



1.	GENERAL PROCEDURES.....	5
1.A.	CONTROL-LINE PROFICIENCY LEVELS	5
	General rules for all Proficiency wings	5
1.B.	SAMAA CONTROL-LINE DISPLAYS.....	6
1.C.	CONTROL-LINE RULES CHANGE PROPOSALS	7
	Timetable for Proposals to the SAMAA Control-line Delegate. The Technical Rules Meeting and Agenda for this Meeting: Effective Date of Rule Changes.....	7
1.D.	GENERAL RULES FOR NATIONAL CONTESTS.....	7
	GENERAL DEFINITION OF NATIONAL CONTESTS.....	7
	Definitions of the Expressions Used for Model Specifications and Rules	7
	Types of National Contests.....	9
	Contest Officials.....	9
	Organisation of National Contests	10
	Contest Information and Entry Fees	10
	Special Contest Organisation Requirements	11
	Interruption of the Contest.....	11
	Classification and Awards at National Championships.....	12
	Processing of the Model Characteristics.....	12
	Protests	12
	Safety Precautions and Instructions.....	13
	Recommended.....	14
	Disqualification From the Contest.....	14
	SAMAA CHAMPIONSHIP TROPHIES.....	14
	Collection of Trophies.....	15
	Registration of Trophies.....	15
	ORGANISATION OF NATIONAL CONTESTS.....	16
	Processing of the Model Characteristics and Number of Models.....	16
2.	INDIVIDUAL CLASS RULES	17
2.A.	SPEED MODELS.....	17
	Definition of Speed Models	17
	Entry Participation Requirements.....	17
	Classification of Control Line Speed Models.....	17
	Model Design and Construction	18
	Number of Models.....	18
	Class.....	18
	Engine Restrictions.....	19
	Engine Use Restrictions	19
	Fuel.....	19
	Control Line Specifications and Pull Test.....	20
	Pylon Specifications.....	21
	Timing of Flights	22
	Official Flight.....	23
	Number of Flights.....	23
	Engine Starting Time	23
	Definition of an Attempt.....	23
	Distance of Timed Course	23
	Timing Pole - Height Marker	24
	Proto Speed.....	24
	Design of Proto Speed Model.....	24
	½ A Profile Proto Specifications	24
	Launching (Proto)	24
	Scoring of Proto Flights.....	24
	Records	25
	.21 Proto Speed	25
	Objective.....	25
	Design.....	25
	Aeroplane Specifications.....	26
	Engine, Propeller and Fuel System.....	26
	Flying Lines.....	26
	Fuel.....	26
	Distance of Timed Course	26
	Judging.....	26
	.21 Sport Speed.....	27

Applicability.....	27
Formula "40" Speed.....	28
Formula "40" Description.....	28
Formula "40" Model Design and Construction.....	28
Launching.....	28
Establishment of Line Sizes and Pull Tests in C/L Speed.....	28
2.B. NOVICE AEROBATICS.....	30
Definition of an Aerobatic Model.....	30
Characteristics of Control Line Aerobatic Models.....	30
Line Length.....	30
Definition of an Attempt.....	30
Number of Attempts.....	30
Definition of an Official Flight.....	30
Number of Flights.....	30
Cancellation of the Flight.....	30
Number of Helpers.....	30
Execution of Manoeuvres.....	30
Scoring.....	31
Judges and Timekeepers.....	31
Classification.....	31
List of Aerobatics Manoeuvres.....	31
Description of Aerobatic Manoeuvres.....	31
2.C. TEAM RACING UNIFIED RULES.....	36
Definition of a Team Racing Event.....	36
Team Race Site.....	36
Controls.....	36
Organisation of the Races.....	36
Race from Start to Finish.....	36
Definition of an Official Flight.....	37
Warnings - Eliminations.....	38
A TEAM SHALL BE WARNED:.....	38
A TEAM SHALL BE ELIMINATED FROM A RACE:.....	38
Team Qualification and Classification.....	38
2.C. GOODYEAR UNIFIED RULES.....	38
UNIFIED GOODYEAR SUPPLEMENTAL.....	40
CLASS 2 GOODYEAR SUPPLEMENTAL.....	40
FORMULA 360 SUPPLEMENTAL.....	40
Engine.....	40
MOUSE RACING SUPPLEMENTAL.....	41
2.D. SAMAA COMBAT RULES.....	42
Definition of a Combat event.....	42
Definitions.....	42
Control System.....	42
Safety devices.....	42
Technical Details.....	43
Number of Models.....	43
Streamer.....	43
Method of Starting.....	43
Timing.....	44
Termination of the Contest.....	44
Method of scoring.....	44
Attempts.....	45
Conduct.....	45
Offences.....	45
Cancellation of the Flight.....	45
Classification.....	46
2.D.(a) SAMAA NOVICE COMBAT RULES.....	46
2.E. BASIC CARRIER DECK RULES.....	47
xxv. After the landing signal, a single exceedance of 30 degrees, however momentary, will disqualify the flight without warning.....	48
xxvi. The Contest Director may choose to position himself close to the pilot's circle in order to monitor the above requirements. APPENDIX A.....	48
APPENDIX A.....	49

<i>TECHNICAL RULES FOR CONTROL LINE NOVICE AEROBATIC MODELS JUDGES GUIDE</i>	49
<i>APPENDIX B</i>	55
<i>TECHNICAL RULES FOR CONTROL LINETEAM RACE JURY GUIDE</i>	55
<i>Appendix D F2C, F2F, Unified and Class 2 Goodyear Circle Markings</i>	61
<i>Appendix E F2D, SAMAA and Novice Combat Circle Markings</i>	61
<i>Appendix F Formula 360 Circle Markings</i>	61
<i>APPENDIX G</i>	62
<i>APPENDIX H</i>	63

SAMAA CONTROL-LINE MANUAL

1. GENERAL PROCEDURES

I. A. CONTROL-LINE PROFICIENCY LEVELS

General rules for all Proficiency wings

- i. All flights to be made at a registered SAMAA flying field and a witness is to be present at the time of the flights.
- ii. The same witness is to judge both flights for any one proficiency rating and the witness must have the same or higher proficiency rating as the one being judged.
- iii. More than one wing rating can be flown for on any one day.
- iv. If a pilot has passed the first flight but fails to complete the second flight the pilot must start again from the first flight, only then is the proficiency rating valid.
- v. Silver wings can only be flown for after completion of the Bronze wings and Gold wings can only be flown for after completion of the silver wings. Pilots flying for the Silver and Gold wings must start and tune their own motor without outside help, physically or verbally.
- vi. The aircraft must not jettison parts while flying or break when landing, circumstances outside the pilots control will be taken into account in case of breakage.

All safety procedures must be followed by the pilot before, during and after the flight, pilots flying for Bronze wings may be helped to unroll and connect lines, check and adjust handle for level and to roll lines up again, but must still check for handle connected the right way, clips secure, pull test etc. Pilots flying for Silver and Gold wings must do all safety checks as above without any help, except for the pull test.

Sport Flying

Bronze Wings (Solo Wings)

Fly two (2) consecutive flights, on the same day, without any help from inside the circle.

Flights to consist of:

- i. Take off or Hand launch
- ii. Level flight
- iii. Landing

Silver Wings

Fly two (2) consecutive flights, on the same day, without any help from inside the circle.

Flights to consist of:

- i. Take off or Hand launch
- ii. Level Flight
- iii. One (1) Wing over
- iv. Two (2) Inside loops
- v. One (1) Lazy eight or normal horizontal eight
- vi. Landing

Gold Wings

Fly two (2) consecutive flights, on the same day, without any help from inside the circle

Flights to consist of:

- i. Take off or Hand launch
- ii. Level flight
- iii. One (1) Reverse wing over
- iv. Three (3) Consecutive inside loops
- v. Two (2) Level laps inverted
- vi. Three (3) Consecutive outside loops
- vii. Two (2) Consecutive horizontal eights
- viii. One (1) Inside square loop
- ix. Landing

Aerobatics

Bronze Wings

The applicant must be able to complete the SAMAA novice stunt or FAI class F2B schedule and must have achieved 50% of the possible maximum score at a National or Provincial competition.

Silver Wings

The applicant must be able to complete the FAI class F2B stunt schedule and have achieved at least 60% of the maximum score possible in this event at a National/Provincial competition. Silver wings can only be achieved at the second National/Provincial competition completed in the last five years and for consideration at Silver wings level the applicant must already have bronze wings.

Gold Wings

The applicant must be able to complete the FAI class F2B schedule and must have achieved at least 70% of the maximum in a National or Provincial competition. Gold Wings can only be achieved at the third Nationals/Provincial completed in the last five years and only after silver wings have been awarded.

Team Racing

Wings will be awarded to the individuals in the team and not to a team as a whole. This means that, as teams vary from time to time, a pilot may have Bronze Wings and a mechanic Gold Wings.

Bronze Wings

Completion of a heat in Open Goodyear, FAI provisional Class F2F or FAI Class F2C in less than 6 minutes, or a final in less than 12 minutes at a National/Provincial competition. Completion of a heat in Class 2 Goodyear in less than 7 minutes, or a final in less than 14 minutes at a National/Provincial competition.

Silver Wings

Completion of a heat in Open Goodyear, FAI provisional Class F2F or FAI Class F2C in less than 5 minutes, or a final in less than 10 minutes at a National/Provincial competition. Completion of a heat in Class 2 Goodyear in less than 6 minutes, or a final in less than 12 minutes at a National/Provincial competition. Silver Wings can only be achieved at the second Nationals/Provincial completed in the past 5 years and only after bronze wings have been awarded.

Gold Wings

Completion of a heat in Open Goodyear, FAI provisional Class F2F or FAI Class F2C in less than 4 minutes, or a final in less than 8 minutes at a National/Provincial competition. Completion of a heat in Class 2 Goodyear in less than 5 minutes, or a final in less than 10 minutes at a National/Provincial competition. Gold Wings can only be achieved at the third Nationals/Provincial completed in the past 5 years and only after bronze wings have been awarded.

1.B. SAMAA CONTROL-LINE DISPLAYS.

- i. Ensure SAMAA Chairman or Deputy has been informed for insurance purposes, at least 21 working days before the display date.
- ii. Appoint a Safety Officer and/or Appoint a suitable person for crowd control
- iii. Ensure circle and pit areas are demarcated.
- iv. Ensure adequate clearance distance from the crowd (5m).
- v. Scrutinise lines and connectors.
- vi. Pull test all aircraft equipment, including wrist thongs that are mandatory for all displays.
- vii. Scrutinise models for general safety.
- viii. Protective headgear for pilots + pitmen while flying a demonstration combat match.

NB Checklist is included at Appendices

1.C. CONTROL-LINE RULES CHANGE PROPOSALS

Proposal Submitted to the SAMAA Control-line Delegate:

- i. Rule changes are accepted every 2 years except for emergency or safety rules which can be incorporated at the discretion of a meeting of the Control-line subcommittee convened by the SAMAA Control-line delegate.
- ii. For the purposes of rule changes, incorporation is made every even year (1998, 2000 etc....)
- iii. Each proposal must conform with the following requirements:
- iv. State the page number(s) in the Sporting Code, or its relevant approved amendments, on which the proposal will appear;
- v. Quote the relevant paragraph and/or heading from the Sporting Code;
- vi. Detail exactly what the alteration or addition to the wording is to be;
- vii. Give the reason(s) behind the proposed alteration in a short separate paragraph;
- viii. The proposal must reach the SAMAA Chairman, Secretary or Control-line delegate at least 30 days before the SAMAA Annual Convention.
- ix. The number of proxy votes present at the Control-Line Subcommittee Rules meeting of the SAMAA Annual Convention may not exceed the number of eligible voters present at the meeting itself.
- x. Addition of classes is subject to proving of the class at club level for 2 years prior to incorporation into SAMAA rules. In the case of proven outstanding success, incorporation may be considered at an earlier stage by the convening of a Control-line subcommittee by the SAMAA Control-line delegate.

A proforma form for this purpose of rule amendment/addition is enclosed at appendix C.

Timetable for Proposals to the SAMAA Control-line Delegate. The Technical Rules Meeting and Agenda for this Meeting: Effective Date of Rule Changes

- i. For all classes, rule changes from the current Sporting Code will become effective only when the following Sporting Code is issued. The only exceptions will be for real safety matters and for absolutely indispensable rule clarifications; also, changes affecting noise. Changes to model specifications involving model size and/or power limits and the introduction of new manoeuvre schedules shall receive separate consideration in each case. These rule changes will become effective 1 September each year.
- ii. The guideline to be applied for proposed exceptions is whether necessity is involved rather than desirability or mere rule improvement. Technical rule changes affecting model, engine or equipment for flying must be accompanied by supporting data.

1.D. GENERAL RULES FOR NATIONAL CONTESTS

GENERAL DEFINITION OF NATIONAL CONTESTS

- i. Any aeromodelling event in which three or more competitors, organised by SAMAA or with its permission or participation under the rules of this Sporting Code, which is entered in the SAMAA Sporting Calendar and is open only to persons holding a valid SAMAA membership.
- ii. Rules for classes approved on a provisional basis will be incorporated in this Sporting Code.

Definitions of the Expressions Used for Model Specifications and Rules

Surface Area (St)

The surface area includes the total surface of the wings and that of the horizontal or oblique stabilising surface or surfaces. The surfaces taken for calculation are the orthogonal projection on to a horizontal plane of the surfaces in question with each surface at zero incidences.

When wings or stabilising surfaces are built into the body of the aeroplane the surface taken into account shall include that area contained within the normal contours of the flight surfaces extended to

meet at the plane of symmetry of the model.

Weight

The weight taken to figure out the minimum loading and minimum weight is that of the complete model in flying order but without fuel unless otherwise specified.

Loading

When loading rules are applied the loading shall be defined at the weight in grammes per square decimetre of surface area (St).

Wingspan

The wingspan is the maximum distance between two points ending the wing.

Piston Motor

Motors in which the energy is obtained by the combustion or expansion of a fluid acting on one or more reciprocating or rotary pistons.

Glow Plug Motor

A glow plug motor is one that uses a continuously incandescent element to provide ignition.

Compression Ignition Motor

A compression ignition motor is one in which the charge is ignited solely by the effect of compression. This may include a mechanical system specially provided to control compression when the engine is operating.

Hand Launching

This is effected by hand, the competitor or helper standing on the ground.

Takeoff

The model must rise from the ground in the correct manner without any help from the pilot or mechanic.

Landing

The model is considered to have landed when it has first touched ground, or definitely ended it's forward movement.

Swept Volume

Reciprocating engines

Swept volume is calculated as:

Swept piston area x stroke = swept volume

Swept piston area is calculated by measuring the bore of the liner at the top dead centre.

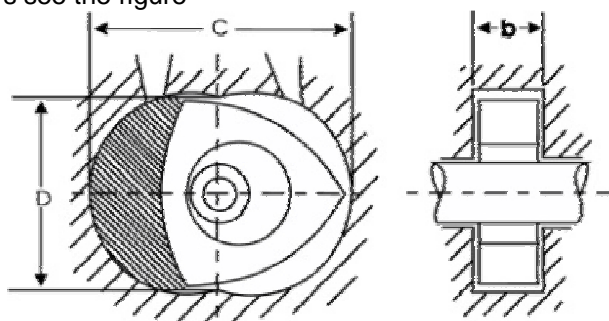
The calculation of volume shall be truncated to two decimal places (0,01 cm³)

Rotary engines

Swept volume is calculated as:

$0,325(C^2 - D^2) \cdot b$

For meaning of the letters see the figure



Types of National Contests

Open National Contests

Contests in which all aeromodellers are members of SAMAA. These contests are for individual classifications only.

Limited National Contests

These are contests in which all aeromodellers are invited by SAMAA. These contests are for individual and possibly international team classifications.

Competitors and Teams

Competitor

Competitor's Proxy and Substitution of Team Members

Proxy flights are not permitted *unless allowed under specific class rules*. Substitution of team members is permitted only up to the time of registration or before model processing, whichever comes first.

Age Classification for the Contest

A competitor is considered a junior up to and including the calendar year in which he attains the age of 18. All other competitors are classed as seniors. Determination of associated fees due for SAMAA events is the responsibility of the host club.

National Teams for World and Continental Championships

A National team shall consist of three individual competitors, or three pairs of competitors for each category as a maximum, and a Team Manager. The reigning World or Continental Champion would have the right (subject to the approval of SAMAA and the Aero Club of South Africa) to participate in the next world or continental championships in that category no matter whether he qualifies for the National team or not. If he is not a member of the National team, his score will not be considered in the team results.

Contest Officials

SAMAA Jury

- i. The Organiser of all National contests included in the SAMAA Sporting Calendar shall nominate a SAMAA Jury of three members at least two of who shall be chosen for their competence in the category of models being flown in the event. It is the responsibility of the Jury to see that the event is conducted according to the relevant provisions of this Sporting Code, and they are empowered to make all decisions dictated by any circumstances that may arise and to rule on disputes. Before the start of the competition, the SAMAA Jury must make sure that the organiser has satisfied the rules of the paragraph headed "**Special Contest Organisation Requirements**"
- ii. The Contest Director or Chief Jury Member at each National contest must submit a report to the SAMAA Control-line delegate within one month of the contest. This report should include descriptions of any deviation from the Sporting Code and any exceptional circumstances that arose.
- iii. With other National events, the Jury must include at least one delegate or a person approved by SAMAA. The other two members can be delegated by the committee of the organising Club.
- iv. The jury must be announced before the start of the event. Members of the jury may not compete in the event but when the timetable gives a subdivision into categories. In that case, one or two members of the jury may compete in a category and must then be replaced by alternate jury members (not competing in that category) for all matters involving that category.

Contest Officials (judges, time keepers, etc.)

- i. The organisers may appoint timekeepers and other contest officials from other countries provided those are approved by SAMAA.

- ii. The Club responsible for organising a provincial or National Championship shall submit to SAMAA the names of the persons who shall act as judges/jury for approval. Judges/jury must have had recent practical judging and/or flying experience of the category for which they are selected.

Organisation of National Contests

Each National Contest in the SAMAA Sporting Calendar must be organised according to the Sporting Code. The National Control Line Championships shall be held annually, on a date and venue agreed to by the Committee, according to the rules of the SAMAA sporting code and the rules herein. Provincial and inter-provincial championships shall also be held according to these rules.

