over or under rotation of snap roll. Apply “One Point per 15 Degree Rule”
- 45 degree downline not at 45 degrees. Apply "One Point per 15 Degree Rule"
- Half rolls not opposite; score is zero (0)

5.30 Half Loop from Top (T) – A.7

From inverted flight perform 1/2 inside loop to recover in level upright flight in the opposite direction as entry.

Downgrades:

- Changes in heading during half loop
- Half loop not a constant radius

5.31 Three Horizontal Loops (D) – A.8

From upright, perform three complete revolutions in either direction. Center is that point when the airplane is inverted during second roll.

Downgrades:

- Changes in heading (track) during rolls
- Changes in altitude during rolls
- Roll rate not constant
- Model does not do exactly three rolls. Apply “One Point per 15 Degree Rule”
- Wings not level at beginning or endof roll sequence. Apply "One Point per 15 Degree Rule"

5.32 1/2 Square Loop, 2 of 4 Point Roll Up (T) – A.9

From upright perform 1/4 inside loop to a vertical track (up line), hesitate, perform 2 of 4 point roll, hesitate, perform 1/4 outside loop to recover in level upright flight in the opposite direction as entry at a higher altitude.

Downgrades:

- Corner loop segments not of equal radius
- Model upline track not vertical before and after prescribed roll
- Prescribed roll not on middle of vertical line
- Over or under rotation of prescribed roll elements. Apply “One Point per 15 Degree Rule”
- Changes in track in loop segments or during prescribed roll
- Roll rate not constant

5.33 Two Turn Spin (U) – A.10

From upright, approach center with decreasing speed until model stalls at center, performs the required 2 turns of rotation (spins) and stop with the wings perpendicular to the flight line in a vertical downward track, hesitate, performs a one-quarter (1/4) inside loop to horizontal upright level flight to finish. Stall is the center of the maneuver and should occur directly over the center pole for Center Box presentation. All spins begin and end with a horizontal line. In order to accomplish a spin, the model must be stalled. The entry should be flown in a near horizontal path with the nose high attitude increasing as the speed decreases. The nose then drops as the model stalls. Simultaneously, the wing drops in the direction of the spin. Spin entry (i.e. stall/break) for center maneuvers should occur directly in front of the judges on the center line/pole. The stall may occur while the airplane has forward motion with respect to the ground.

Downgrades:

- Snap roll or entry not stalled entry - 0 points
- Model climbs or dives during entry. Apply “One Point per 15 Degree Rule” (Entry ends with the stall)
- Model climbs or dives during exit. Apply “One Point per 15 Degree Rule” (Exit begins at completion of quarter loop to level flight)
- Wings not level during entry or exit
- At stall, spin is forced in the opposite direction to initial wing drop
- Wings not perpendicular to flight line at end of required number of turns. Apply “One Point per 15-Degree Rule”
- Spiral dive or pure rotation around roll axis of more than one-half (1/2) turn - 0 points
- Tail of model does not describe a cone during rotation - 0 points
- Wing passes through vertical plane before nose passes through horizontal plane (snap roll entry) – 0 points
- Fuselage reaches a vertical attitude before rotation begins (simulation of stall by application of elevator) -0 points
- See Description of Maneuvers (Spins) in AMA Competition Regulations for additional criteria

5.34 Humpty Bump with Roll Options (½ Roll Up or ¼ Roll Up and Down) (T) – A.11

From upright perform 1/4 inside loop to vertical track (upline), hesitate, perform 1/2 roll, optionally 1/4 roll on this upline, hesitate, perform 1/2 loop to a vertical downline. If 1/4 roll option was chosen, another 1/4 roll is performed on the downline. The model then recovers with 1/4 loop to level upright flight in the opposite direction of entry.

Downgrades:

- Track not vertical in up line and down line
- Rolls (as specified) not centered in respective vertical lines
- Over or under rotation on prescribed roll. Apply “One Point per 15 Degree Rule”
- Loop segments not round with same size and radius
- If optional cross box roll is used (1/4 roll), 1/2 loop not 90 degrees to the flight line

5.35 Slow Roll (D) – A.12

Model rolls through 360 degrees. Center is middle of inverted flight.