National and Provincial Championships Events

SAMAA will decide which events shall be held as Provincial or National Championships and to which Club the responsibility for the organisation of this event shall be delegated. Bids to be the host of Championships may be submitted at the previous years SAMAA Annual Convention. The firm acceptance of a bid will normally be made by vote of the SAMAA Subcommittee meeting six months before the year of the proposed championships. To be eligible for selection, all bids must include the full details of the event.

Contest Rules

All National contests included in the SAMAA Sporting Calendar must be held according to the Sporting Code or provisional rules agreed by SAMAA.

The rules must be available at the contest site.

Local Rules

Local rules established by the organisers must be published no later than the publication of the entry form in the SAMAA magazine. Reasonable local rules decided later must be issued in writing before the start of the contest. (Local rules take the form of fees; curfew hours for noise, amount of a protest fee etc., and these rules are supplied by the host Club.)

Contest Information and Entry Fees

- i. A first memorandum of information and entry forms must be despatched to SAMAA members, also to jury members and judges at least two months before the contest. For open National contests, entry forms supplied by the organisers must include: Name - First name - Date of Birth - Postal address - SAMAA Number – Class (es) entered.
- ii. The entry fee will consist of an obligatory fee to be paid by all competitors and team managers and an optional fee that covers accommodation and food. If an obligatory fee is required for official helpers and official supporters, it must not exceed 20% of the obligatory fee for competitors. Items contributing to the calculation of the Basic Entry Fee are (applicable depending on local circumstances): Contest site - rent and cost for preparing, and organisation costs. Organisation costs consist of meeting and travelling of organising committees; rent or purchase of contest equipment (if not already available), such as timing devices, lap counters, sighting apparatus, processing equipment, score board, walkie-talkies, frequency control equipment, score sheets, flags, flag poles, etc., cost of instruction and briefing session of contest officials and personnel; press information; a souvenir package; cost of travelling, board and lodging of contest officials, judges and jury, licences and permits (Telecommunications, local authorities); stationery, postage (information bulletins, correspondence); rent of tents and any other items the contest organisers deem necessary organisation costs. Organisation costs consist of meeting and travelling of organising committees; rent or purchase of contest equipment (if not already available), such as timing devices, lap counters, sighting apparatus, processing equipment, score board, walkie-talkies, frequency control equipment, score sheets, flags, flag poles, etc., cost of instruction and briefing session of contest officials and personnel; press information; a souvenir package; for the successful and safe completion of the contest.
- iii. The cost of any Official opening ceremony must be included in the items to be taken into account when calculating the basic entry fee.

- iv. Obtaining a sponsor for one might be possible for the above items. This will result in a lower basic fee. Therefore, sponsoring is highly recommended. However, sponsoring can only be taken into account if it is absolutely sure that it will be obtained, otherwise a loss can be expected. Sponsoring negotiations should start as early as possible.
- v. Separate additional fees should be offered at choice for: lodging hotels and camping; food (banquet not included) and banquet (and possible other additional events). Maximum possible fee = basic fee + lodging (hotel) + food + banquet.
- vi. The cost of hotel accommodation should be kept within acceptable limits. Keep in mind that hotel accommodation is often the only possibility for overseas or distanced participants. Accommodation of acceptable middle class standard will be sufficient. There is no need for any luxury. The same applies to the food.
- vii. Results must be despatched to SAMAA and Clubs taking part in the event within a month. The results should include the full name of those listed.

The organiser must acknowledge receipt of the entry form and entry fee.

Special Contest Organisation Requirements

The organisers must:

- i. Secure enough qualified officials, timekeepers and jury members.
- ii. Provide themselves with the necessary measuring apparatus adequate to check the characteristics of aeromodels in question.
- iii. Give the competitors opportunity to find the characteristics of their models on the official measuring equipment before the contest.
- iv. Give the competitors sufficient opportunity to prepare and test fly their models between events.
- v. Provide at least one half day practice before the competition, to be announced in the invitation along with a flying schedule for the competition.
- vi. The organiser will provide a schedule for the official practice giving all competitors equal practice time. The practice day must not be extended to delay the start of official competition. A reserve day is recommended after the competition to allow for the completion of official flying in case of weather or other delays preventing completion as scheduled.
- vii. The organiser should also provide the name and address of a contact person, who can inform outside Clubs.
- viii. Display the results of each round throughout the contest and publish the official results afterwards. The display and publication shall not contain any additional statistics or items other than those required by the Sporting Code.
- ix. All timekeeping should be made with quartz-controlled electronic stopwatches with digital readout.
- x. The contest programme including round duration's, starting and finishing times of the contest must be clearly shown in the regulations.

Interruption of the Contest

The contest may be interrupted or the start delayed by the Jury if:

- i. The wind is continuously stronger than **9 m/s** measured at two metres above the ground at the starting line (flight line) for **30 seconds**, unless specified otherwise in category rules.

- ii. The visibility prohibits proper observation of the models or due to atmospheric conditions, continuing the competition would be dangerous.
- iii. The prevailing conditions are such that they may lead to unacceptable sporting results.
- iv. In case of interruption during a round, the remainder of the round may be completed when conditions allow, with adequate notice given to all competitors.
- v. In the cases described, the organiser is not obliged to return the entry fee nor repeat the contest. The results will be based on the scores of the finished rounds.

Classification and Awards at National Championships

Individual Classification

- i. In each contest category a certificate from the host Club will be awarded to the competitors in the first, second and third places.
- ii. If there is a Challenge Trophy, this is awarded to the Club of the winning competitor for custody until the following championship.
- iii. The winner earns the title of National Champion in the category. With a trophy being awarded, this shall remain in his or her custody until the following National Championship.
- iv. The High Points Trophies (Victor Ludorum) will be awarded to the person/s accumulating the highest sum of points awarded for individual placings in SAMAA and FAI events. Only the entrant's highest placing in one of each of the Speed, Aerobatics, Team Race and Combat classes will be considered for the Victor Ludorum score. In the case of a tie, the four highest placings are discarded and the entrant's next best scores in the remaining events of each of the four classes will be considered. Scores are allocated from the following table:

1 st place	9 points
2 nd place	6 points
3 rd place	4 points
4 th place	3 points
5 th place	2 points
6 th place	1 point

Processing of the Model Characteristics

- i. A competitor may interchange various parts as he wishes provided the resulting model conforms to the rules of the contest and that the parts have been checked before the start of the contest.
- ii. Repairs are permitted provided they do not in any way alter the characteristics of the model as defined in the rules and regulations.
- iii. When, after official checking, a model is lost or damaged, the competitor shall have the right to present a further model for checking up to one hour before the official starting time of the contest. In any event, the competitor may have only the eligible number of models entered (see **Processing of the Model Characteristics and Number of Models**, paragraph i.) at the start of the contest.
- iv. The organiser must appoint at least two processing officials, who will process at random the important model characteristics of at least 50% of competing models during the official contest time.
- v. Results are subject to the rechecking of the characteristics of the first, second and third place winning models.

Protests

All protests must be presented in writing to the Contest Director at the competition and must be accompanied by a fee. The amount of this fee shall be stated in the local rules. The deposit is returned only if the protest is upheld.

Time Limit for Lodging Protests:

- i. Before the opening of the contest: Protest against the validity of an entry, qualification of competitors, the contest rules, the flying and contest area, the processing of models, the judges or other contest officials, must be lodged at least one hour before the opening of the contest.
- ii. During the contest: a protest against a decision of the judges or other contest officials or against an error or irregularity committed during an event by another competitor must be lodged within 30 minutes of the occurrence.
- iii. After announcement of the results: any protest relating to the results must be submitted through the SAMAA Control-line delegate within 15 days after announcement of the results by the organiser. If necessary this protest may be passed to the SAMAA Committee.

Safety Precautions and Instructions

- i. Most of the model flying today in most countries takes place as recreation, rather than within a competition framework and sometimes on publicly accessible sites with little or no formal control. Any accident involving model aircraft may result in property damage, injury and possibly even death. Apart from the direct harm, a less obvious result is the poor image of model flying that comes from the media coverage of such incidents, which leads to public antagonism, and the loss of flying facilities.
- ii. While the following information is intended primarily for SAMAA competition flying, much of it can be applied both to domestic contests and recreational model flying.

Premise

- i. It is very important that all model flyers observe safety rules. Any accident caused by carelessness is a hindrance to the progress of model aviation.
- ii. Safety rules are not obstacles to the enjoyment of model flying; they help to prove that model flyers are the responsible *individuals* they proclaim to be.
- iii. It is not a sign of intelligence to show one's own skill among spectators. The flyer may know what he is doing but has no way of knowing what anyone else will do. So, it is to his personal benefit to make certain that no action on his part will result in an accident. It is therefore very important not to fly any model aircraft in competition or in the presence of spectators until it has been proved airworthy by having been previously flight-tested.

Competence

The following officials must be competent to apply and enforce safety rules:

- i. the Jury;
- ii. the Contest Judges;
- iii. the Contest Director;
- iv. the Circle Marshals;
- v. the Processing Officials;
- vi. the Leaders of the Organisation;
- vii. the Club or other officials.
- viii. the Timekeepers;

Prohibited

- i. Metal-bladed propellers;
- ii. Repaired power propellers;

- iii. Improperly mounted engines;
- iv. Knife-edge leading edges;
- v. Sharp spinners or propeller fasteners;
- vi. Any ballast or heavy parts subject to jettisoning; No jettisoning may occur in flight. Any jettisoning will result in disqualification of the contestant/team from that particular flight.
- vii. Fishing swivels may not be used on any lines. For speed and team race, turned steel or brass buttons over which a doubled loop fits tightly are preferred for line attachment at both ends. Sullivan clips are good substitutes in all events.
- viii. Only continuous strand Carbon, Kevlar and Glass fibre propellers, wooden propellers, and proprietary brands approved by the SAMAA Control-line subcommittee are permitted to be used on engines that exceed 20000rpm on the ground.
- ix. No model aircraft capable of a speed greater than 180 km/h shall be allowed to fly unless arrangements have been made to keep spectators behind a safety fence/net or a minimum distance of 20m away.

Recommended

- i. The model should bear an identification of the owner. Note this is a requirement in some classes.
- ii. All spinners and other forward-facing metal or equally rigid projections should have a minimum radius of 5 mm.
- iii. All models shall have their mass shown on the left wing panel in letters at least 5 mm high (metric units) to simplify pull testing.
- iv. *Models that have not been tested and proven airworthy should not be flown in the presence of spectators. Attempt to conduct all flights in a way that avoids danger to spectators and other flyers.*

Pre-flight Checks

- i. Immediately before each flight, the flyer must verify the actual conditions and the proper functioning of all parts contributing to an efficient and safe flight of the model and the proper fitting and fixation of the various parts, with special reference to engines and propellers.
- ii. Immediately after the helper has launched his model, he must leave the starting area and remove his equipment *unless the helper is needed for the normal functioning of the relevant class as allowed by the class rules.*

Flying Sites

It is imperative that all flying sites are situated as far as possible from power lines.

Penalties

All dangerous models must be excluded from the competitions. For any action against the Safety Rules, the penalties listed in the Sporting Code General Section apply.

Disqualification From the Contest

All competitors using a model, equipment or fuel that does not conform in all respects to the rules and regulations of the contest or which have not been verified by the organisers shall be disqualified from the contest.

The Contest Organisers/Jury may disqualify any competitor for unsporting/upsetting/violent/dangerous/unacceptable conduct which in the opinion of the Organiser/Jury is detrimental to the contest.

Disqualification must be applied after any action contrary to paragraph “**Processing of the Model Characteristics and Number of Models**”

The Jury shall notify the participant immediately and quote the reasons for disqualification.

SAMAA CHAMPIONSHIP TROPHIES

Custody

All trophies adopted by SAMAA for award to individual or team winners of championship contests shall be considered in the custody of SAMAA.

Ownership

Dependant upon the terms of presentation, trophies shall be considered the property of either SAMAA or the donor. A schedule of ownership shall be maintained by the SAMAA committee.

Award

Trophies shall be awarded to the holder annually. In those instances where for any reason a trophy is not awarded over a period of five years, custody of the trophy shall revert to the donor.

Holders of the trophies shall be responsible for:

- i. Maintaining the trophy in good condition.
- ii. Engraving the name of the winner and date of the award in the manner established by previous winners, where the facility therefore is provided.
- iii. Insurance against loss for the period during which it is held.
- iv. Delivery of the trophy to the organisers of the next championships to the address and by the date requested by the organisers. The paragraph "Collection of Trophies" refers. Should no request be made, the trophy shall be delivered to SAMAA at least six weeks before the date of the championships.
- v. For purposes of identification, the holder shall be the Aero Club concerned.

Collection of Trophies**Organisers of championships shall be responsible for:**

- i. Requesting delivery of trophies by a specific date and to a specific address from the person/Club concerned.
- ii. Supply of duplicate copies of all correspondence and the name and address of the subsequent trophy holder to SAMAA.
- iii. Obtaining a letter of receipt from the representative of the SAMAA.
- iv. Delivery of the trophy to the organisers of the next Championship to the address and by the date requested by the organisers. The paragraph "Collection of Trophies" refers. Should no request be made, the trophy shall be delivered to SAMAA at least six weeks before the date of the Championships.

Registration of Trophies

SAMAA or the Aero Club shall maintain a master register of trophies listing the holders, donor and giving terms of presentation and acceptance. This register shall be maintained by the Secretary no later than the annual meeting of SAMAA each year. Acceptance of Trophies Donors of trophies considered being "Perpetual" (i.e. remaining the property of SAMAA or the donor) and proposed for an award at championships shall declare their intent to the SAMAA not later than the date of closure for the agenda each year. Acceptance of the trophy shall be conditional on a majority vote in favour by members of SAMAA. Loss in case of loss or failure to award championship trophies, organisers of championships must present a statement of circumstances to SAMAA and propose replacement that shall be at the consideration of the donor of the original trophy and SAMAA.

ORGANISATION OF NATIONAL CONTESTS

The organisers must:

Take due consideration for the safety of spectators. Circuit surfaces shall be firm, smooth and free of grit or dust. The radius of all circles shall be clearly marked with a prominent line at least 25 mm wide. Provision of adequate practice areas shall be made before and during championships.

Processing of the Model Characteristics and Number of Models

- i. The number of models eligible for entry is as follows
- ii. Class SAMAA Speed, Novice Aerobatics, Goodyear Class 2 and *Unified Goodyear*, two (2) only.
- iii. Class SAMAA Combat *and Class SAMAA Novice Combat* - unrestricted.
- iv. Any one model may only be used by one competitor during a competition, except in Speed where proxy rules are to be followed
- v. The competitor may provide himself with spare propellers and piston motors.
- vi. For all classes, all piston motors that might be used during the contest must be marked with an easily visible identification mark, details of which must be recorded at the time of checking the model. Motors checked and recorded in this way may not be exchanged with other competitors.
- vii. Each model shall carry a model identification code, which is to appear on each part of the model (wing(s), tail, front and rear fuselage if detachable) so that the individual parts of a competitor's different models may be separately identified. The identification code of the nominated models (refer paragraph concerning number of models eligible for entry) will be recorded on the scrutineering sheet.
- viii. Each model must bear the SAMAA Number of the competitor. The letters or figures must be at least 10 mm high and appear at least once on each model (preferably on the upper surface of the right wing).
- ix. The maximum noise level in all classes except for Speed and Open Goodyear will be 96dB(A) measured at 3m from the centreline of the model with the model placed on (or with a combat model, at a safe distance above) the ground over concrete or tarmac at the flying site. With the motor running at full power, measurement will be taken at 90° to the flight path on the right-hand side and downwind of the model. The measuring device shall be positioned approximately 30cm above the ground pointing towards the motor. No noise reflecting objects shall be nearer than 3m to the model or measuring device. The noise measurement will be made during processing of the model and at any other time at the Contest Director's discretion.
- x. If a concrete or tarmac surface is not available then the measurement may be taken over bare earth or short grass, in which case the maximum noise level will be 94dB(A).
- xi. With a model failing the noise test, the entrant will be granted one additional chance to comply, where after if the model fails the test again, it shall be withdrawn from the competition.
- xii. All line lengths are measured from the inboard face grip of the control handle to the centreline of the model.

2. INDIVIDUAL CLASS RULES

2.A. SPEED MODELS

Definition of Speed Models

Aeromodel in which a piston motor provides the power and in which lift is obtained by aerodynamic forces acting on the supporting surfaces, which must remain fixed (except control areas) during flight. The object of the model is to obtain a maximum speed sustained under its own power over the measured course. Supercharging or turbocharging, whether it is engine driven or by a gaseous boost of any type shall also be prohibited. This does not include tuned exhaust systems. Only naturally aspirated engines shall be allowed in speed events.

Applicability.

All pertinent SAMAA regulations and the General Control Line rules shall apply except as specified below.

The builder-of-the-model rule shall not apply to any CL Speed event for any age grouping.

Entry Participation Requirements.

Junior and Senior entrants must fly their own models unless they meet the requirements for a proxy flier. Others may operate the starting equipment.

An Open entrant may either fly his entry or start and regulate the engine and launch the model. Others may operate the starting equipment. If the entrant elects not to fly the model, the designated pilot must show a valid SAMAA membership and be in the same age group as the entrant; (or if the pilot is younger the pilot must have the event director's approval.) The contest Director must assure himself that the younger pilot is capable of safely flying the aircraft. If the entrant elects not to fly the model, he shall clearly indicate to the officials that he is going to perform the starting function and give the name of his designated pilot for the attempt. The entrant may not change his elected function after the starting rime for the attempt has begun. There are no restrictions on using different pilots on different attempts or on the entrant from changing his elected function on different attempts. The provision above takes precedence over the Proxy Flying and Team Entry paragraphs of the Sanctioned Competition section of these regulations. These provisions do not apply to contestants who arc flying for Individual, Category, Team, or Club Championship points; such contestants still are required to fly their own entries except in the case where they are eligible for a proxy flier.

Classification of Control Line Speed Models.

Models powered by reciprocating engine(s) are classified by total piston displacement of engine(s) as follows. There is only one (I) classification for models powered by jet engine(s).