Downgrades:

- Changes in track
- Changes in altitude
- Roll rate not constant
- Model does not roll exactly 360 degrees. Apply “One Point per 15 Degree Rule”
- Duration of roll less than 3 seconds

5.36 Top Hat, 3/4 Roll Up, 1/4 Roll Down (T) – A.13

From upright, perform 1/4 inside loop to a vertical track (up line), hesitate, perform 3/4 roll, hesitate, perform 1/4 inside loop to level inverted flight, hesitate, perform 1/4 inside loop to vertical track (down line), hesitate, performs 1/4 roll hesitate, perform 1/4 inside loop to recover in level flight in the opposite direction as entry.

Downgrades:

- Model not vertical at start and finish of roll elements
- Rolls not exactly 90 or 270 degrees
- Model does not fly straight and level inverted and at 90 degrees to the flight line

- Rolls not centered on line segments
- Loop segments not round with same size and radius
- Model not inverted on top line (0 points)

5.37 Double Immelmann with 2 Point Roll First, Full Roll Second (U) – A.14

From upright, fly through center, perform 1⁄2 inside loop, immediately perform 2 of 2 point roll to level inverted flight, hesitate, perform 1⁄2 inside loop to return to the entry altitude, followed immediately by a full roll to recover in level upright flight. The horizontal legs, including any required roll, should be equal to the diameter of the half loops, thus forming a square.

Downgrades:

- Half loops not round with constant and equal radius
- Half loops not completed exactly above or below point of commencement of half loops
- Horizontal legs not equal to diameter of half loops
- Rolls not executed immediately after completion of half loops
- Roll rates not constant and equal
- Changes in track during half loop, rolls, or lines
- Entry and exit not at same altitude or not level
- Under or over rotation of prescribed roll elements. Apply “One Point per 15 Degree Rule”
- Line segments including rolls not straight, horizontal and on track

5.38 1/2 Reverse Cuban 8 with 2 of 4 Point Roll (T) – A.15

From upright, perform 1/8 inside loop to a 45 degree upline. On this line hesitate, perform a 2 of 4 point roll, hesitate, perform 5/8 inside loop to level upright flight in the opposite direction of entry.

Downgrades:

- Loop segments not round and of equal radius
- Changes in track during loop segments or during prescribed roll
- Roll elements not centered on 45-degree downline
- Under or over rotation of roll elements. Apply “One Point per 15 Degree Rule”
- 45-degree downline not at 45 degrees. Apply “One Point per 15 Degree Rule”

5.39 Four Point Roll (D) – A.16

From upright, perform a roll through 360 degrees, hesitating at each 90 degree point; at each hesitation wings are parallel or vertical to the horizon. Center is middle of inverted flight.

Downgrades:

- Hesitations are not at 90, 180, 270, 360. Apply “One Point per 15 Degree Rule” to each
- Model does not hesitate after each one-quarter roll
- Roll rate not constant
- Changes in altitude
- Changes in track

5.40 Stall Turn, 1/2 Roll Up, 1/2 Roll Down (T) – A.17

From upright, perform 1/4 inside loop to an upward vertical track (upline), hesitate, perform 1/2 roll, hesitate, perform a stall turn through 180 degrees to a downward vertical track (downline), hesitate, perform 1/2 roll, hesitate, perform 1/4 inside loop to level flight.

Downgrades:

- Track is not exactly vertical

- Loop segments not round and of equal size and radius
- Wings not level during loop segments
- Changes in track during loop segments or prescribed roll elements
- Prescribed Roll not centered on lines
- Over or under rotation of prescribed rolls. Apply “One Point per 15 Degree Rule”
- Roll rate not constant
- Pivot radius greater than half wingspan
- Pendulum movement after stall

5.41 Avalanche (U) – A.18

From upright, perform an inside loop with a positive or negative snap roll centered on the apex of the loop.