Class ½A	.0000 - 0604 cubic inch
Class A	.0605 - .1525 cubic inch
Class B	.152 - .3051 cubic inch
Class D	.3052 - .6500 cubic inch
Open ½A Profile Proto	.000 - 0504 cubic inch
.21 Sport Speed	.198 - .2135 cubic inch
.21 Proto	.00 - .2135 cubic inch
Formula "40"	.2800-4028 cubic inch
Jet	N/A

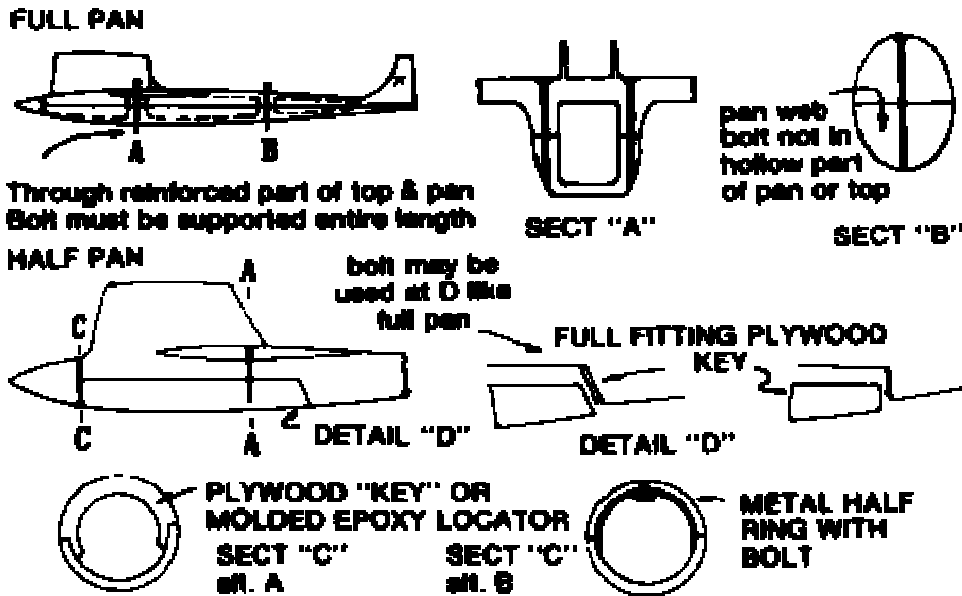
Juniors are not permitted to fly Formula "40" or D speed.

If desired, two (2) or more classes maybe combined, so long as the displacement limits given are observed.

Regulations for ½A, A, .21 Sport, .21 Proto, B, Formula .40, D, and Jet follow .

Model Design and Construction.

There are no wing loading, power loading or cross-sectional requirements. The method of "hold down" construction for holding two parts of the model together shall be considered, in the Contest Director's opinion, to be at least as strong as the methods illustrated.



Number of Models.

Each contestant shall be allowed two (2) models per event. A competitor may interchange various parts as he wishes provided the resulting complete model conforms to the rules of the contest. Each contestant is allowed to use the two (2) models in any combination, utilizing at most four (4) attempts, to make at most three (3) official flights. Only the two (2) models per event processed at the time of entry will be permitted. Each h model must have the same SAMAA number(s) and must be identifiable by distinguishing marks or characteristics so they can be differentiated for pull test requirements.

Model Weight.

Models shall be weighed in complete, ready-to-fly condition, including fuel. Maximum model weights and pull tests shall be based on these weights.

CL Speed								
Class	Max	Minimum	Required Minimum Diameter of Each Line					Pull Test
			Single Strand			Multi Strand		
Engine Size (Cubic Inch)	Model Weight	Line Length	1 Line	2 Lines	3 Lines	2 Lines	3 Lines	
1/2 A .00 - .0604	10oz. 283.5g	47' 5" 14.468m	0.014" 0.356mm	0.012" 0.3mm	-----	-----	-----	48G
1/2 A Proto .00 - .0604	9oz. 255.15g	42' 12.802m	-----	0.010" 0.25mm	-----	-----	-----	32G
A 0606-1525	22oz. 623.7g	60' 18.288m	0.022" 0.56mm	0.018" 0.46mm	-----	-----	-----	48G
.21 Proto Speed .00 - .2135	30oz. 850.5g	60' 18.288m	-----	0.016" 0.41mm	-----	-----	-----	32G
.21 Sport Speed .198 - .2135	26oz. 737.1g	60' 18.288m	-----	0.018" 0.46mm	-----	-----	-----	40G

B .1526- .3051	32oz. 907.2g	70' 21.336m	0.024" 0.61mm	0.020" 0.51mm	-----	-----	-----	48G
Formula 40 .28 - .4028	34oz. 963.9	60' 18.288m	-----	0.020" 0.51mm	-----	-----	-----	48G
D .3052 - .6500	47oz. 1332.4g	70' 21.336m	0.033" 0.84mm	0.026" 0.66mm	-----	-----	-----	52G
Jet	47oz. 1332.4g	70' 21.336m	0.033" 0.84mm	0.024" 0.61mm	-----	-----	-----	48G

Engine Restrictions.

Sixty percent of the actual piston displacement of four-stroke cycle engines shall be taken for competition classification purposes.

No restrictions are placed on the design of the engine(s) used for Jet Speed, except that the total internal cross-sectional area of the tailpipe(s) at the point of minimum cross-section shall not be greater than 1.25 square inches. Afterburners are not permitted, but augments tubes and/or other ducting devices not making use of combustion may be used.

Control Line Speed models are exempt from any muffler requirement and noise standards or limits contained in the General or Control Line General sections of this book or in any other document.

½A Profile Proto is restricted to "open face" exhausts for all age classes.

The .21 Sport Speed, 21 Proto Speed, Formula "40," Open D, Junior ½A, Junior A, and Junior B Speed events are restricted to constant diameter exhaust extensions ("minipipes") or "open face" exhausts. The overall length of the constant diameter exhaust extensions is restricted to a most six (6) inches measured from the centreline of the cylinder along the centreline of the exhaust system to the end of the exhaust extension. No tuned or untuned megaphone or expansion chamber exhaust extensions shall be allowed in these events.

Open ½A, Open A, and Open B are the only Speed events without exhaust extension restrictions.

Juniors may elect to use the Open class exhaust restrictions when flying at contests with their class combined with the Open class or if they elect to fly in the Open age group at a contest that does have a separate Open category. National junior records may be set only when the junior class exhaust restrictions are followed. Juniors may apply for Open records when Open class exhaust restrictions are followed.

Engine Use Restrictions

Once an engine (i.e., crankcase, piston and sleeve or jet head and tailpipe) has been used by a contestant to make an official attempt in an event, the same engine cannot then be used by another competitor in that same event in the contest. This does not restrict the number of different engines a contestant may use to make his attempts in an event, nor does it mean that engine commitment to a given competitor must be made at the time of processing as is the practice in FAI. Engine commitment is not made to a given contestant until said engine is used to make an official attempt for that contestant.

This rule is solely intended to prevent the same engine from being used by more than one (1) competitor in a given event at a given contest.

Fuel

The contest organisers will supply fuel of standard formula. The percentages of ingredients in the fuel mixture supplied must be accurate, consistent with careful and accurate mixing techniques. Fuel for two-cycle glow plug engines of more than .0504 cubic inch displacement shall contain not more than 10% nitro methane, not less than 20% lubricant and the rest shall be methanol. Fuel for jet engines shall consist of 80% methanol and 20% propylene oxide.

Control Line Specifications and Pull Test.

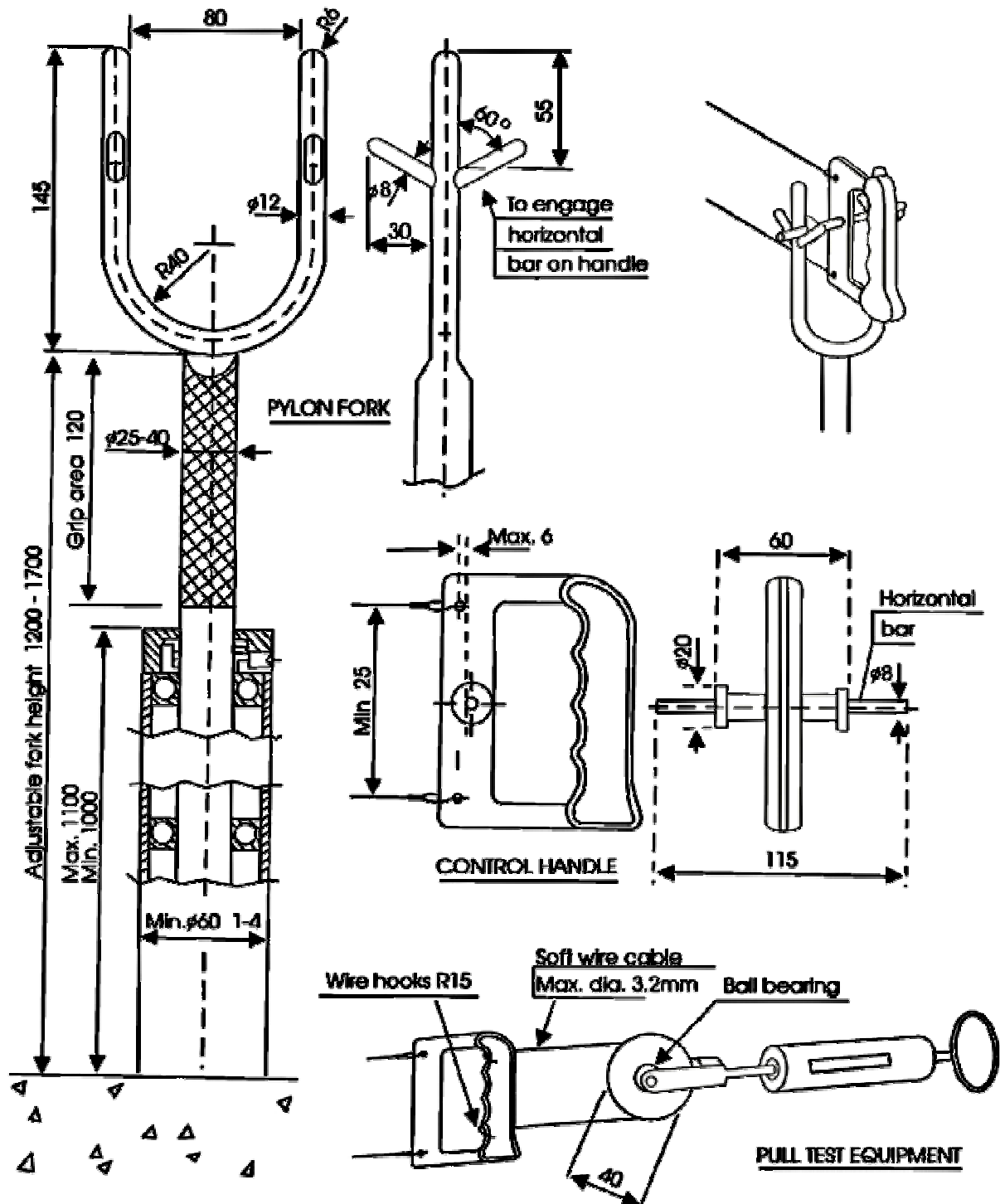
As per chart. Lines of braided or stranded construction will not be allowed in any CL Speed event. All lines used to control flights shall be of steel music wire type ASTM A228, only. The line sizes stated in the chart are applicable regardless of model weight.

When a crossbar is used on a Speed handle to engage the pylon fork, the line length is measured from the front of the bar to the aeroplane centreline. The safety thong must still be used, and the pull test is per the chart.

In the event of a line failure on a two-line model, the remaining line must be scrapped due to potential stress damage.

Control handles providing for easy adjustment of overall length of control lines are prohibited in all Speed and Proto Speed events.

Pylon Specifications



Competition Flying.

From a Pylon. The Contest Director shall provide a substantial fixed pivot post or pylon from which all official Speed flights shall be controlled. The pylon shall be between elbow and shoulder height, preferably adjustable, and equipped with a freely revolving yoke hand rest for centering the flight path. During the entire period when official timing is being made, and for at least three (3) laps immediately preceding, the contestant shall keep his wrist (defined as within three (3) inches of the wrist bone), or his hand holding the control handle or control handle device, on the hand rest between the forks.

"Wrist" or "hand" does not apply if a crossbar on the handle is used to engage the pylon fork on the side opposite the aeroplane. (See paragraph titled "Control Line Specifications and Pull Test" for measuring line(s) if crossbar is used.)

Without a Pylon. When a pivot post or pylon is not provided, or when weather conditions do not permit their use, a six (6) foot diameter ring is to be marked at the centre of the flight circle within which the flier shall remain while the flight is being timed. Such flights will not be considered for record purposes.

Whipping. Whether flying from a pylon or without, any attempt by the flier to shorten the effective length of the control line(s) or touch the line(s) between the control handle (device) and the model shall constitute a foul. Except when a pylon is not required, it shall be mandatory at every sanctioned meet for one (1) official, with field glasses, to be assigned the duty of watching the flier to determine if he is leading (whipping) the model. Any attempt to whip the model more than is necessary to get it safely airborne shall constitute a foul, disqualifying the flight. Two (2) such fouls in an event shall disqualify all flights in that event. This shall apply to all classes in the Speed event.

At any time during the clocking, any excessive vertical movement of the monoline handle stem shall constitute an attempt to shorten the effective length of the line (see 10.3). Excessive movement of the tip of the stem from a straight line formed by the stem and the flying line at any time during the flight shall not be allowed. This is a judgement call by the official with the field glasses. The monoline system was designed to control the model by twisting the line, not by raising and lowering the control device. Although it would take a considerable bend to actually shorten the line enough to affect the timed distance, excessive movement at the tip of the stem causes a bend of the flying line at that point, and repeated bending at this point can greatly weaken the line.

In any contest or any meet where speed is not required to be flown from the pylon, only two (2) stopwatches shall be required to record the flight, and no field glasses are required. The average of the two (2) watches shall be used for scoring purposes.

Timing of Flights

Except as specified in 10.4, at least three (3) timers, equipped with stopwatches having one-tenth (1/10) second or finer graduations, shall time flights in unison from a point on the opposite side of the circle from the timing pole or marker. Timing shall start immediately after the third complete lap has been flown from the pylon according to "competition flying from a pylon. If the flier so chooses, he or his pit crew may give a prearranged signal to the timers as to when to start the three (3) preliminary laps before timing starts; if this is done, timing shall start after at least three (3) full laps in the pylon have been completed following the prearranged signal to the timers (in accordance with Competition Flying From a Pylon). The reference for counting laps and starting watches is when the model passes the timing pole or marker.

Scoring of Flights. The best official flight by each competitor in an event, in terms of miles per hour, shall be used for competition and record scoring. The average of the three (3) watches shall be used for scoring. Records shall be recognised only when no more than .2 seconds variations exists between any of the three (3) watches. If the watches do not read within this required tolerance, and a record has been broken, the flier may request another attempt permitted. In the case when no record is broken, or if the flier does not elect to take another attempt, the average of the two (2) watches that are within .2 second of each other shall be taken for scoring purposes, disregarding the results of the third watch. If no two (2) of three (3) watches are within .2 second of each other the flier has the right to ask for another attempt, with the previous flight being cancelled, or to request that the average of the three (3) watches be used for scoring.

To separate the competitors in the case of a tie, the average of the competitors two (2) best flights will be taken. In the case of the two (2) best flights still producing a tie, the average of the three (3) best flights will be taken to determine the winner

To compute the score in miles per hour for ½A Speed, use the formula:

$$\text{Velocity} = \frac{1016.79}{(\text{time in seconds})}$$

Official Flight

An official flight occurs when the model has successfully completed the timed distance in accordance with these regulations, and an official timing (clocking) has been recorded.

Number of Flights

Each contestant shall be allowed four (4) attempts for three (3) official flights.

Engine Starting Time

The maximum time allowed for starting engines shall be three (3) minutes from the time the initial propeller turning sequence begins (or air is applied to the intake of a jet engine,) until the engine is running under its own power. The model may land and take off as many times as the flier wishes within the allowed starting time as long as the attempt is not automatically terminated for any of the reasons stated under the "definition of an attempt."

Definition of an Attempt

An attempt is the process of trying for an official flight within the allowed starting time. An attempt also refers to the failure to achieve an official flight during the starting time allowed. An attempt is declared when a foul is called as described in other paragraphs. An attempt is declared when the starting time has elapsed.

An attempt is automatically terminated and no further starting time is allowed when any of the following takes place: a part of the model is lost during the flight (this does not include propellers, but does include wheels and/or tires); a removable takeoff gear does not fall free of the model as it becomes airborne but does fall free later during the flight and it is not retained by the required safety line; the engine loses all or part of the propeller, and the engine continues to run and at excessive rpm ("shaft run" or "scream out") but the model does not become or remain airborne.

If the engine throws part of the propeller, but does not run at excessive rpm (does not "shaft run" or "scream out") after becoming airborne but without completing an official clocking, the Contest Director shall inspect the model before allowing the attempt to continue. At any time after a model has become airborne it then comes in contact with the ground or other obstacle while under power, resulting in an engine cut-off (not a shaft run), the Contest Director shall inspect the model before allowing the attempt to continue. This shall also be done when a jet model makes contact with the ground, causing the engine to shut off. This inspection time shall not constitute a part of the "starting time."

In the case of a large number of contestants and short flying hours, the Contest Director may elect to add further restrictions to the flying procedures in order for more flights to be flown in a given time. Example: allow only two (2) minutes from the time the flier is called to fly until his starting time begins, or a similar rule to speed up the contest. If any such procedures are to be used, they must be announced prior to the start of competition and preferably in contest advertisements.

Distance of Timed Course

For competition and record purposes, the model must complete the following distances.

Class	Distance	No. Laps
½A		5
½A Profile Proto	½ mile	10
A	½ mile	7
.21 Proto	1 mile	14
.21 Sport	½ mile	7
B	½ mile	6
Formula 40	1 mile	14
D Open	½ mile	6
Jet	½ mile	6

Timing Pole - Height Marker

A pole or reference marker shall be provided outside of the flight circle for timing and judging flights. Elevations of 15 feet for Classes ½A, A, .21 Sport, .21 Proto, B and Formula 40, and 20 feet for Class D and Jet are to be clearly marked for reference purposes. Maintenance of flight in excess of the above heights, as specified for the various classes, for more than ½ lap shall constitute a foul.

Proto Speed

All speed regulations for the size class of model shall be applicable except for the additions and modifications following.

Design of Proto Speed Model

Proto Speed models need not be scale, however the design must resemble that of a full-scale aeroplane. Models must have a profile fuselage, rudder or butterfly tail, and a clear cockpit or cabin in proportion to the total model. No pod and boom fuselages, flush or prone cockpits, or flying wing designs will be permitted unless they are scale models of full-scale aircraft. The model must be colourfully painted or colourfully trimmed so as not to permit clear-finished models. Models must satisfy the Control Line General profile definition on.