Downgrades:

- Loop not round
- Over or under rotation of snap roll. Apply “One Point per 15 Degree Rule”
- Snap roll not centered on apex of loop
- Changes in track during loop or snap
- Snap roll not a snap (0 points) - See 3.3.8

5.42 Landing Sequence (U) – A.19

The landing maneuver will be scored in one point increments from 10 to 0. The maneuver will start 2 meters from the ground. The model flares smoothly, dissipating flying speed, and then smoothly touches the ground within the landing zone. The maneuver should be considered complete once the plane has slowed below flying speed and rolled 10 meters or comes to a stop and no further downgrades shall be applied after that point. The landing zone shall be marked by lines placed perpendicular across the runway and spaced 30 meters apart. The width of the landing zone is normally the width of the runway but in no case shall it exceed 30 meters. Landing is not a centered maneuver and there is no downgrade for displacement of the touchdown point left or right from center as long as the landing is in the landing zone. If the touchdown is within the runway but not in the landing zone it should be downgraded proportionate to the distance outside the landing zone. The Contest Director may designate any landing zone appropriate to the field if safety considerations dictate. If the landing zone is anything other than standard it should be thoroughly discussed with the pilots and judges before flying is started and no downgrade shall be applied due to the touchdown in the non-standard landing zone.

The landing will not be downgraded if:

- Wing dips which are caused by air turbulence unless they are not immediately corrected.
- The pilot “slips to a landing” to handle a crosswind condition in which case a wing will be low.
- The model rolls to a controlled stop within 10 meters.
- Displacement of touchdown point left or right as long as the landing is in the landing zone.

Downgrades:

- Model passes behind the judge’s line, zero (0) points
- Model impacts the runway due to lack of flare
- Model bounces
- Changes in track
- Model ends on its back, zero (0) points
- Model lands outside landing zone
- If any undercarriage retracts before the landing is complete, zero (0) points
- Aircraft porpoises and/or wanders during approach or flare
- Aircraft lands outside the landing area or runway, zero (0) points

- Aircraft touches down while not straight to runway and ground track

5.43 Takeoff Sequence (U) - M.1

The takeoff maneuver will be scored in one point increments from 10 to 0. The model is smoothly accelerated to takeoff speed. When flying speed is reached it gently lifts off the ground and climbs at a gradual angle. The lift off should be within one meter of center for maximum points. (Measured as one meter each side of center as defined by the center pole) The aircraft must not deviate in track during takeoff but may change heading after liftoff to maintain a straight track with the takeoff roll. The maneuver is complete when the model is approximately 2 meters (6-1/2 feet) from the ground.

It is not necessary for the model to stand still on the ground with the engine running without being held before the takeoff begins. It is also not necessary for the model to reach 2 meters in the same distance as the takeoff role. The takeoff should not be downgraded for wing dips caused by air turbulence unless the wings are not immediately leveled.

Downgrades:

- Model jumps from the ground
- Lift off is not within one meter each side of center
- Retouches the ground after becoming airborne
- Steep climb angle
- Gallops in elevation during climb
- Wings not level
- Throttle not smoothly accelerated
- Model passes behind the judge's line, scored 0 points

5.44 Pyramid Loop from Top (Base at Bottom), 1/2 Roll on Both 45's, Snap Roll on Bottom (U) – M.2

From upright, push to a 45 downline on center, pause, perform a 1/2 roll, pause, push through a 3/8 loop to level upright flight, pause, perform one snap roll, pause, pull through a 3/8 loop to a 45 upline, pause, perform a 1/2 roll, pause, push to exit upright.

Downgrades:

- Climbing and diving paths not 45°. Apply One Point per 15-Degree Rule".
- Climbing and diving paths not of equal length
- Loop segments not round and of equal size and radius
- Wings not level during loop and line segments
- Changes in track during loop segments or prescribed roll elements
- Prescribed rolls not centered on lines
- Over or under rotation of prescribed rolls. Apply "One Point per 15-Degree Rule".
- Roll rates of 1/2 rolls not constant
- Snap roll not a snap roll scores 0

5.45 Reverse Goldfish, 2 of 4 Point Roll on First 45, Full Roll on Second (T) – M.3

From upright, perform a 1/8 loop into a 45 degree downline, hesitate, perform a 2 of 4 point roll, hesitate, push through a 3/4 outside loop into another 45 degree downline, hesitate, perform a full roll, hesitate, push through a 1/8 loop.

Downgrades:

- Climbing and diving paths not 45°. Apply One Point per 15-Degree Rule".
- Loop segments not round and of equal size and radius
- Wings not level during loop and line segments

- Changes in track during loop segments or prescribed roll elements
- Prescribed rolls not centered on lines
- Over or under rotation of prescribed rolls. Apply “One Point per 15-Degree Rule”.
- Roll rate not constant within individual roll elements

5.46 Knife Edge Humpty, 1/4 Roll Up and Down, 1/2 Knife Edge Loop Across Top, Exit Inverted (D) – M.4

From upright, on center, pull a 1/4 inside loop to a vertical upline, hesitate, perform a 1/4 roll, hesitate, perform a 1/2 loop in knife edge flight to a vertical downline, hesitate, perform a 1/4 roll, hesitate, then push a 1/4 outside loop to an inverted exit.

Downgrades:

- Track not vertical in up line and down line
- Rolls (as specified) not centered in respective vertical lines
- Over or under rotation on prescribed roll. Apply “One Point per 15 Degree Rule”.
- Loop segments including knife edge not round with same size and radius
- Roll rate not constant

5.47 Reverse Sharks Tooth, Negative Snap Roll on 45 (T) – M.5

From inverted, push a 1/8 outside loop to a 45-degree upline, hesitate, perform 1 negative snap roll, hesitate, pull a 3/8 inside loop to a vertical downline, hesitate, pull a 1/4 loop to exit upright.

Downgrades:

- Loop segments not round or of equal radius
- Ascending path not 45° before and/or after prescribed roll. Apply “One Point per 15-degree rule”.
- Vertical down line not vertical
- Model changes track
- Snap roll not centered on 45° line
- Snap roll not a snap roll scores 0

5.48 Loop, 1/2 Roll Integrated Over the Top 90 Degrees, Exit Inverted (U) – M.6

From upright, pull into an inside loop. 1/2 Roll is integrated into the top 90 degrees of the loop. Exit Inverted.

Downgrades:

- Loop not round and of constant radius
- Wings not level or vertical during non-rolling loop segments
- Changes in track during loop
- Prescribed Roll not integrated into top 90 degrees of loop. Apply “One Point per 15-Degree Rule”.
- Over or under rotation of prescribed roll. Apply “One Point per 15-Degree Rule”.
- Roll rate not constant
- Model not on knife edge at apex of loop

5.49 Humpty Bump with Options (½ or ¼ Rolls Up and Down) (T) – M.7

From inverted, push a 1/4 outside loop to a vertical upline, hesitate, perform a 1/2 roll, or optionally a 1/4 roll on this upline, hesitate, pull or optionally push through a 1/2 loop to a vertical downline, hesitate, perform a 1/2 roll, hesitate, pull a 1/4 inside loop to exit upright.

Downgrades:

- Track not vertical in up line and down line
- Rolls (as specified) not centered in respective vertical lines
- Over or under rotation on prescribed roll. Apply “One Point per 15 Degree Rule”.
- Loop segments not round with same size and radius
- If optional cross box roll is used (1/4 roll), 1/2 loop not 90 degrees to the flight line
- Roll rate not constant

5.50 6 of 4 Point Roll, Exit Inverted (D) - M.8

From upright, perform 6 consecutive 1/4 rolls, hesitating at each 90 degree point, exit inverted. Center of maneuver is the middle of 3rd point (knife edge).

Downgrades:

- Hesitations are not at 90, 180, 270, 360 and 450 degrees. Apply “One Point per 15 Degree Rule” to each.
- Model does not hesitate after each one-quarter roll
- Hesitations not of equal duration
- Roll rate not constant
- Changes in altitude
- Changes in track

5.51 Stall Turn, 4 Point Roll Up, 1/2 Roll Down (T) – M.9

From inverted, push a 1/4 outside loop to a vertical upline, hesitate, perform a 4 point roll, hesitate, perform a stall turn to a vertical downline, hesitate, perform a 1/2 roll, hesitate, and then pull a 1/4 inside loop to exit upright.