½ A Profile Proto Specifications

- i. Minimum wing span, 14" (12" for biplane,).
- ii. Minimum wing area, 45 square inches.
- iii. Minimum fuselage length, 12 inches.
- iv. Must have clear canopy
- v. Must have fixed landing gear, with minimum of two (2) main wheels permanently attached.
- vi. Main wheels must have a minimum diameter of 7/8 inches.
- vii. The landing gear must include at least two (2) main wheels of equal diameter, which are laterally separated from each other by a distance of at least two (2) wheel diameters.
- viii. Engines equipped with exhaust extensions of any kind are not permitted.
- ix. Models must have an exposed two line control I system.
- x. Models must have a side-mounted engine, and a fully exposed tank mounted on the same side of the fuselage as the engine. The tank may not form a fairing behind the cylinder head, but a fairing behind the tank is permitted.

Launching (Proto)

Models shall take off from the ground or runway under their own power.

Timing of Flights (Proto) shall be the same as for the respective size class of Control Line Speed, except as follows:

The timers shall be located on the opposite side of the circle from the launch point (180 degrees from launch point). The timing mark is an imaginary straight line going from the timers and passing through the pylon to the point where the model is launched. Sighting reference for counting laps and terminating the clocking is as the model passes behind the pylon. The flier may select his launching location.

Proto Speed will be timed from the instant the model is released for takeoff. The contestant will be allowed a maximum of 1½ laps in which to get the model airborne before he is required to fly from the pylon as specified under "Competition Flying From a Pylon". However, any attempt to whip the model more than what is necessary to get it airborne during the first lap and one half shall constitute a foul, disqualifying the flight. Any such whipping to get the model safely airborne must cease immediately when the model becomes airborne and is in a normal attitude.

Scoring of Proto Flights

The best official flight by each competitor in an event, in terms of miles per hour (mph), shall be used for competition and record scoring. The average of the three (3) watches shall be used for scoring. Records shall be recognised only when no more than .4 second variation exists between any of the three (3) watches. If the watches do not read within this required tolerance, and a record has been broken, the flier may request another attempt, and the flight with the discrepancy shall be cancelled and another attempt permitted. In the case when no record is broken, or if the flier does not elect to take another attempt, the average of the two (2) watches that are within .4 second of each other shall be taken for scoring purposes, disregarding the results of the third watch. If no two (2) of the three (3)

watches are within .4 second of each other, the flier has the right to ask for another attempt, with the previous flight being cancelled, or to request that the average of the three (3) watches be used for scoring.

To separate the competitors in the case of a tie, the average of the competitor's two (2) best flights will be taken. In the case of the two (2) best flights still producing a tie, the average of the three (3) best flights will be taken to determine the winner.

Records

Fliers establishing or surpassing a national speed record shall be required to make a supporting or verification flight within five (5) mph of the record flight on the same day as the record setting flight before it can be recognised for record purposes. Basis for this supporting flight shall be as follows.

After a record is broken during the contest, the flier shall be granted three (3) attempts to make a supporting flight within five (5) mph of the record flight. The flier has the option of making the supporting flight immediately after the record flight or at any time during the same day; however, the flier should not be permitted to delay the contest while he makes preparations for the supporting flight, but he should be worked into the starting line as soon as is reasonable. All supporting flight attempts shall be subject to the same starting restrictions as official contest flights (see Engine Starting Time paragraph).

Any official flights attempted during the contest after a record is broken shall be deemed attempts to satisfy the requirement of a supporting flight. The first three (3) official flights flown or the first four (4) attempts shall be considered the contest flights. This shall also hold true for multi day contests when the same event can be flown on more than one (1) day.

The most extreme case would occur where a flier broke the record on his third official flight (fourth attempt) during the contest. He would then be allowed a maximum of three (3) attempts after the contest to come within five (5) mph of the record flight.

If the flier's first or second attempt for a supporting flight is within the five (5) mph required, no further attempts shall be given for the supporting flight.

If the flier has made another official flight during the contest that was within the required five (5) mph, he will be required to use this as the supporting flight for record purposes.

If the supporting flight is faster than the record flight, it will become the record flight and the other the supporting flight. Under no circumstances can the record resulting from a supporting flight be over five (5) mph faster than an official contest flight. If the supporting flight was flown after contest hours and exceeded the contest record flight, the "after hours" flight can be used only for record purposes; it cannot be used as an official contest flight for scoring purposes.

SAMAA records for FAI class F2A speed shall be considered only when the flights have been made according to the FAI Sporting Code.

.21 Proto Speed

Objective

It is the purpose of .21 Proto to fly semi-scale, realistic aeroplanes in C/L speed competitions. Proto speed models need not be scale models however true scale subjects are highly encouraged.

Design

The model must have a full fuselage and rudder. Butterfly type stabilisers are not acceptable unless it is a true scale model. The engine can be mounted in any position, if mounted sideways model must have matching opposing cowling. A model with a small fuselage and helmet cowling used on traditional speed model designs is not acceptable. The model must have a cockpit or cabin as laid out in specifications following. No pod-and-boom fuselages, flush or prone cockpits or flying wing designs will be accepted unless they are actual scale models of full size craft.

The engine must be fully cowled except in the case of a scale model. If the builder wishes, the glow

plug or head fins may be exposed. Wing area enclosed in the fuselage will be considered, but area of fillets shall not be counted. The model must be carefully painted, with no all clear finishes¹. The entrants SAMAA membership number must be permanently affixed to the upper right hand wing surface at least 1" high prefixed with "RSA".

Aeroplane Specifications

The model shall have a minimum of 125 square inches of wing area; the stabilizer must be a minimum of 25% of the wing. Rudder/fin area shall be a minimum of 5% of the wing area. The minimum wingspan shall be 24" or 16 for a biplane. The minimum distance from the trailing edge of the wing to the leading edge of the stabilizer must be 5". The model must have a clear canopy, a minimum dimension of 3-1/2" in length by 1" high and 1" wide and shall house a scale pilot with a minimum of 1" in height. Pilot must have clear unobstructed view. The landing gear must be of the fixed type and similar to a full-size aeroplane. The main landing gear shall consist of two wheels spaced at least 6" apart between wheel centres. Wheels must have a minimum diameter of 1 1/2". The wing and stabilizer must be of equal span with no asymmetry, maximum deviation is 1/4". The weight limits of the aircraft (dry) shall be 20 oz. minimum and 30 oz. maximum.

True scale subjects are exempt from all specs other than minimum 125sq.in. wing.

Engine, Propeller and Fuel System

The engine shall have a maximum size in displacement of .2135 cubic inches. An open exhaust or mini pipe type exhaust system only A mini pipe cannot be longer than 6 inches from the centreline of the engine bore to the end of pipe. The inside diameter of the pipe shall be of constant size. Any fuel system is acceptable and the use of a shutoff is mandatory. Only standard two bladed propellers are acceptable, either wood or composite.

Flying Lines

Only two wire type control systems are acceptable. Minimum two wire sizes shall be (2) .016" x 60"0". The minimum wing tip separation of the lines shall be 0.20". The model and control system shall be subjected to a 32g-pull test.

Fuel

Fuel shall be of standard composition containing 10% Nitro Methane, 20% lubricants and 70% Methanol. Contest management will supply the fuel.

Distance of Timed Course

The model will be timed from the instant the model is released from takeoff for 14 laps (1 mile). The flyer will be allowed 1-1/2 full laps to get model airborne before entering the pylon. Any attempt to whip the model more than is necessary to get airborne during the first lap shall constitute a foul and the flight will be disqualified.

Judging

All models will be lined up where an experienced panel of three judges will place them in order of appearance from best to worst. The model aircraft will be inspected and judged upon REALISM, CONSTRUCTION and FINISH and models will receive points based on the following formula:

$$\frac{3}{\text{Number of entries}}$$

That is the three divided by the number of entries, with each model receiving points according to its position.

EXAMPLE:

Six entries divided into three equals .5 stagger of points from best to worst where the best model would get the maximum three points, 2nd would receive 2.5 points, 3rd would receive 2 points, 5th -1 point and 6th - .5. This works for any number of entries, the more entries the tighter the competition. Points are rounded out to the 100th.

¹Clear area of finish may not exceed 20% of the total models surface area (wing, stabiliser; fuselage, rudder).

Scoring. Each contestant uses their best Proto speed time in MPH converts that time to points and adds in the appearance points for the final tally

EXAMPLE:

'Joe Speedster': Proto Speed Time: 121.21 MPH Appearance Points 1.5 TOTAL 122.71 POINTS

Records. All records local or national will be expressed in the actual Proto speed time of the model only.

Handy 21 Proto Appearance Point Guide

Entries	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1st	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
2nd		2.00	2.00	2.25	2.40	2.50	2.57	2.63	2.67	2.70	2.73	2.75	2.77	2.79	2.80
3rd			1.00	1.50	1.80	2.00	2.14	2.25	2.33	2.40	2.45	2.50	2.54	2.57	2.60
4th				0.75	1.20	1.50	1.71	1.86	2.00	2.10	2.18	2.25	2.31	2.36	2.40
5th					0.60	1.00	1.29	1.50	1.67	1.80	1.91	2.00	2.08	2.14	2.20
6th						0.50	0.86	1.13	1.30	1.50	1.64	1.75	1.85	1.93	2.00
7th							0.43	0.75	1.00	1.20	1.36	1.50	1.62	1.71	1.80
8th								0.38	0.67	0.90	1.09	1.25	1.38	1.50	1.60
9th									0.33	0.60	0.82	1.00	1.15	1.29	1.40
10th										0.30	0.55	0.75	0.92	1.07	1.20
11th											0.27	0.50	0.69	0.86	1.00
12th												0.25	0.46	0.64	0.80
13th													0.23	0.43	0.60
14th														0.21	0.40
15th															0.20

.21 Sport Speed

Applicability

All pertinent SAMAA regulations (see sections titled Sanctioned Competition and General), the General Control Line rules and the CL Speed rules shall apply, except as specified below.

Engine Restrictions

Any engine from .198 to .2135cubic inch displacement may be used. Open exhaust or a mini-pipe may be used. The mini-pipe cannot be longer that six (6) inches from centreline of engine bore to end of pipe. The inside diameter of the pipe shall be of constant size.

Model Design and Construction.

- i. Models are to be of standard configuration. No asymmetrical designs allowed.
- ii. There may be no more than one (1) inch differential between the lengths of the left and right wing. This dimension shall be measured from the wing tip to the centreline of the fuselage.
- iii. The minimum distance between the lead-outs at the wing tip shall be no less than .200 inches.
- iv. The model can be designed with or without the use of a metal speed pan. Profile fuselage models are permitted.
- v. Propellers. Only standard two-blade propellers are permitted. No single blade propellers will be allowed.
- vi. Size, Construction, and Length of Control Lines. Size and length as per chart. Lines shall be constructed as described in the General Control Line section. Lines of braided or multi strand construction will not be allowed. No single line control systems are allowed. A 40G pull test is required.
- vii. Flight Timing. The model shall be timed for seven (7) laps (½ mile) after three (3) complete laps are flown in the pylon.
- viii. Flight elevation shall be as per CL "A" Speed.

- ix. Flight scoring shall be as per CL. "A" Speed.
- x. Records. Requirements are the same as those listed in the Records paragraph of the CL Speed section.

Formula "40" Speed

Applicability

All pertinent SAMAA regulations, the General Control Line rules and the CL Speed rules shall apply except as specified below.

Formula "40" Description

This event is intended to be a common ground for competition between monoline speed fliers and two line racing fliers (and other two line pilots) using an engine size that is rapidly becoming the most highly developed and most commonly used of all model aeroplane racing engines. Because of the requirement for two (2) lines and fixed landing gear, it is hoped that newcomers will also enter this event. Formula "40" is limited to Senior and Open class fliers. Juniors are not permitted to fly Formula "40."

Engine Restrictions

Engine displacement is as per the chart. No tuned or untuned megaphone or expansion chamber exhaust extensions shall be allowed. Constant diameter type exhaust extensions are allowed, but only if the overall length as measured from the centreline of the cylinder along the centreline of the exhaust system does not exceed six (6) inches. There are no additional engine restrictions other than those that appear in the CL Speed section. Open face exhausts are permissible.

Formula "40" Model Design and Construction

There are no wing loading, power loading or cross-sectional requirements. The method of "hold down" construction for holding two parts of the model together shall be considered, in the Contest Director's opinion, to be at least as strong as the methods illustrated in the CL Speed section. Models shall have a fixed landing gear with a minimum of one (1) wheel.

Launching

Models shall take off from the ground or runway under their own power, unassisted (no hand launching or dollies).

Size, Construction, and Length of Control Lines

Size and length as per chart.

Lines shall be constructed as described in the General Control Line section. Lines of braided or multi strand construction will not be allowed. No single line control systems are allowed. A 48gpull test is required.

Formula "40" flight timing shall be from a standing start for 14 laps. The flight timing procedure shall be the same as for ½A Profile Proto.

Flight elevation shall be a maximum of 5 metres. Maintenance of flight in excess of 11 feet for more than one half lap shall constitute a foul.

Scoring of flights shall be the same as for ½A Profile Proto.

Establishment of Line Sizes and Pull Tests in C/L Speed

General. The SAMAA has adopted the following guidelines for determining minimum line sizes and pull tests in CL Speed. In all cases, wire strength shall be based upon minimum breaking strengths for ASTM A228 music wire as indicated in the chart. Maximum expected flight loads are based on record speeds in each class, and maximum weights where applicable. For speed events permitting single and two-line control systems, the established records shall be used for both monoline and two-line application unless separate records are established.

Maximum Expected Flight Loads. Maximum expected flight load, in G s, is calculated as shown:

$$\text{Max load(G's)} = \frac{0.0668 \times 1.2 \times V^2}{R}$$

where V= record speed in MPH, and R = line length in feet. Maximum expected flight load in pounds is equal to maximum load in G's, times maximum model weight in pounds.

$$\text{Max load (pounds)} = \frac{0.0668 \times M \times 1.2 \times V^2}{M}$$

M = maximum model weight (pounds).

Line Sizes. The line sizes for single line applications shall be such that the maximum expected flight load in pounds shall not exceed 56% of the minimum breaking strength of the wire size being utilised. If the maximum expected flight load exceeds this number, the line size shall be increased to the next standard wire size that will satisfy the above criteria. Additionally for two-line control systems, the maximum expected flight load in pounds must not exceed 86% of the minimum breaking strength of one wire. In the event this number is exceeded, the line size shall be increased as described above.

Pull Tests. The pull tests for CL Speed shall be such that the pull test, in G's , will be at least 1.10 times the maximum expected flight load in G's . In the event the pull test is less than the prescribed value, the pull test shall be increased to a value where the pull test in G's is at least 1.15 times the maximum expected flight load in G's.

Implementation. It is the responsibility of the Control Line Subcommittee Chairman/Delegate to monitor and maintain the line sizes and pull tests as described above. In the event where a record is established which necessitates an increase in line size, pull test, or both, any changes will be published concurrently with announcement of the new record. Changes will become effective immediately upon publication in the SAMAA News magazine. Changes are to be automatic, with no further action required by the Control Line Subcommittee.

Final Scoring

The speed is calculated as a percentage of the speed record of the corresponding class as in Appendix G of this Sporting Code. The person with the highest percentage wins, etc.

2.B. NOVICE AEROBATICS

Definition of an Aerobatic Model

Aeromodels in which the propulsion energy is provided by a piston motor(s) and in which lift is obtained by aerodynamic forces acting on the supporting surfaces that must remain fixed (except control areas) during flight. The object of the model is to perform the prescribed manoeuvres as detailed.

Characteristics of Control Line Aerobatic Models

- i. Maximum flying weight 5 kg
- ii. Maximum surface area (St) 150 dm²
- iii. Maximum loading 100 g/dm²
- iv. Maximum swept volume of the motor(s)
 - a. two stroke motor(s) 10cm³
 - b. four stroke motor(s) 15cm³
- v. The noise level should be checked according to the procedure outlined in para. vi of "**Processing of the Model Characteristics and Number of Models**".

Line Length

Line length shall be more than 15 metres but not more than 21,5 metres.

Line Tests (to be made before each attempt for an official flight)

- i. Line length is measured from the axis of the grip of the control handle to the axis of the propeller. Where two propellers are employed their axis of symmetry is taken as the reference for measurement.
- ii. A load test shall be applied to the assembled control handle, lines and model equal to 10 times the weight of the model.

Definition of an Attempt

There is an attempt when the model does not become airborne within three minutes of the starting signal, or the competitor does not enter the circle within two minutes from being called to fly, *or if the competitor calls for an attempt before the three minutes have elapsed.*

Number of Attempts

Each competitor is entitled to two attempts for each official flight. After the first attempt the competitor is entitled to make his second attempt immediately but if he leaves the circle he shall be called to make his second attempt at the end of the flying order.

Definition of an Official Flight

A flight is official when the model becomes airborne.

Number of Flights

Each competitor is entitled to three flights. Under exceptional circumstances, the Jury may reduce the number of flights.

Cancellation of the Flight

The flight is cancelled when jettisoning of permanent model parts occur at any time from the release of the model, to when the model stops forward motion on landing. With a crash, or a flip over, a belly or upside down landing, the flight is not cancelled.

Number of Helpers

Each competitor is entitled to two helpers.

Execution of Manoeuvres

The manoeuvres must be executed in the order listed. Between the end of one manoeuvre and the start of the next one the competitor must fly a minimum of 2 laps. The competitor may attempt a manoeuvre only once in any one flight. The competitor must complete the flight programme within 6

minutes including the take off and landing. This 6-minute time limit commences when the participant gives a hand signal before starting his motor, but not later than 3 minutes from the moment he has entered the circle. The motor *may* be started *with an electric starter*. Timing ceases when the model stops forward motion on landing. No *electric/electronic/mechanical* system or device may be used to stop or control the engine run.

Scoring

During the flight, each complete manoeuvre may be awarded marks between 0 and 10 in increments of 0,5 points by each judge. These marks are multiplied by a coefficient that varies with the difficulty of the manoeuvre.

A manoeuvre flown out of sequence will not be scored. Omitted manoeuvres are not scored, but succeeding manoeuvres are considered in sequence if flown in the proper order compared with the remainder of the flight pattern.

Judges and Timekeepers

The organisers must appoint a panel of at least three suitable judges. The judges must be the same for all competitors in any particular series of flights. With five judges being used, the highest and lowest score card for each flight will be discarded and only the three middle scores shall be counted. Aerobatic judges will be responsible for observing each attempt at an official flight and to record their awarded score for each manoeuvre as it is executed. There shall be training flights for judges, with a briefing before and debriefing after. A timekeeper shall show elapsed time from the moment the competitor gives a hand signal before starting his motor, at one minute and six minutes stages.

Classification

- i. The judges' marks multiplied by their appropriate coefficient are added for classification of the competitors.
- ii. With a two-way tie for 15th place both competitors are classified as number 15 and the following competitor is number 17; with a three-way tie for 15th place, all three will be classified as number 15 and the following competitor is number 18; etc.
- iii. At contests the classification will be done according to:
- iv. The sum of the best two flights in case of three flights;
- v. The best single flight score in case of two or one flight(s).

List of Aerobatics Manoeuvres

1. Starting	k =1
2. Takeoff	k=2
3. Reverse wing-over	k =8
4. Three inside loops	k =6
5. Inverted laps (2 laps)	k =2
6. Three outside loops	k =6
7. Two inside square loops	k =12
8. Two horizontal eights	k =7
9. Two vertical eights	k =10
10. Two overhead figure eights	k =10
11. Landing	k=5

Description of Aerobatic Manoeuvres

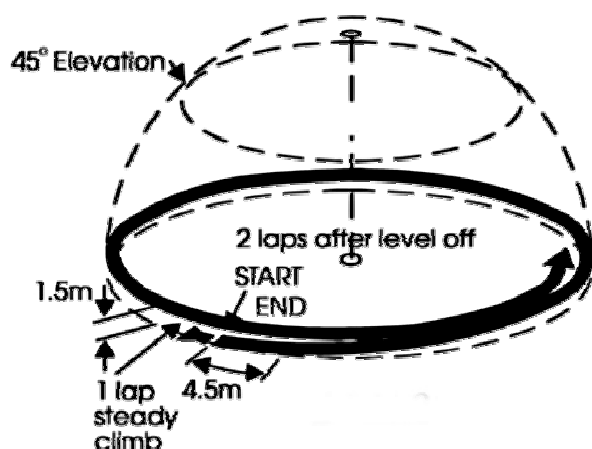
Note: The Novice Aerobatics Judges Guide is at Appendix A.

1. Starting

Release of model within one minute from the time the competitor gives a hand signal before starting his motor. The motor *may be started with an electric starter*. Release of model within one minute receives full points; release of model after one minute receives no points.

2. Takeoff

A correct takeoff consists of the model rolling smoothly along the ground for a distance of not less than 4,5 metres, but not greater than one quarter of a lap. The model then rises smoothly into the air with a gradual climb and a smooth level-off to normal flight level of 1,50 m over the point at which the model commenced it's ground roll. Model continues for two smooth laps of normal level flight at 1,50 m to point of original level-off.

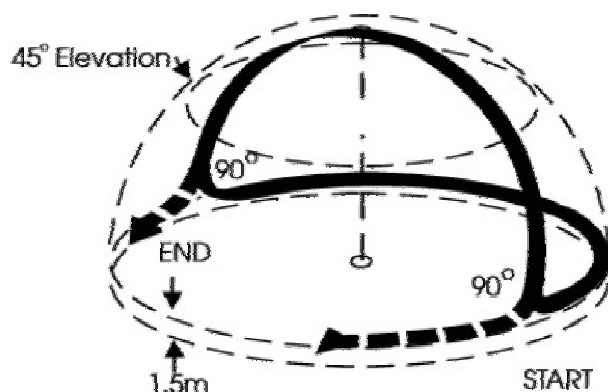


Errors:

Model bounces or becomes airborne too soon, or too late. Takeoff, climb or level-off is not gradual and smooth. Level-off occurs too soon, or too late. Level-off and normal flight level are not within a height of 1,20 m - 1,80 m.

3. Reverse Wing Overs (one required)

Correct reverse wing overs are judged when model starts from normal flight level, makes a vertical climb and dive, passing directly over the flyer's head, cutting the ground circle in half, and recovers in an inverted position at normal flight level. The model continues for half a lap inverted, to the starting point, then makes a vertical climb and dive over the centre of the circle from inverted flight, recovers at normal flight level.



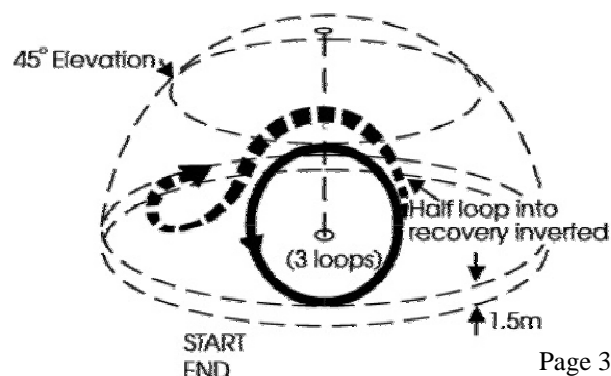
Errors:

First Half: Model starts at other than normal level flight, wobbles when going into the climb. Model does not cross directly over flyers' head. Model does not cross the circle in a straight line. Model wobbles or recovers at other than normal flight in an inverted position. Model does not cut the circle in same position and direction in second part of the manoeuvre.

Second Half: Scores the same as first half, reversing the entry and recovery positions.

4. Consecutive Inside Loops (three required)

Correct loops are judged when the model starts from normal flight level and makes a series of three smooth round loops, all in the same place with the bottoms of the loops at normal flight level and the tops of the loops with the line(s) at 45 degrees elevation. The model then continues for another half loop, recovering inverted and descending to normal flight level, flying two laps before being judged for inverted flight.

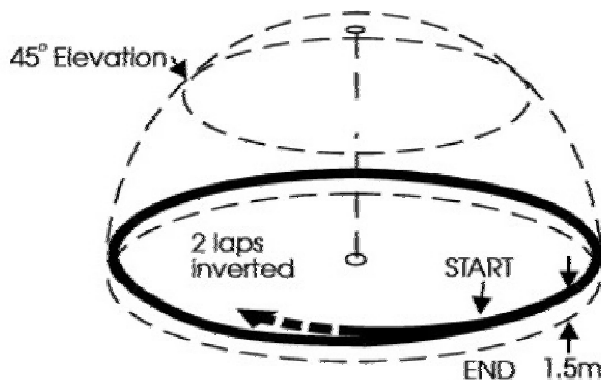


Errors:

Loops are rough and irregular (i.e. egg-shaped, hexagonal, etc.). Bottoms of loops are not at 1,20 - 1,80 m height. Tops of loops vary more than 0,60 m, plus or minus, of the 45 degrees

elevation point. Second and third loops vary more than 0,60 m from the path of the first loop.

5. Inverted Flight (two laps)

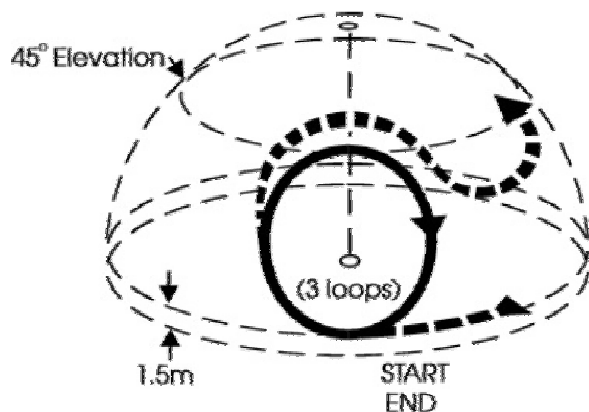


Correct inverted flight is judged when the model makes two smooth, stable laps at normal flight level.

Errors: Height is not 1,20 m - 1,80 m. Height varies more than 0,60 m.

6. Consecutive Outside Loops (three required)

Correct loops are judged when model starts from inverted position at normal flight level and makes a series of three smooth, round loops, all in the same place, with the bottoms of the loops at normal flight level and the tops of the loops with the line(s) at 45 degrees elevation. The model then continues for another half loop, recovering at normal flight level.

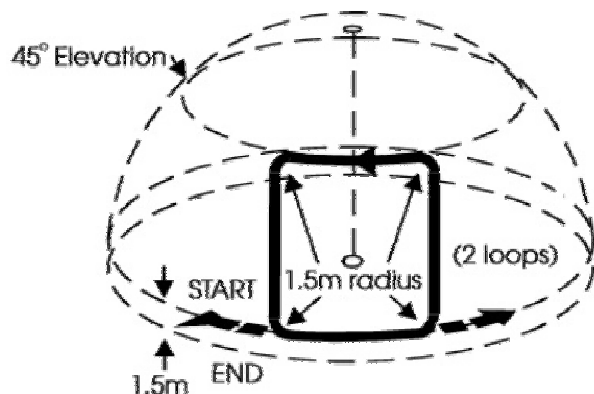


Errors:

Loops are rough and irregular (i.e. egg-shaped, hexagonal, etc.). Bottoms are not at 1,20 m - 1,80m height. Tops of loops vary more than 0,60 m, plus or minus, of the 45-degree elevation point. Second and third loops vary more than 0,60 m from the path of the first loop.

7. Consecutive Inside Square Loops (two required)

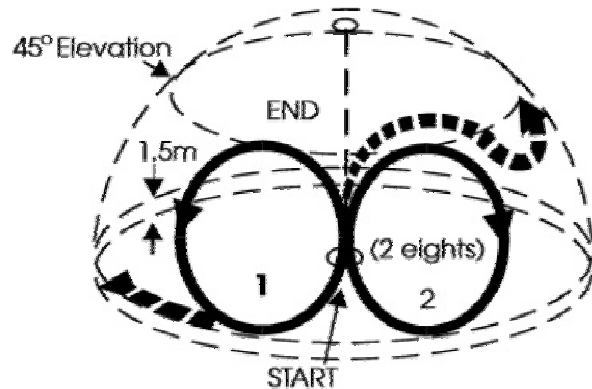
Consecutive inside square loops are judged correct when the model starts from normal flight level and flies a square course consisting of two loops, each with four inside turns of approximately 1,5 metres radius and straight equal sized segments, with bottom segments at normal flight level and top segments as inverted flight at 45 degrees elevation. The two bottom corners are equal and so are the two top corners. The manoeuvre begins and ends with the model in level flight at the point of the start of the first turn.



Errors: Model wobbles on turns. Lower height is not between 1,20 m - 1,8 m. Upper height is not within 0,60 m of the 45-degree elevation point. Turns are not precise and exceed 2,10m radius. Sides of loops are not equal. Second loop is not in the same flight path as the first loop.

8. Horizontal Eights (two required)

Horizontal eights are to be entered and completed at the intersection point of the circles and exit at the same point. The inside loop must be flown first. Correct eights are judged when the model makes two eights, each consisting of two round circles or loops of the same size, tangent to each other, and in a horizontal line. The model must enter the eight from normal flight level and be vertical at the intersection point of tangency of the circles. The eights must be symmetrical. At the top of each circle the model must be at the 45 degrees elevation point; the bottoms of circles must be at normal flight level.

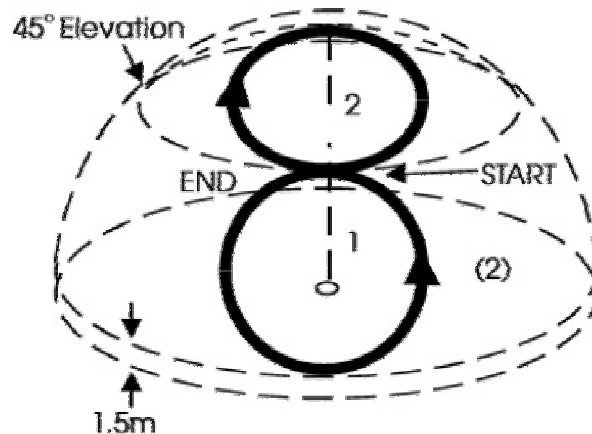


Errors:

Model is not vertical at entry. Model at top of circles is not within 0,60 m of 45 degrees elevation point. Bottom of circles not within 1,20 m - 1,80 m height. Loops are not round and equal in size. The point of intersection varies. Second eight is not in the same position as the first.

9. Vertical Eights (two required)

Vertical eights are to be started at the point of 45 degrees elevation and finished at the same point in inverted flight. The inside loop must be flown first. Correct eights are judged when the model makes two eights, each consisting of two round circles or loops of the same size, tangent to each other, and in a vertical line. The model must be horizontal at the intersection point of tangency of the two circles. The eights must be symmetrical, the top of the heights at a point 90 degrees over flyers' head, and the 1.5m bottom of the heights at normal flight level.

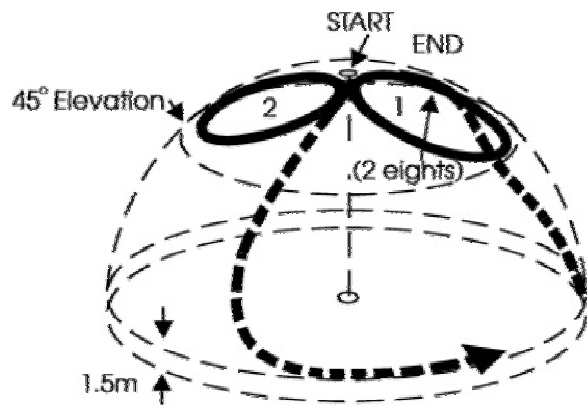


Errors:

Model is not horizontal at entry. Entry is not within 0,60 m of the 45 degrees elevation point. Tops of eights are not within 1,20 m from the 90 degrees point. Bottoms of eights are not at a height between 1,20 m - 1,80 m. Loops are not round and equal in size. The point of intersection varies. Second eight is not in the same position as the first.

10. Overhead Figure Eights (two required)

Overhead eights are to be entered and completed at the intersection point of the circles, directly over the flyer's head, and exit from the same point. The inside loop must be flown first. Correct overhead eights are judged when the model makes two eights, each consisting of two round circles of the same size, with the intersection or point of tangency directly over the flyer's head. The model must enter the eights with a vertical climb through the centre of the circle, and must always point in this direction at the centre of the eights. The eights must be symmetrical and the model at the lowest point of each circle must be at a point of 45 degrees elevation.



Errors:

Model is not vertically overhead at entry. Low point of circles is not within 0,60 m of the 45 degrees elevation point. Loops are not round and equal in size. The point of intersection varies. Second eight is not in the same position as the first.

11. Landing

A correct landing is judged when the model descends smoothly from normal flight level to land with no bounce or unusual roughness, and without any part of the model other than the landing gear having touched the ground. The model comes to a stop within one lap from point of the touchdown. The point of touchdown is one lap after the point at which the model begins its descent from level flight. Main wheel(s) or three point landings are permissible. Errors:

An error is committed whenever the model bounces or when any part of the model other than the landing gear touches the ground. A crash, or a flip over, a belly or upside down landing receives no marks. Descent from level flight is not smooth, or is shorter or longer than one lap. Model does not come to a stop within one lap. *"The mark zero (0) points shall not be awarded for this manoeuvre if the model aircraft flips over during the ground roll out phase and if, in the opinion of the judges, a) the flip was due to adverse wind conditions, or if, b) the flip over was due to poor ground surface conditions affecting what would be otherwise be predictable as the model aircraft's normal ground roll after touching down."*

Any unusual circumstances, outside the pilot's control, which may have caused one of these errors will be taken into consideration by the judges.

Note:

Illustrations are for anti-clockwise flight and are reversed for clockwise flying.

2.C. TEAM RACING UNIFIED RULES

Definition of a Team Racing Event

- i. A team racing event is a contest during which eliminating races are followed by semi finals and a final, in which two or three specially built models participate simultaneously, flying around the same circuit, each of them being entered by one team consisting of a pilot and one mechanic.
- ii. No member of a team may be a member of another team.
- iii. A race is run over a set number of laps corresponding to the distance to be covered. The time taken by each model to cover that distance after the start signal is registered.
- iv. During the race the pilots remain in the centre of the circuit. Their only function is to control the model. The mechanics are placed outside the flight circle. Their function is to start and adjust the motor and if necessary to refuel when the model is on the ground, and generally to deal with the different operations that enable the model to race. The motor must be started by flicking the propeller by hand.
- v. During all races the mechanics must wear a safety helmet with a chinstrap strong enough to withstand the impact of a flying team race model.

Team Race Site

- i. A team race site must consist of two concentric circles that shall be marked on the ground.
- ii. Circle to be used by the mechanics: This is called the flight circle and is divided into six equal 60-degree sectors. At each sector a starting and refuelling area, one metre in length, shall be marked on the outside of the flight circle and be known as the "pitting area".
- iii. Circle to be used by the pilots: This is called the centre circle and always has a radius of 3 metres. The centre of this circle shall be marked with a distinctive spot of at least 0.3m diameter.
- iv. *Circle dimensions are found in Appendices D, F and G.*

Controls

No intentional twisting and/or linking of the two lines together shall be permitted between the point of the exit of the model and a point 300mm from the handle. The use of a flexible grouper(s) attached to the wingtip and extending a maximum of 20mm is permitted. *Control shall be by two lines and measurement of the diameter of the lines as required by the class rules shall be made with a suitably accurate measuring instrument at three points along the length of the lines. Preferably a micrometer should be used if one is available.*

Organisation of the Races

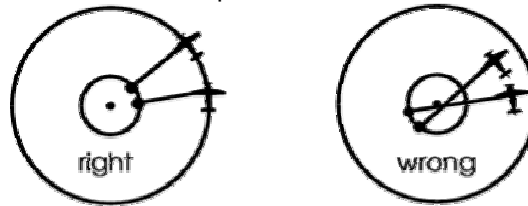
- i. Two or three competing teams are called for the contest after having been drawn for order. The teams may be allowed to run their motors just before entering the circle under the organisers supervision so that the running does not interfere with the starting procedure of a race.
- ii. A pitting area is occupied by each model that is to participate in the race. The model of the team designated first during the draw occupies the place chosen by that team. The other teams choose one of the remaining free pitting areas in the order of the draw. For the final, the choice of the pitting areas shall be according to the results of the semi-finals. The team with the fastest time chooses first, the team with the second fastest chooses next, etc. With a tie, the teams second fastest times in the semi final will decide the order of choice.