Downgrades:

- Track does not become exactly vertical
- Loop segments not round and of equal size and radius
- Wings not level during loop segments
- Changes in track during loop segments or prescribed roll elements
- Prescribed rolls not centered on lines
- Over or under rotation of prescribed rolls. Apply “One Point per 15-Degree Rule”.
- Model does not hesitate after each one-quarter roll during 4 point roll
- Hesitations not of equal duration
- Pivot radius greater than half wingspan
- Pendulum movement after stall

5.52 Eye Catcher with 1/2 Rolls (U) – M.10

From upright, perform a 1/2 roll on center to a horizontal line, push through a 3/4 outside loop to a 3/4 inside loop to level inverted flight, perform 1/2 roll on center to exit upright.

Downgrades:

- Loop segments not round and of equal radius
- Change in track during loop segments or lines
- Roll elements not centered on Center Pole
- Transition between loops not on Center Pole
- Line segment between loops
- Roll rate not constant

5.53 2 1/2 Turn Spin (T) – M.11

Approach the upwind end box with decreasing speed until stall occurs, perform the required 2 ½ turns of rotation (spins) and stop with the wings perpendicular to the flight line in a vertical down line, hesitate, perform a 1/4 inside loop to exit upright. All spins begin and end with a horizontal line. In order to accomplish a spin, the model must be stalled. The entry should be flown in a near horizontal path with the nose high attitude increasing as the speed decreases. The nose then drops as the model stalls. Simultaneously, the wing drops in the direction of the spin. The stall may occur while the airplane has forward motion with respect to the ground.

Downgrades:

- Snap roll or unstalled entry - 0 points
- Model climbs or dives during entry. Apply "One Point per 15-Degree Rule" (entry ends with the stall).
- Model climbs or dives during exit. Apply "One Point per 15-Degree Rule" (exit begins at completion of 1/4 loop recovery to level flight).
- Wings not level during entry or exit
- Wings not perpendicular to flight line at end of required number of turns. Apply "One Point per 15-Degree Rule".
- Spiral dive or pure rotation around roll axis of more than 90 degrees - 0 points
- Tail of model does not describe a cone during rotation - 0 points
- Wing passes through vertical plane before nose passes through horizontal plane (snap roll entry) – 0 points
- Fuselage reaches a vertical attitude before rotation begins (simulation of stall by application of elevator) - 0 points

5.54 Bow Tie, Two 2 of 4 Point Rolls Reversed on First 45, 1 1/2 Roll on Second 45, Exit Inverted (D) – M.12

From upright, pull through a 1/4 loop into a vertical up line, hesitate, pull through a 3/8 loop into a 45 degree down line, hesitate, perform a 2 of 4 point roll, perform a 2 of 4 point roll in the opposite direction, hesitate, push through a 3/8 loop into a vertical up line, hesitate, push through a 3/8 loop into a 45 degree down line, hesitate, perform a 1 1/2 roll, hesitate, push through a 1/8 loop, exit inverted. Roll reversal may be immediate or with a slight pause.

Downgrades:

- Loop segments not round with the same size and radius
- Track not at 45 degrees where required. Apply "One Point per 15 Degree Rule".
- Changes in track in loop segments or after roll element
- Roll elements not centered in 45 degree lines
- Over or under rotation of roll. Apply "One Point per 15 Degree Rule".
- Roll rate not constant within roll elements

5.55 Stall Turn, 3/4 Up, 1/4 Roll Down (T) – M.13

From inverted, push a 1/4 outside loop to a vertical upline, hesitate, perform a 3/4 roll, hesitate, perform a stall turn to a vertical downline, hesitate, perform a 1/4 roll, hesitate, and then pull a 1/4 inside loop to exit upright.

Downgrades:

- Track does not become exactly vertical
- Loop segments not round and of equal size and radius
- Wings not level during loop segments
- Changes in track during loop segments or prescribed roll elements
- Prescribed roll not centered on line
- Over or under rotation of prescribed rolls. Apply "One Point per 15-Degree Rule"

- Pivot radius greater than half wingspan
- Pendulum movement after stall

5.56 Cobra Roll, 4 of 8 Point Rolls on 45 Degree Lines (U) – M.14

From upright, pull a 1/8 inside loop to a 45 degree upline, hesitate, perform a 4 of 8 point roll, hesitate, pull a 1/4 inside loop to a 45 degree downline, hesitate, perform another 4 of 8 point roll, hesitate, pull a 1/8 inside loop to exit upright.

Downgrades:

- Loop segments not round with same size and radius
- Climbing and diving paths not 45 degrees. Apply "One Point per 15 Degree Rule".
- Model changes track
- 4 of 8 point rolls not exactly 180 degrees of roll. Apply "One Point per 15 Degree Rule".
- Roll elements not centered on 45 degree lines
- Roll rate not constant
- Entry and exit not at same altitude
- Points not exactly 45 degrees. Apply "One Point per 15 Degree Rule".

5.57 Top Hat, 3 of 4 Point Roll Up, 1/4 Roll Down (T) – M.15

From upright, pull a 1/4 inside loop to a vertical upline, hesitate, perform a 3 of 4 point roll, hesitate, pull a 1/4 inside loop to level inverted flight, hesitate, pull a 1/4 inside loop to a vertical downline, hesitate, perform a 1/4 roll, hesitate, pull a 1/4 inside loop to exit upright.

Downgrades:

- Loop segments not round and of equal size/radius
- Up line and down line not vertical. Apply "One Point per 15-Degree Rule"
- Prescribed rolls not centered on vertical lines
- Changes in track during loop elements, up and down lines
- Over or under rotation of prescribed rolls. Apply "One Point per 15 Degree Rule".
- Wings not level
- Roll rates not constant
- Horizontal line at top not inverted scores zero (0)

5.58 Square Loop, 1/2 Roll in Vertical Legs, 2 of 4 Point Roll in Horizontal Legs (D) – M.16

From upright, pull a 1/4 inside loop to a vertical up line, hesitate, perform a 1/2 roll, hesitate, push a 1/4 outside loop to level horizontal flight, hesitate, perform a 2 of 4 point roll, hesitate, pull a 1/4 inside loop to a vertical down line, hesitate, perform a 1/2 roll, hesitate, push a 1/4 outside loop to level inverted flight, hesitate, perform a 2 of 4 point roll to exit upright.

Downgrades:

- Loop segments not of equal radius
- Prescribed rolls not on middle of lines
- Over or under rotation of prescribed roll. Apply "One Point per 15-Degree Rule".
- Changes in track in loop segments or during prescribed roll
- Roll rate not constant with roll types
- All legs of square, including roll elements, not of equal length

5.59 1/2 Reverse Cuban Eight, Full Roll on 45, Exit Inverted (T) – M.17

From upright, pull a 1/8 Inside loop to a 45 upline, hesitate, perform a full roll, hesitate, push through a 5/8 outside loop to exit in level inverted flight.

Downgrades:

- Loop segments not round with same size and radius
- Climbing path not 45 degrees. Apply “One Point per 15 Degree Rule”.
- Model changes track
- Roll element not centered on 45 degree line
- Roll not 360 degrees. Apply “One Point per 15 Degree Rule”.
- Roll rate not constant

5.60 Roll Combination, 2 of 8 Point Roll, Full Roll, 2 of 8 Point Roll, All Rolls Opposite (U) – M.18

From inverted, perform a 2 of 8 point roll to knife edge flight, perform a full roll in the opposite direction back to knife edge flight, perform a 2 of 8 point roll in the opposite direction to exit the maneuver in level, upright flight. Roll reversals may be immediate or with a pause.

Downgrades:

- Hesitations in point roll segments are not at 45 degrees. Apply “One Point per 15 Degree Rule” to each.
- Roll rate not constant
- Changes in altitude
- Changes in track

5.61 Landing Sequence (U) - M.19

The landing maneuver will be scored in one point increments from 10 to 0. The maneuver will start two (2) meters from the ground. The model flares smoothly to a nose high altitude, dissipating flying speed, and then smoothly touches the ground, within the landing zone. The maneuver should be considered complete once the plane has slowed below flying speed and rolled 10 meters or comes to a stop and no further downgrades shall be applied after that point.