Race from Start to Finish

- i. Timekeepers are assigned to each team. They stand outside the flight circle, near the pitting area of the model that they control. They are in charge of lap timing and counting for their particular team.
- ii. A first signal given by the Circle Marshal authorises the mechanics to continue with the warming up of the motor(s), during 90 seconds. A second signal (visual and acoustic) announces the end of the warming up period and orders the mechanics to stop motors.
- iii. A period of 30 seconds is allowed for final preparations (filling of tanks) and the Circle Marshal announces the last five seconds by reverse counting.
- iv. The Circle Marshal through a visual signal gives the starting signal (flag) and a sound signal. At that moment the mechanics must be standing close to their model and the pilots must be

crouching on the border of the centre circle, with their control handles *as close to the ground as possible or as required by the contest organisers* . The starting signal must be "sharp" to enable accurate timing.

- v. Models must fly at a normal height of between two and three metres, except during overtaking, taking off and landing.
- vi. Pilots must keep their controlling hand and the model on a plane perpendicular to a line joining their shoulders and passing through the centreline of their body. Pilots must also keep their controlling hand on the vertical line between the middle of the chest and the top of the forehead, unless overtaking, taking off and landing when an exception of three laps is allowed.
- vii. Overtaking must be done by over flying, and the pilot must warn his or her fellow competitors of his or her intention to overtake them. The model is not in any case allowed to fly higher than six metres height when overtaking. The pilot being overtaken must on no account carry out any manoeuvre to impede the overtaking competitor. The pilot should always find him/herself on an imaginary line between the centre spot of the circle and the model.



viii. POSITION OF PILOT

- ix. The model is allowed to fly a maximum of two laps without the motor running.
- x. Landings take place inside the flight circle.
- xi. The model must touch the ground with its motor stopped before the mechanic is allowed to catch it.
- xii. After the mechanic has caught the model, he or she must go to the pitting area at (or immediately behind) the point at which the model was stopped. If that pitting area is already occupied, he or she must go to the next pitting area ahead of his or her stopping point. A pitting area is occupied if a mechanic is standing at such an area, even if his or her teams' model is still in the air.
- xiii. Should the model stop between two pitting areas, the mechanic must go to the nearest free pitting area.
- xiv. After the mechanic has caught the model, but only then, the pilot is allowed to place one foot outside the centre circle.
- xv. During the refueling and the restart of the motor, and until the time when he or she releases the model, the mechanic must keep the model in contact with the ground by at least one point and with the centreline outside the flight circle. During that time the pilot must be crouching or sitting inside the centre circle. He or she must keep his or her handle and lines close to the ground until the model starts again.
- xvi. The race ends when the number of laps completing the required distance has been covered by all the competing models or, when the official time limit has been reached, which is fixed at 10 minutes for eliminating races and semifinals, and at 15 minutes for finals.
- xvii. When the model has finished the race or when it cannot continue after a stop, its pilot must sit or crouch outside the centre circle if the other competitors are still engaged in the race, unless the Circle Marshal allows him or her to leave the centre circle before this.

Definition of an Official Flight

- i. An official flight is recorded for every participant in any race not granted an attempt.
- ii. Attempts are granted as follows:
- iii. Any team in a heat or semi-final interrupted through an obstruction or collision for which it was not responsible shall be granted an attempt.
- iv. In a final interrupted through an obstruction or collision before any of the participants have completed 50% of the laps the final shall be stopped and all competitors, except any who have at the point of stoppage of the race been disqualified, shall be granted an attempt.
- v. If, before 50% of the laps of an eliminating race or semi-final have been completed by any of the teams who started the race, only one team remains in the running and flying alone, the race shall be declared void and considered as an attempt for the remaining team. A team

- granted an attempt is allowed to participate in another race.
- vi. Should the result of the draw cause that before the last heat only one-team remains that has not yet completed sufficient heats to set a time, a draw will be held among the other competitors to select a team or teams to fly.

Warnings - Eliminations.

At each warning the Chief Judge shall notify the mechanic (if necessary through the team manager) concerned so that in turn, he or she may convey the reason of the warning to the mechanic. In case of any serious breach of the rules, the jury may eliminate the team from the race. *The contest organisers may decide not to apply eliminations and apply a time penalty for each elimination offence instead, except in cases of serious safety breaches or repeated infringement of safety rules.*

A TEAM SHALL BE WARNED:

- i. If a pilot interferes with or obstructs another pilot either by his or her conduct in the circle or by a manoeuvre of his or her model preventing another model from flying or landing normally. i.e. It is the responsibility of the team to ensure that his or her released model will not cause a landing model to become entangled in his or her teams' lines.
- ii. If a pilot, instead of walking around the centre, stands in the same place or continuously walks backwards or continuously keeps the centre spot of the circle between him or her and the model. Care must be taken to distinguish between regaining the centre after overtaking, and walking backwards.
- iii. If the pilot's flying style does not conform to "**Race from Start to Finish**" paragraph vi.
- iv. If a pilot applies physical effort to increase the speed of the model during the official flight.
- v. If the height level of the flight prescribed by the rules is exceeded.
- vi. If, during the start of the race or during the pitstops, the control handle, the lines and the model are not as close to the ground as is safely possible and/or the centreline of the model is inside the flight circle.
- vii. If a mechanic services the model outside the designated pitting area.
- viii. For any other flagrant breach of the rules.

A TEAM SHALL BE ELIMINATED FROM A RACE:

- i. If the pilot steps outside the centre circle before the mechanic has taken hold of the landing model, and/or the pilot does not act according to rule "**Race from Start to Finish**" paragraph ix and xiii.
- ii. If the mechanic reaches more than 0.5m into the flight circle to retrieve a model *or steps into the flying circle with either foot.*
- iii. If the mechanic retrieves his or her model by any device.
- iv. If overtaking is done by passing under the slower model.
- v. If the pilot whose model is to be overtaken carries out any manoeuvre to impede the overtaking competitor.
- vi. If a member of the team or the model causes a collision.
- vii. If the model is not in the condition as stated in individual class rules.
- viii. If the model flies more than two laps with the motor stopped.
- ix. If the model is recovered with the motor running or before touchdown with the motor stopped.
- x. If, after its models have been processed, the competing team has used parts or elements not checked during the control; if the team has modified its model(s) by changing the characteristics or specifications imposed by the rules, this may lead to application of penalties as stated by the Jury.
- xi. If the mechanic does not act according to "**Race from Start to Finish**" paragraph xi and xii.
- xii. If the team has accumulated three warnable offences during the race.

Team Qualification and Classification

Each competing team must take part in at least one eliminating race to qualify for the semi finals, but it may participate in two.

2.C. GOODYEAR UNIFIED RULES

- i. Models shall be *profile* scale models of Goodyear racing planes that have flown in Goodyear or Continental Trophy races or any other NPRPA Formula 1 races.
- ii. The profile of the model shall be within 5% of scale linear dimensions, the scale being 1/8 but where noted below. (Note: To help scaling up plans - all full size aircraft are required to have a minimum wing area of 66 sq. ft. Therefore all models must have a minimum wing area of 9.6 sq. decimetres (148.5 sq.ins)
- iii. The tail area may be increased by 25% over scale area to permit safe handling, by increasing either the mean chord and span equally, or if the appearance of the model is not drastically altered, by increasing the span alone.
- iv. Models shall be painted in a scale like fashion, ie. In a colour scheme that might have been used on the full size aircraft.
- v. The full size aircraft's racing number or the member's Club number shall be displayed in a similar position on the model. (Left and right sides of the rear fuselage and the left-hand wing upper surface)
- vi. The entrant's SAMAA number shall be displayed on the right-hand wing upper surface.
- vii. Models shall have a profile fuselage with a maximum width of 25mm, excluding cheek cowl that may be fitted. Fuselage side cheeks shall be permitted in so much as they do not cowl the motor. *The motor and tank shall be mounted on the outboard side of the profile fuselage.* The motor or tank shall not be recessed or equipped with any aerodynamic devices to reduce drag except with a motor (usually a team race type) designed to be mounted on the reverse centreline (left-hand side of the thrust line), in which case 8mm shall be allowed for a mounting plate. *Maximum model weight (dry) shall be 700 grammes.*
- viii. Monowheel undercarriages are permitted. The undercarriage need not be affixed to the model in the same place as the full size aircraft provided the scale appearance of the profile is not drastically altered. *No retractable undercarriages are permitted.*
- ix. The entrant, if so requested, shall produce a three-view drawing to prove the scale outline of the model. The drawings shall be from a source acceptable to the Contest Director.
- x. Distance between the centre of the control handle grip and the centreline of the model shall be 15.92 metres +0.040m -0.020m (52 ft. 3 ins. +1.5ins -0.75ins)
- xi. Minimum wheel diameter shall be 25mm.
- xii. An inboard wing skid shall be fitted, the purpose of which shall be to keep the lines at least 6mm clear of the ground with the aircraft in any attitude. (i.e. In case of inversion of the aircraft on landing.)
- xiii. Race distance shall be
Heats: - 100 laps (10km) with a minimum of two pitstops.
Finals: - 200 laps (20km) with a minimum of five pitstops
- xiv. Any team and/or the members thereof shall, at the discretion of the Contest Director or the Safety Officer, be required to prove their competency before competing in a race. The recommended form of this shall be a one-up race with a commanded pit-stop.
- xv. Maximum engine swept volume: 2.5cm³ (0.1526cu.in)
- xvi. A safety wire made from a minimum 7-strand 0,5 mm wire must be visibly and safely attached between the bellcrank pivot bolt and the engine.
- xvii. Propellers must be of the commercially available fibre-reinforced thermoplastic type, for example: APC, Kyosho, Graupner "Super", or similar types.
- xviii. The model must be equipped with an effective engine cut-off device, enabling the pilot to shut off the engine before the fuel tank is completely empty.
- xix. Hand held plastic squeeze bottle refuelling only permitted. Pressurised filling systems are not permitted.
- xx. Fuel feed from the fuel tank to the engine must be by engine suction. Pressurised fuel feed systems are not permitted.
- xxi. *Multifunction valves (Valve systems which operate more than one function of the fuel system) are not permitted.*
- xxii. *The use of sharp spinners or spinner nuts with a radius of less than 5 mm shall not be allowed.*
- xxiii. The compression adjusting screw must be of a type that does not have any forward projecting sharp parts that can cause harmful damage to a person on impact. I.e. no T-bar adjusting screws.
- xxiv. Refuelling shall be carried out at all pitstops.

UNIFIED GOODYEAR SUPPLEMENTAL

- i. The cut-off design is unrestricted, as long as it is not a MFV-device, or in any way affects, or is affected by the filling operation.
- ii. *Multifunction* valves are not permitted; *maximum* internal diameter *of filling device*/tube *must be 3 mm*.
- iii. Maximum venturi *area must be equivalent to an* inside diameter *of 5mm (19,63 mm²)*.
- iv. No exhaust pipes are allowed.
- v. Diameter of the lines = Single strand, 0,30 mm. Multi strand, 0,34 mm. Two-line system must be used.
- vi. Pull test 20 G.

CLASS 2 GOODYEAR SUPPLEMENTAL

- i. *Front intake motors with a crankshaft supported by needle, ball or roller bearings will be of the iron/steel piston/liner configuration if "Schneurle" ported. Radially ported, Crossflow and plain bearing motors may use any intake configuration and Piston/Liner materials."*
- ii. All control systems, undercarriage and tank systems must be mounted externally: No recessing is allowed except the area where the lead outs pass through the fuselage.
- iii. Maximum length of the exhaust system shall not exceed 200mm measured from the engine piston face.
- iv. Minimum line diameter: 0.35mm (0.014') (three strand Laystrate not allowed). *Two line control system must be used.*
- v. Pull test 20 G.

FORMULA 360 SUPPLEMENTAL

Applicability. All rules from the Team Racing Unified Rules shall apply to this event except as modified, appended, or specified here.

Model Specifications.

- i. Models must be of the profile fuselage type and can have a cheek cowl on the inboard side of the model only
- ii. The model shall have a constant cord wing with a minimum area of 23.23 square decimetres (360 square inches). The overall span shall be 1016mm (40 inches) minimum, measured from wingtip to wingtip and the chord shall be 9 inches minimum. The minimum wing thickness shall be 30mm (1 3/16") for at least 914mm (36 inches) of the span.
- iii. All models must have a canopy and a horizontal stabilizer, elevator and vertical fin or a "V" or "T" tail type configuration. No butterfly tails allowed.
- iv. The fuel tank shall be a commercial, 2 oz (60ml), plastic clunk tank, the clunk can be removed and replaced with a solid pick-up tube.
- v. The entire fuel tank must be located ahead of the wing, on the outboard side of the fuselage.
- vi. Pressure fuel systems are not allowed, with the exception that the vents may be directed into the airstream.
- vii. No quick fill valves shall be allowed, tanks to be filled through a 3mm (1/8") I.D. pipe with a hand held plastic squeeze bottle or syringe only.
- viii. The model may, if desired, be equipped with an effective engine cut-off device, enabling the pilot to shut off the engine before the fuel tank is completely empty.
- ix. All models must have a fixed landing gear with a minimum of one main wheel. The minimum diameter of the main wheel shall be 50mm (2") "balloon" type wheel. The model must be capable of an unassisted R.O.G. take off.

Engine

- i. Maximum engine swept volume 6.5cc (0.40 cu.in.)
- ii. Non-Schnuerle ported engines may have a crankshaft supported by needle, roller or ball bearings, for engines having plain bearings (bushed) crankshafts, exhaust and transfer porting is unrestricted.
- iii. No tuned mufflers allowed, only standard or tongue type mufflers may be used.
- iv. Only *commercial* propellers from 9 to 10 inches in diameter with a 6 inch pitch may be used.

Size, Construction and Length of Control Lines.

- i. Minimum line diameter 0.38mm (0.015"), multi-strand line only, *two line control system*.
- ii. Distance between the centre of the control handle grip and the centre line of the model shall be between 18.14 and 18.44m (59' 6" and 60' 6")
- iii. Pull test of 15 G

Races.

- i. All heats shall be 2 up races and the final a 3 up race
- ii. Each contestant shall be allowed 2 qualifying heats of 120 laps in length.
- iii. Final races shall be 120 laps in length.
- iv. One mandatory pit stop is required within the race distance.
- v. Electric starters may be used to start motors, but a 60 second time penalty shall be incurred.

Field Layout.

- i. The field shall be laid out on a tarmac or grass circle
- ii. The pilot circle shall be 3m (10 foot) radius
- iii. The flight circle shall be 21.94m (72 foot) radius

MOUSE RACING SUPPLEMENTAL

- i. Any reed valve engine with a swept volume of 0.0504 cu in. (0.826cm³) may be used.
- ii. Spring type starters mounted on the engine and carried by the engine in flight may be used.
- iii. Models must have an exposed control system.
- iv. The maximum length of the exhaust system as measured along its centreline from the face of the piston shall be 0.5 inches.
- v. There are no restrictions to the aircraft form, except that the aircraft must have fixed landing gear and must rise off ground. (Single wheel gear permissible).
- vi. In order not to create an unwarranted hazard to contestants, the Contest Director may require that any, or all, contestants put up a qualifying flight to prove adequate flight stability before being allowed to compete.
- vii. Each contestant shall be allowed two (2) qualifying heats of 80 laps in length. One (1) refuelling stop is mandatory in each heat.
- viii. Final race(s) shall be 160 laps with two (2) mandatory refuelling stops.
- ix. line length shall be 11.94m ± 7.5cm
- x. Minimum line diameter:
- xi. Multi strand 0.012" (0.3mm)
- xii. Single strand 0.010" (0.25mm)
- xiii. Pull test 7.5 lb (3.4kg)
- xiv. Maximum fuel capacity 8cm³.

2.D. SAMAA COMBAT RULES

Definition of a Combat event

A combat event is a contest in which eliminating heats are followed by a semi final and a final in which two models are flown simultaneously in the same circle for a predetermined time, the object being to cut a streamer attached on the longitudinal centreline of the opponent's model, points being awarded for each cut taken.

Definitions

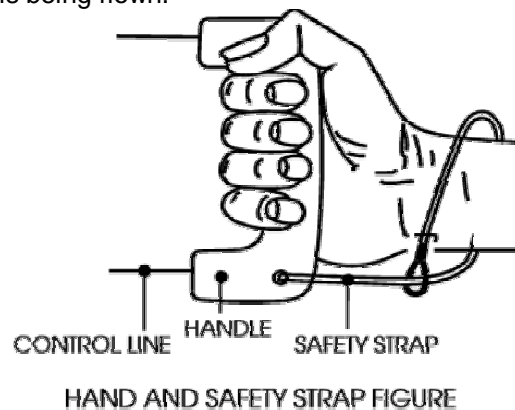
- i. A combat model is a model aeroplane in which a piston motor provides the propulsion energy(s) and in which the lift is obtained by aerodynamic forces acting on the supporting surfaces that must remain fixed (except control surfaces) during flight.
- ii. The longitudinal centreline shall be defined as the axis of the propeller with a single engined model and the axis of symmetry with a multi-engined model.
- iii. Combat Site- A combat site must consist of two concentric circles that shall be marked on the ground. The flight circle must be laid out on grass *and will have a radius of 20 metres*. The centre (piloting) circle may be laid out on grass or on any other material having a maximum radius of 2metres.
- iv. Competitor- the pilot, who shall be the entrant and known as the competitor, may employ a maximum of two mechanics in any one bout. (In exceptional circumstances of wet or extremely windy weather, an additional helper may be used as a streamer holder and must perform no other function for the duration of that combat period).
- v. Streamer cutting aids- The model shall not carry any artificial aid intended to assist the cutting of the streamers. The model shall be equipped with a device specially designed to retain the streamer that shall be fitted on the longitudinal centreline and sufficiently strong so that the streamer shall not become detached under normal flying conditions.
- vi. Builder of the Model- Unless otherwise stated, the competitor does not have to be the builder of the model entered.

Control System

- i. No free ends on the lines capable of entangling an opponent's lines, or line splices shall be permitted.
- ii. Before any heat any sets of lines that may be used must be checked for length and diameter. A pull test shall be applied to the assembled handle(s), control lines, and model(s) for all the equipment to be used in that heat.

Safety devices

- i. The aircraft shall have a restraining cable of 0.5 mm or larger that attaches the engine securely to the bell crank mounting bolt.
- ii. A wrist thong, capable of sustaining the pull test, shall be fitted to the handle and worn by the pilot while the model is being flown.