The landing zone shall be marked by lines placed perpendicular across the runway and spaced 30 meters apart. The width of the landing zone is normally the width of the runway but in no case shall exceed 30 meters. Landing is not a centered maneuver and there is no downgrade for displacement of the touchdown point left or right from center as long as the landing is in the landing zone. If the touchdown is within the runway but not in the landing zone it should be downgraded proportionate to the distance outside the landing zone. The Contest Director may designate any landing zone appropriate to the field if safety considerations dictate. If the landing zone is anything other than standard it should be thoroughly discussed with the pilots and judges before flying is started and no downgrade shall be applied due to the touchdown in the non-standard landing zone.

The landing will not be downgraded if:

- Wing dips which are caused by air turbulence unless they are not immediately corrected
- The pilot “slips to a landing” to handle a crosswind condition in which case a wing will be low
- The model rolls to a controlled stop within 10 meters
- Displacement of touchdown point left or right as long as the landing is in the landing zone

Downgrades:

- Model passes behind the judges line, 0 points
- Model impacts the runway due to lack of flare
- Model bounces

- Changes in track
- Model ends on its back, 0 points
- Model lands outside landing zone
- If any undercarriage retracts before the landing is complete, 0 points
- Aircraft “porpoises” and or wanders during approach or flare
- Aircraft lands outside the landing area or runway, 0 points
- Aircraft touches down while not straight to runway and ground track

PART B: F3P INDOOR RADIO CONTROL AEROBATIC POWER MODEL AIRCRAFT

Section 1: General Rules - to be completed

Section 2: Contest Operation - to be completed

Section 3: Judging Guidelines - to be completed

Section 4: Aerobatic Sequence

4.1 F3P Intermediate

	Manoeuvre	K	Description
1	Takeoff Sequence	1	The takeoff run should be straight, the model should lift gently from the ground on the center line and climb at a gradual angle. Perform a rectangular circuit to position the airplane for the first maneuver in the same direction as the takeoff.
2	Cuban 8	3	From upright, pull through a 5/8 loop into a 45 deg downline, perform a 1/2 roll, pull through a 3/4 loop into another 45 deg downline, perform a 1/2 roll, pull through a 1/8 loop, exit upright.
	Free Turnaround		Turnaround 180 degrees and position the airplane for the next maneuver. Adjust altitude as required.
3	Cobra	2	Model pulls up to a 45 deg upline, push to a 45 deg downline, then pulls to recover in level flight.
	Free Turnaround		Turnaround 180 degrees and position the airplane for the next maneuver. Adjust altitude as required.
4	Knife Edge	3	Perform a 1/4 roll, maintain knife edge flight for at least 5 meters, perform a 1/4 roll.
	Free Turnaround		Turnaround 180 degrees and position the airplane for the next maneuver. Adjust altitude as required.
5	2-Point Roll	3	Model rolls through 360 deg in either direction, hesitating when inverted.
6	Stall Turn	3	Near the end of the room, the model pulls up into a vertical flight path, stall turns through 180 deg to a vertical dive, then pulls up to recover in level flight.
7	Loop	2	The model flies straight and level to the center line, pulls up and performs one complete loop to finish at the same altitude and direction.
8	Landing Sequence	1	Perform a rectangular circuit to position the airplane for the landing in the same direction as the takeoff. The model flares smoothly to touch the ground near the center line with no bouncing or changes in heading and rolls to a stop.
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4.2 FAI-F3P Advanced AA-17

	Manoeuvre	K	Description
1	Tilted Humpty-Bump with 1/2 Roll, 1/2 Roll	3	From upright, pull through a ½ loop, into inverted flight, pull through a 1/2 loop, exit upright
2	Stall Turn	3	From upright, pull through a ¼ loop into a vertical upline, perform a stall turn into vertical downline, pull through ¼ loop, exit upright.
3	Horizontal Circle 8	6	From upright perform a ¼ horizontal circle, then perform immediately another (full) circle in the opposite direction, then finish the remaining ¾ of the first circle, exit upright.
4	Half Horizontal Square Circle	2	From upright, perform a ¼ horizontal circle with wings level, perform a ¼ horizontal circle with wings level, exit upright.
5	Roll Combination with Consecutive 1/2 Roll, 1/2 Roll, 1/2 Roll	4	From upright, perform consecutively a 1/2 roll and 1/2 roll in opposite directions, exit upright.
6	Knife-Edge Humpty-Bump with 1/2 Roll	3	From upright, pull through 1/4 loop into a vertical upline, perform a 1/2 knife-edge loop into vertical downline, pull through a 1/2 loop, exit upright.
7	Cobra Roll with 1/2 Roll, 1/2 Roll	5	From upright, pull through a 1/8 loop into a 45° upline, perform a 1/2 roll, pull through a 1/4 loop into a 45° downline, perform a 1/2 roll, exit upright.
8	One Half Horizontal Circle	3	From upright, perform a 1/2 horizontal circle, exit upright.
9	Vertical Upline with Consecutive Two 3/4 Rolls (Option: Vertical Upline with Torque Roll)	5	From upright, pull through a ¼ loop into a vertical upline, perform consecutively two ¾ rolls in opposite directions, push through a ¼ loop, exit upright. Option: From upright, pull through a ¼ loop into a vertical upline, reduce flying speed to zero, perform a torque roll, then accelerate into a vertical upline, push through a ¼ loop, exit upright
10	1/2 Square Loop	3	From upright, push through a 1/4 loop into a vertical downline, push through a 1/4 loop, exit inverted.
11	Loop with 1/2 Roll	5	From inverted, perform a loop with a 1/2 roll integrated in the top 90 degrees, exit upright
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Summary of Rule Book Changes

March 2013

The following changes were approved at the MAAC Annual General Meeting held on March 23, 2013 and are now reflected in this document:

2.1 Team Trials: addition of deadline for registrations and requirement that contestants be emailed the list of competitors

4.1 Sportsman Schedule: insertion of a second Straight and Level Flight - Manoeuvre #13

4.3 Advanced Schedule: amend to reflect the AMA sequence for the 2013 and 2014 years. Section 5 - Description of Manoeuvres also revised.

4.4 Masters Schedule: amend to reflect the AMA sequence for the 2013 and 2014 years. Section 5 - Description of Manoeuvres also revised.

May 2013

2.06 Marking Sportsman: out-dated wording for the Sportsman box was deleted (i.e. The manoeuvre must be performed in a plane and at a height, which will allow them to be seen clearly by the judges, approximately 60° vertically and 90° horizontally. The non-observance of this rule will be penalized by loss of points.)

May 2014

Incorporated F3P into rulebook by separating F3A and F3P into Part A and Part B.

Part B:

4.1 F3P Sportsman schedule was added

4.2 F3P Intermediate schedule was added

May 2015

The following changes were approved at the MAAC Annual General Meeting held in April 2015 and are now reflected in this document.

Part A:

4.3 Advanced Schedule: amend to reflect the AMA sequence for the 2015 year. Section 5 - Description of Manoeuvres also revised.

4.4 Masters Schedule: amend to reflect the AMA sequence for the 2015 year. Section 5 - Description of Manoeuvres also revised.

4.5 FAI National and Team Selection Competitions: amend to incorporate changes to the method of calculating final score.

January 2016

Section 2.0.7 was amended to reflect the use of half-points in marking, as per Sections 5.1.8 and 58.5 of the 2016 Sporting Code.

May 2016

The following changes were approved at the MAAC Annual General Meeting held in April 2016 and are now reflected in this document:

Part A:

2.1 Team Trials: renumber paragraphs.

2.1.1, 2.1.3, 2.1.4: amend to remove FAI Semi-Final schedule from Team Trials format.

2.1.8, 2.1.9: clarify team selection as it relates to Junior pilots

2.1.10: add selection of Team Manager

4.3 F3A Advanced and Masters Schedules: amend to reflect the AMA sequence for the 2016 year. Section 5 - Description of Manoeuvres also revised.

4.5 FAI National and Team Selection Competitions: amend to incorporate changes to the method of calculating final score (only flying current FAI-F3A Preliminary schedule ""P-xx"

Part B:

4.1 Change name of current F3P Sportsman schedule to F3P Intermediate.

4.2 Change name of current F3P Intermediate schedule to F3P Advanced and amend to reflect current FaI-F3P-AA-xx schedule.