- iii. Both pilot and mechanic(s) shall wear a safety helmet during the match

Technical Details

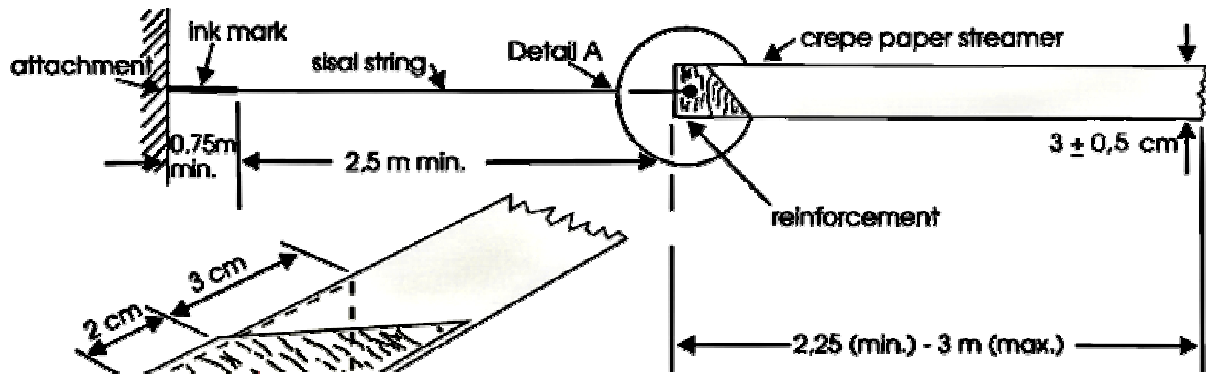
- i. Maximum engine swept volume 6.5cm³ (0.40cu.in)
- ii. Control Verification:
- iii. Minimum line diameter 0.38 mm (0.015ins.) up to and including 0.25 cu.in (4.1 cc)
- iv. 0.42 mm (0.018ins.) up to 0.40 cu.in (6.5cm³)
- v. Line length 15.92m +/-0.04m (52'3" ±1.6")
- vi. Pull test 15g.
- vii. Mechanical means for starting engines may be used.

Number of Models

- i. A competitor may have processed any number of models. Only one processing certificate is required for each design of model presented by the competitor.
- ii. Each competitor shall be permitted a maximum of one model, one handle, one set of lines and one engine in each combat period.

Streamer

- i. The streamer shall consist of double weight crepe paper (80g/m²) or any replacement with equivalent strength, not less than 2.25 m or more than 3 m long and 3±0.5cm wide, fixed to a sisal string of 2.5 m minimum length. All streamers must be of the same length. There shall be a clearly visible ink mark 2.5 m from the junction of the string and the streamer. The streamer shall be attached to the model so that the ink mark is level with, or behind, the rearmost portion of the model. The attachment portion of the string shall have a minimum length of 0.75m.
- ii. The attachment end of the streamer shall be reinforced on either side by fibre/fabric reinforced tape approximately 2cm wide affixed diagonally to the length of the streamer with one at right angles to the other and extending for a maximum of 5cm.
- iii. The colour of the streamer must be different for each model in the heat. Each pilot/pit crew shall be issued a streamer at the start of the heat by the judge assigned to that competitor. A second streamer will be available from this judge when needed.



Circle Marshal is satisfied that there is approximately half a lap separation between the two models.

Timing

- i. A first signal ("Starting Signal"), given by the Circle Marshal, shall signify the beginning of the 60 seconds period when the mechanic(s) or the pilot has the opportunity to start, run and adjust their motors. The models may be launched immediately that they have been started.
- ii. A second signal at the end of the 60 seconds, both visual and acoustic, signifies the start of the timed combat bout where the models must be launched ("Signal to Launch"). If both models are airborne and complies with iii, iv and v before the 60 seconds starting period has elapsed, the Circle Marshal may give the signal to launch. From the moment the Circle Marshal has given the signal to launch, the contest lasts for 4 minutes.
- iii. When airborne, the models shall be flown level at 1-3 m in order for the judge to determine the speed of the model and shall remain at this height until the signal for commencement of combat is sounded/shown.
- iv. The Official Timer shall now check the models for speed. Maximum airspeed with the streamer: - 73mph = 120.0km/h. This corresponds to a minimum lap time of 3 sec. per lap at a flying height of between 1 and 3 metres.
- v. Once satisfied, he or she indicates approval to the Circle Marshal. When the Circle Marshal is satisfied that each model has completed two level laps, anticlockwise, separated by approximately half a lap, he or she will give a signal that the combat may commence.
- vi. The Circle Marshal through a visual signal gives the starting signal (flag) and a sound signal. The starting signal must be "sharp" to enable accurate timing.
- vii. The Circle Marshal may stop the bout at any time at his or her or her own discretion and request the competitors to fly level to determine whether they meet the speed limit.
- viii. If a model at any time exceeds the speed limit, the bout shall be declared void and the perpetrator given a warning. On the third warning the competitor shall be disqualified from the competition.

Termination of the Contest

- i. The Circle Marshal shall give an acoustic signal to end the contest after the determined time.
- ii. The same acoustic signal shall be given if the contest has to be terminated due to disqualification of one or both of the competitors or for any other reason.
- iii. The Circle Marshal shall signal both pilots to fly level and anti-clockwise and to cease combat when both streamer strings have been cut.

Method of scoring

- i. 100 points shall be awarded for each distinct cut off the opponent's crepe paper streamer.
- ii. There is a cut each time the model, propeller or lines, fly through the opponent's streamer resulting in paper particle(s) becoming detached from the streamer.
- iii. A cut of the string between the point of attachment at the model and the knot securing it to the streamer results in a score of 100 points and no further score can be obtained on the string alone.
- iv. Should the string become detached from the model while airborne, the competitor will be penalised by 100 points and must immediately, on a signal from the Circle Marshal land and replace the streamer. Ground time will be counted from the moment of such a signal being given.
- v. If after a midair collision no streamer can be found and the streamer-retaining device is missing or bent, then, with the permission of the judges, it is acceptable to continue the heat without replacing the streamer.
- vi. One point shall be awarded for each whole second that a model is airborne during the four-minute period *after the signal to launch*.
- vii. Each warnable offence shall be penalised by the deduction of 40 points from the competitor's score.
- viii. Should the mechanic(s) damage the streamer, or the model cut its own streamer, while the model is on the ground the mechanic(s) must replace the streamer with a new one. If they launch the model without replacing it, the competitor shall be penalised by 100 points. Ground time will be counted while the model is airborne with the damaged streamer.

Attempts

- i. Only one attempt will normally be allowed to complete a combat bout unless:
- ii. A streamer breaks or fails to unfurl from the rolled state.
- iii. In case of line tangle resulting in the control line(s) breaking and only one model being grounded, making it impossible to clear the line tangle.

Conduct

- i. A pilot must remain inside the centre circle while his or her model is flying, except at the moment of release of the model by the pitman.
- ii. During the combat period each competitor (and his or her pit crew) shall be watched by at least one member of the jury specifically assigned to him or her, besides the Circle Marshal, to ensure that they behave fairly according to the rules.
- iii. After a midair collision the heat shall continue as if both models had landed subject to articles "**Cancellation of the Flight**" paragraphs iii, iv, xiii, xiv and xv.

Offences

- i. The following are warnable offences and shall attract the appropriate penalties ("**Method of Scoring**" paragraph vii):
- ii. If a pilot leaves the centre circle *of his/her own accord without permission of the circle marshall* while his or her model is airborne.
- iii. If the mechanics enter the flying circle at an oblique angle or cut across the flying circle to reach a downed model. One penalty only will be incurred for each offence even if more than one mechanic is involved.
- iv. If the mechanic(s)/pilots do not immediately, or after a line disentanglement, withdraw a grounded model to outside the 20m circle before servicing it.
- v. If the model is launched before the starting signal.

Cancellation of the Flight

- i. An entrant shall be eliminated from a heat and his or her opponent declared the winner, subject to "**Attempts**", paragraph iii, if:
- ii. He or she deliberately attacks the streamer of his or her opponents' model before the Circle Marshal's signal to commence.
- iii. His or her model fails to become airborne within 3 minutes after the signal to launch.
- iv. He or she attempts to fly a model that at the time of launch does not have a strong, effective control mechanism, does not have a secure engine attachment, or does not have a running engine.
- v. He or she interferes with his or her opponent, or forces his or her opponent to leave the centre circle.
- vi. He or she deliberately flies in a dangerous manner.
- vii. He or she leaves the lines of his or her models, which at that moment are not airborne, in the centre circle.
- viii. He or she attacks his or her opponents' streamer without his or her own, or the remaining parts, attached to his or her model.
- ix. He or she is not present at his or her allotted flight time, unless he or she has the express permission of the Circle Marshal.
- x. He or she leaves the centre circle, intentionally while his or her model is flying, or without informing his or her opponent of his or her intention to do so when his or her model is grounded for a purpose other than to allow his or her model to be serviced.
- xi. He or she deliberately leaves the centre circle without wearing protective head gear.
- xii. He or she flies in a way that inhibits his or her opponent, or his or her opponents' pit crew, from clearing any line entanglement.
- xiii. He or she flies other than level in an anticlockwise direction when only his or her model is airborne and there is no line entanglement.
- xiv. For any other flagrant breach of the rules.
- xv. He or she releases the flying handle, or removes the safety strap, for any reason, while the model is flying.
- xvi. His or her model(s) do(es) not conform to the model specifications required by the supplemental rules.
- xvii. He or she deliberately attacks or interferes with his or her opponents' continuous level flying model, which clearly has no paper streamer left.

- xviii. If the streamer becomes detached from the streamer retaining device during combat, but not because of the midair collision.
- xix. If the model lands with no streamer string and the streamer retaining device is missing or bent, but *not* because of a midair collision.
- xx. If the mechanic(s) jump over the opponents' model(s) and lines kept within the pitting area.

Classification

- i. The contest shall be run as a knockout tournament.
- ii. The competitor who obtains the highest score in points shall be the winner of each bout.
- iii. A competitor shall be eliminated from the competition when he or she has lost two bouts.
- iv. Each round shall be randomly drawn from the competitors remaining in the competition.
- v. In case of an unmatched competitor remaining in any round, that competitor shall be matched with the first competitor drawn in the next round and (if he or she is not first eliminated) in each successive round, unless such time as there is again an unmatched competitor remaining in a round. Then these two competitors shall be matched to complete that round.
- vi. Individual and team standings will be based on the number of matches won. Losses will not be subtracted.
- vii. In case of a tie for second or third place (both cannot happen) fly them off using the above procedures except allowing only one loss during the fly off.
- viii. In case of a two-way tie for third remaining after a fly off for second, match them with the winner to take third.
- ix. In case of a tie score in any bout, that bout shall be re-flown. A bout is considered a tie if the difference in score is 5 points or less.

2.D.(a) SAMAA NOVICE COMBAT RULES

Rules are as per SAMAA Combat Rules except for the following:

- i. The event is restricted to persons who in the sole opinion of the contest director are not expert combat flyers. The decision of the Contest Director is final.
- ii. The Pilot will be disqualified immediately if at any time the model attitude exceeds the vertical. ie no loops or inverted flying except that loops or inverted flying are permitted for safety reasons or on instruction from the circle marshal to free a line tangle.

2.E. BASIC CARRIER DECK RULES

- i. The competitor can use any fixed wing model of 450 sq.in (29 dm²) wing area or less, any fixed line length of 60ft (18.3m) or less and any engine(s), throttled or unthrottled.
- ii. Except elevators used only for normal pitch control, the competitor cannot use any additional control surfaces, slow speed/high lift devices, boundary layer control systems or yaw variation methods, eg: such moving items as flaps, ailerons, rudder, spoilers, air brakes, slats and line rakes or such fixed items as slots are not permitted.
- iii. Tuned pipe systems of any form are banned.
- iv. The competitor must have insurance that is acceptable to the Contest Director.
- v. The model must have a stable wheeled undercarriage; an effective silencer and an arrester hook no longer than a third of model length. The hook must have no other function than to arrest the model.
- vi. The competitor must provide a visible stranded steel safety cable of minimum bulk diameter 0.457mm (ie: heavy Laystrate) between the bellcrank and the engine.
- vii. Flying wires must be of the multi-strand variety. The model, lines and handle combination must be capable of withstanding a pull test of 15 times the model weight, sustained for 10 seconds.
- viii. Flying procedure is as follows:
- ix. The competitor takes off from a miniature aircraft carrier built on the ground and flies as fast as possible for 7 laps. Then flies as slowly as possible, also for 7 laps. Finally, The competitor makes a landing back on the carrier by hooking up on the arrester wires.
- x. The minimum dimensions of any carrier deck should be: centreline length 27ft 6in (8.4m) excluding stern ramp; width 5ft (1.5m); height 1ft 2in (0.35m), stern ramp length 4ft (1.2m) measured down slope; centreline curved to a 60ft (18.3m) radius.
- xi. Arrester wire details should be: 4 wires supported 1" (25mm) above the deck, each 16ft (4.9m) long with a 5 lb (2.5kg) sandbag (or other suitable arresting drag) attached to each end; the No.1 wire should be located perpendicular to the deck centreline at a distance of 4ft (1.2m) forward from the ramp top and the remaining wires perpendicular to the centreline and spaced at 2ft 8in (0.8m) intervals.
- xii. *The competitor must enter the circle and be ready to start his engine within three minutes after being called.*
- xiii. The competitor will normally be allowed a maximum of 3 attempts to make a maximum of 2 official flights. Once 2 official flights have been recorded, no further attempts or official flights are allowed unless these maxima are extended by the Contest Director. The competitor's flight is defined as an attempt *once he/she has given a hand signal to the Contest Director before beginning to start his/her engine(s).*
- xiv. *An attempt is declared if the competitor does not show readiness to start within 3 minutes of being called, and unless waived by the Contest Director, the competitor has 3 minutes to start a single engined model and 4 minutes for a multi engined model. The flight becomes official once the model is released for takeoff.*
- xv. The competitor's model begins it's high speed run from a standing start on the deck. The competitor may not take off until the Contest Director has indicated to the competitor his readiness to start timing. 7 complete laps are then timed from this position. The competitor will receive a signal from the Contest Director when these laps have been completed.
- xvi. When the competitor's high-speed run has finished and when he/she feels ready for the next stage, he/she makes a clear signal of readiness. If the competitor does not hear an audible acknowledgement from the Contest Director, the signal has not been seen. Once The competitor's signal has been acknowledged, the slow speed run then starts when the model next passes over the timing position. 7 complete laps are then timed. The competitor will receive a signal from the Contest Director when these laps have been completed.
- xvii. When the competitor's low speed run has finished and when he/she feels ready for the next stage, he/she makes a clear signal of readiness. The Contest Director will *clearly and audibly* acknowledge this signal. The competitor now has to land on the deck at the next approach *after receiving this signal from the Contest Director..* The competitor will lose 5 points from the landing score for each complete lap flown after this.
- xviii. The quality of the landing will be assessed and points awarded as follows:
 - a) Arrested. When stationary, model has correct deck attitude for wheel arrangement: 100
 - b) Arrested. When stationary, model does not conform to a) but has all main wheels on deck:

- c) Arrested. When stationary, model does not conform to either a) or b) but is still on deck: 60
d) Not arrested. When stationary, model has correct deck attitude for wheel arrangement: 40
e) Not arrested. When stationary, model does not conform to d) but is still on deck: 20
f) Any part of model makes ground contact after deck contact, whether arrested or not.
- xix. If the model has the scale-like appearance of a specific navy aircraft, which has made an arrested landing on an aircraft carrier, the competitor will be awarded 10 bonus points. If the model has a navy-like colour scheme, the competitor will also be awarded 10 bonus points. If the model satisfies both requirements, the competitor will be awarded 20 bonus points.
- xx. The competitor's score is calculated as follows:
Times will be recorded in seconds to the nearest 1/10th of a second. Subtract the high speed time from the low speed time. The resulting number of seconds is expressed as the time difference, in points. Subtract any deductions from the landing points and add the resulting figure to the time difference points. Finally, add any bonus points to produce the overall score.
- xxi. *Throughout the entire flight, the competitor must remain within the 3m diameter pilot's circle, The competitor should not fly higher than 20ft (6m), model progress should always be forwards and anticlockwise, and ground or deck contact, except after landing, is considered ditching and is not allowed.*
- xxii. *Whipping is not permitted during the fast run.*
- xxiii. *Any infringement of these requirements during an attempt will terminate the attempt.*
- xxiv. *Any infringement during an official flight will disqualify the flight.*
- xxv. *At no time should model attitude exceed 30 degrees to the horizontal. To assess this angle, a clearly visible line shall be either temporarily adhesive-taped or permanently painted onto both sides of the model fin or other vertical surface in such a way that the line is either horizontal or vertical when model attitude is 30 degrees. Except after the landing signal, each exceedance of 30 degrees for one second or less will incur a warning. Three warnings will disqualify the flight.*
- xxvi. *After the landing signal, a single exceedance of 30 degrees, however momentary, will disqualify the flight without warning.*
- xxvii. *The Contest Director may choose to position himself close to the pilot's circle in order to monitor the above requirements.*

APPENDIX A

TECHNICAL RULES FOR CONTROL LINE NOVICE AEROBATIC MODELS JUDGES GUIDE

Purpose: This guide is part of the SAMAA rules as an aid for interpretation and scoring and shall be used as such when it comes to train judge candidates and for to keep up proficiency of experienced judges. The guide shall be explanatory where the rules need clarification, not replacing actual SAMAA rules.

Rules Knowledge: In-depth understanding of both general control-line regulations and definitions, and very detailed knowledge of specific aerobatic rules, are prime conditions to do Fair judging. People in charge of judges' training are well advised to make certain that these basic criteria are perfectly met, even when dealing with experienced judges. While careful self-study of the Sporting Code rules is, of course, critical, repeated and detailed group instruction is highly recommended.

Judging Focus. To get a complete picture of a manoeuvre, the judge shall focus his attention to four elements:

Shape. This is the geometry of the entire manoeuvre and the position of its elements on the flying hemisphere. In manoeuvres consisting of multiple elements, such as a four-leaf clover, the shape of the individual elements is qualified, too.

Size. Manoeuvre sizes are defined in degrees of line elevation and in degrees of arc length. Since flying too large manoeuvres is easier for the pilot to do, judges shall watch for manoeuvres being flown larger than the 45° or 90° max. line angle elevation. The use of visual terrain reference marks defining 45° altitude is recommended.

Intersections. Qualification of intersections flown is made easier by making use of terrain reference marks, locking-in visually the position of the aeroplane when it passes the point of intersection for the first time in the manoeuvre.

Spirit. Whenever a situation is faced where real world flying varies from manoeuvre elements not described clearly enough in the book, the judge shall remember the true spirit of the rules, thus acting in favour of the sport. After all, it is the manoeuvre itself that is being looked at, not necessarily its entry, its exit or even the laps between.

Error Interpretation. It is advised that the judge uses a list of drawings and descriptions showing most commonly flown errors per manoeuvre. Knowing critical elements of each manoeuvre sharpens the eye and mind of the judge, and considerably reduces fatigue. Attention shall be paid to the "significance" of errors. The rules state clearly which deviations shall be considered as errors, without saying anything about the importance of such a deviation. Consequently, weighting errors, such as giving a higher significance to a height error, is not correct.

Manoeuvre Description Interpretation Remarks. Binding manoeuvre descriptions are published in the Novice Aerobatic Section of this Sporting Code. All manoeuvres are described in writing and pilots shall fly according to these rules. Because flying is done on a hemisphere, and that observers, both pilots and judges, have different view points, exact graphic display of the 3- dimensional manoeuvres on flat paper is a difficult task. Therefore, drawings published in the Sporting Code are to be seen as illustrative only. Manoeuvre designations, such as "square" are informative only, judges may not expect to see a geometric square to be flown on a hemisphere.

(It could be done, however, but only with pilots flying difficult to define curved sides for a single judge observing from one specific point). All further explanations consequently refer to the written descriptions, rather than to the drawings.

A general remark concerning turn angle in degrees has to be made before describing manoeuvres: On a hemisphere, corner angles of objects vary with the size of the object. To understand this, imagine flying a very large triangle 90° up from the horizon to the centre of the hemisphere, and from there by turning 90° again, back to the horizon. The sum of the three angles is $3 \times 90^\circ = 270^\circ$. Fly the same triangle extremely small and the sum of the angles may come close to $3 \times 60^\circ = 180^\circ$. Some of the angles indicated in the rules are given as if the manoeuvre would be flown on a flat surface. For clarity, and for pilot education, true flat angles, such as the ones actually seen and to be flown by the pilot, are added here.

Segment lengths are given in degrees of arc length. Numbers in () are arc length at 20 metre flight radiuses.

Entry: Procedure required to position the aeroplane at the point of beginning of the manoeuvre. This portion of the flight is not to be scored.

Begin: Point at which scoring starts.

End: Point at which scoring ends.

Exit: Procedure required to bring the aeroplane back to level flight at 1,5 m. This portion of the flight is not to be scored.

Subtitle: Refers to respective phrase of the Sporting Code.

Execution of Manoeuvres

2 laps between consecutive manoeuvres. Due to the critical 6 min. time limit, pilots tend to reduce level laps between manoeuvres. A pilot overdoing this by flying only $1\frac{1}{4}$ laps when $2\frac{3}{4}$ should have been flown shall be scored 0 for the following manoeuvre. Deviations of the 2-lap rule of up to approximately $\frac{1}{4}$ lap shall be disregarded.

Starting.

Begin: At competitor hand signal.

End: At beginning of takeoff ground roll.

Do not miss observing takeoff and lift off due to concentrating on the timekeeper (or on your own watch) at this moment. Verify starting time elapsed only after third lap is completed.

Takeoff

Begin: At beginning of takeoff ground roll.

Ground roll measures between 4,5 m and $\frac{1}{4}$ lap. Watch for preliminary lift off ($\frac{1}{4}$ lap is 25-33 metres). Altitude 1,5 m shall be reached after first lap over the point of release. Reaching 1,5 m too soon is a common error.

2 following laps begin and end at the point of release. Include level flight into takeoff qualification.

End: At the end of lap three, when passing over the point of original model release.

Depending on takeoff position selected by the pilot, more than 2 laps may be needed to reach the starting point for the next manoeuvre.

Reverse Wing Overs

Begin: At first turn to vertical.

Vertical Climb and Dive: The rule says 90° turns with out specifying the turn radius. It is common practice to qualify sharp corners higher than large turns.

Directly Overhead Flight: Watch for deviations from a straight vertical flight path. Overhead position shall be hit with a ± 30 cm.

Half a Lap Inverted Flight: Inverted flight portion is often flown too high. Inverted segment is not flown exactly $\frac{1}{2}$ lap. Watch for identical start and end points.

End: After last pullout to horizontal flight at 1,5 m.

Consecutive Inside Loops

Smooth, round Loops: Flying a perfect circle shape is very difficult. Watch for deviations, such as flat spots on the bottom where the pilots try to keep 1,5 m altitude. Look for loops 2 and 3 becoming larger.

Tops at 45° elevation: Tops positioned much higher are a common error. Consider deviations from the 45° line elevation rule as an error.

All in the Same Place: Pilots know that loops tend to wander. To correct this, oval shapes or top flat spots are often flown.

Entry: Two laps level flight at 1,5 m altitude.

Begin: The manoeuvre begins in level flight at the bottom point of the first loop.

End: The manoeuvre ends at the bottom of the third loop.

Exit: The model continues through half a loop, then descends to inverted flight within the guide-suggested distance of $\frac{1}{4}$ lap after the bottom point of the third loop. The model then continues in level flight.

Inverted Flight

Entry: Two laps inverted flight at 1,5 m altitude.

Begin: At the beginning of lap 3.

2 stable laps at normal flight level: Normal flight is defined as 1,2 to 1,8 m (which is equal to $1,5 \pm 30$

cm). The rule says that altitude variations smaller than 60 cm are not to be qualified as errors. It is common practice to use tighter tolerances here, i.e. all visible deviations shall lead to linear downgrading.

"Stable": This is a subjective term, meaning the absence of visible altitude correction inputs.

End: At the end of lap 4.

Judges are advised to watch for altitude deviations resulting from the model flying into head and tail wind alternatively.

Consecutive Outside Loops

Begin: The manoeuvre begins in inverted flight at the bottom point of the first loop.

Smooth, Round Loops: Flying a perfect circle shape is very difficult. Watch for deviations, such as flat spots on the bottom where pilots try to keep 1,5 m altitude. Look for loops 2 and 3 becoming larger.

Tops at 45° Elevation: Tops positioned much higher are a common error. Consider deviations from the 45° line elevation rule as an error.

All in the same place: Pilots know that loops tend to wander. To correct this, oval shapes or top flat spots are often flown.

End: The manoeuvre ends in inverted flight at the bottom point of the third loop

Exit: The model then continues for another half loop, returning to level flight within the guide suggested distance of ¼ lap.

Consecutive Inside Square Loops

Here, the term square does not mean "equal sides and four 90° angles". The rule describes a square course manoeuvre with equal length and straight sides instead, defining the top segment to be flown at 45° line elevation angle. The length of the four sides is thus equal to 45° arc lengths, (which is 15,7 m at 20 m flight radius.) Flown on a hemisphere, this leads to a shape where the angles between bottom horizontals and verticals are larger than 90° (approximately 98° as seen from the pilot). Consequently the two top angles must be flown tighter than 90° (approximately 80° as seen from the pilot). If laid out in real size on flat paper, this would come to a trapezium shape where the bottom horizontal segment seems to be approximately 4m shorter than the top horizontal. If flown as per the book, the judge being placed exactly upwind shall expect to see a square shaped manoeuvre with slightly outward slanted verticals. Deviation from true 90° is approximately 2m per side.

Flying square manoeuvres larger than described in the rules is much easier to do and may, at first glance, even look more attractive. Judges are well advised to look for correct sizing in particular.

Begin: The manoeuvre begins in level flight at a point □ of a lap before the first pull up to vertical. Two bottom corners are equal. : In order to get equally long sides, the two bottom corners must be flown at 99° The vertical segments shall be flown such that their track would cross the 45° elevation line at points approximately 2m left and right of the respective 90° vertical lines. (At 20 m flight radius) and so are the two top corners: In order to get equal long sides, and if following above requirement to fly the bottom angles wider than 90°, the two top corners must be flown tighter than 90°.

Tops at 45° Elevation: Tops positioned much higher are a common error. Consider deviations from the 45° line elevation as an error.

Equal Side Lengths: A tendency to fly horizontals too long is often observed.

Turn Radius 1,5 m: The rule suggests considering a turn radius exceeding 2,1 m as an error. Fact is, that no real life stunt model comes even close to this number. Which means judges are expected to qualify the sharpest turn the highest.

Positioning of Second Manoeuvre: Watch for too long horizontal segments flown to re-establish position. Also, second manoeuvres tend to be too big. Use terrain references to check turn points whenever possible.

End: The manoeuvre ends when the model recovers to level flight from the last vertical dive.

Vertical Eights

Entry: Arriving level at 1,5 m altitude, the model flies half a loop up to 45° elevation.

Begin: The manoeuvre begins at the point where the aeroplane climbing to do the first inside loop passes the future intersection point in horizontal inverted flight for the first time.

Intersections: At point of intersection the model has to pass momentarily through an exact horizontal attitude, avoiding both overlapping and X-shaped flight paths.

Positioning: Due to lack of terrain reference, it is difficult to determine the 45° elevation point at which the intersection must be placed. Typically, the positioning of the intersection too high results in flying the manoeuvre behind the pilot's head, which generates two errors; one for missing the 45° line and a

second one for exceeding the 90° vertical size limit of the manoeuvre. Note, however, that the 90° size tolerance is $\pm 0,6$ m (45° tolerance bandwidth is $\pm 0,3$ m).

Shape and Size: Flying the manoeuvre to an elevation above 90° makes it easier to present a fine shape. Judges are advised to watch for this shortcut. Also, flying loops of different diameter is a very common error.

End: The manoeuvre ends after completing the second outside loop, when passing the intersection point in horizontal inverted flight.

Exit: The model then continues for another half loop, returning to level flight at 1,5 m altitude.

Overhead Eight

Entry: Arriving level at 1,5 m altitude, the model flies up half a wingover up to 90° elevation.

Begin: The manoeuvre begins at the point where the aeroplane arriving to do the first loop passes the top hemisphere point for the first time.

Intersections: Intersections shall be flown exactly through the top centre point, avoiding overlapping and crossover flight paths. Overlapping and S-shaped flight path when passing the intersection point is considered an error.

Positioning: Due to the lack of terrain reference it is difficult to determine the two 45° elevation points where the bottom of the round loops have to be placed. Judges shall watch carefully for loop bottoms flown either below (often) or above (seldom) the 45° elevation line.

Shape: Seen from the outside, judging of roundness is difficult to do. Looking for flat spots and abrupt control inputs may give indications of irregularities here.

Size: Flying the manoeuvre to an elevation below 45° makes it easier to present a fine shape.

Judges are advised to watch for this shortcut.

Symmetry: Judges are well positioned to qualify this.

End: The manoeuvre ends after completing the second outside loop, when passing the intersection point.

Exit: The model then continues to recover into level flight at 1,5m altitude.

Landing

Entry: Normal flight, level at 1,5m altitude. The rule does not define how long the normal flight segment to be flown. It is common, however, to expect the aeroplane to fly level for at least 5 metres to give the judges a chance to clearly define the point at which the actual landing procedure shall begin.

Begin: The manoeuvre starts at the point where the aeroplane leaves level flight of the initial approach segment (1,2 - 1,8m). Please take note that this is not necessarily the point where the engine quits.

Final Approach: It shall be gradual from 1,5m altitude to reach the point of touchdown one lap after leaving the 1,5m altitude. All deviations from descending gradually, including stretched floating in ground effect before actual touchdown, shall be reason for downgrading.

Touchdown: Firm, no bounce. Bounces or touching the ground with any part of the model other than the landing gear is considered an error. Crashes, flip overs and upside down landing are scored 0.

Stop: The aeroplane must come to a halt within one lap of the touchdown point.

End: The manoeuvre, as well as the flight time taking, ends when the aeroplane has stopped the ground roll.

Qualifying of Errors: SAMAA rules define the ideal flight path per manoeuvre by using objective (such as: "1,5 metres") and subjective (such as: "stable") position/tracking tolerances and terms. Flight track and position tolerances are quantified by allowed deviations of $\pm 0,3$ m or $\pm 0,6$ m. At this point, it is important to understand that actual flying results in flight tracks typically way-off from what the rulebook says. Analysis of top ace flights has shown deviations, sometimes many times, exceeding tolerances allowed. Judges are well advised that the perfect 10 points manoeuvre has not been flown yet.

Objective Errors: If the aeroplane tracks within such a given tolerance, no downgrading shall be done. A deviation slightly exceeding the tolerance allowed, such as 0,4 m off track where $\pm 0,3$ m is permitted, shall be considered as light error leading to downgrading of one increment (See "Scoring"). Flying off track as much as two times the tolerance is a middle error; it shall give reason to deduct 2 scoring increments for the segment of the manoeuvre to be qualified. Three tolerance distances from the ideal track must be qualified as heavy error, resulting in a deduction of 3 scoring increments. To use this method successfully, judges must be trained to recognise 0,3 and 0,6 m long objects properly at a distance of 45 metres. Respective demonstrations and training are recommended. Also, judges

must make sure to know the various and different tolerances allowed per manoeuvre and per segment of each manoeuvre.

Increased pilot and model capabilities have shown that above tolerances are not tight enough when it comes to qualify inverted flight. This guide suggests using half the regular tolerance ($\pm 0,15$ m instead of $\pm 0,3$ m) when qualifying this manoeuvre (See: rules paragraph "inverted flight".)

Subjective Errors: A phrase such as "model wobbles on turn" is subjective and the degree to which it is followed cannot be measured. Just like "model makes two smooth, stable laps", such statements are difficult to use when it comes to qualify respective segments of a manoeuvre flown. As a basic rule, stability and smoothness shall be conditions defined by the absence of visible wobble or visible control inputs to keep an aeroplane on its track. Visible deviations from the general term "stability" shall lead to downgrading, again using light, middle and severe criteria.

Scoring: Under the presently valid rules, the number of points to be given per manoeuvre depends on the number of errors observed by the judge. Since the rules do not talk about vague terms, such as general impression and flying style, it all comes down to evaluate the degree to which the requested flight track is followed, the subjective element (apart from the "stability" term) being the fact that the magnitude of deviations observed must be estimated, and not measured, by the judge. The basic principle of judging is: The judge assumes that a manoeuvre is flown within all tolerances allowed by the book and, consequently, is scored at the SAMAA max. of 10. Whenever a deviation from the rule is observed, the full points score is reduced accordingly. SAMAA rules allow scores to be given in 0,5 increments from 0 to 10. Scoring in 0,5 increments include a convenient way to differentiate light (minus 0,5 points) from middle (minus 1 point) and severe (minus 1,5 points) errors, such as mentioned under "qualifying of errors".

Consideration of Outside Influences: With the exception mentioned in rule "Landing", no outside influence may be allowed to influence scoring. While the effects of wind gusts during a powerless landing approach and the influence of rough terrain on takeoff run, touchdown, and rollout phase shall be considered when scoring a landing, no such consideration shall be made on other manoeuvres. According to the book, this means that factors such as wind, noise, speed, turbulence and other circumstances outside the pilot's control shall not influence the scoring. A safety related exception shall be imminent thunderstorm danger. Exceptions shall also be made when foreseeable influences, such as, for example, a dog strolling into the flight circle, prevent the proper execution of a manoeuvre. Instead of scoring such a disturbed manoeuvre with a "guessed" average value, the pilot shall be regranted a reflight under proper conditions.

Scoring of a Manoeuvre Missed by a Judge: Whenever a judge, out of whichever reason, misses a manoeuvre, he shall avoid entering a guessed "average" score on the sheet. Marking the respective manoeuvre with an 'X' instead shall trigger the tabulating team to define the average score of the other judges, and to enter a middle number into the missing field.

Preparations at Contest Site: Well in advance of actual competition flying, contest judges shall meet the organiser, the contest director and the Jury, to define:

Head-Judge in charge (See: para "Contest Supervision" which follows shortly).

Classification procedure (number of flights)

Tabulating procedures

Flying order

Competitors call up procedure

Duration of rounds

Breaks

Seating arrangement, sun shades, food

Availability of score recorders

Timekeeping

Pull-test procedure. Highly recommended before each flight as judges sit closest to the aeroplanes. Judges Position: The panel of judges shall be placed according to the pilot's direction given before the start of his flight. They shall remain in this position even if the wind changes. Judges operate side by side with a distance great enough to prevent distraction and short enough to make communication possible.

Warm-up Flights: Two each warm-up flights, to be flown immediately before the beginning of actual competition, shall be flown per day. Pilots of warm-up flights shall be determined by random. Scores of warm-up flights shall be discussed by the panel of judges and may not be made available to third parties.

Time Keeping: It is common practice to agree on one specific person, such as the circle marshal, to take call-up, start-up and total flight times and to define in which way the result of this time keeping is signalled to the judges. Times taken by this individual are binding. It is recommended that the head-judge runs his own stopwatch as cross reference.

Sighting Devices/Terrain References: Hand held devices are, due to unstable position, eye-focusing problems and due to their use directing the judges' attention to one manoeuvre element only, not recommended. Whenever possible, distant terrain reference marks shall be used to define intersections, verticals and/or line elevation angles. Use of terrain references is particularly helpful when it comes to accurately define 38° and 45° elevations. It is advised such reference marks shall be calibrated and discussed before the start of actual competition flying. (Seen from judges position 5 metres out of the circle, the respective line of view angles are 16° and 19° approximately. Simple hand-held triangular sighting tools to calibrate a site before flying are easy to make and prove to be helpful.

Contest Supervision: Qualified by their in-depth knowledge and experience, judges shall closely observe the running of the contest in general, and the proceeding on the flight circle in particular. Where not defined by the organiser, the panel of judges shall define a head-judge becoming their speaker addressing the official contest jury in all matters relating to Fair proceedings under the rules of the Sporting Code in force. In cases where no official jury member is on site, and to guarantee fair conditions for all competitors, the head-judge shall not hesitate to interfere into the proceedings of the contest whenever the prime goal of Fairness is in danger. The head-judge may at all times take safety related decisions and order respective action.

Results Awareness: To prevent influences of whichever kind, judges shall not search for tabulated results before complete qualification or final rounds are flown. Also, judges shall refrain from discussing actual flights, scores and results with competitors, team managers and other judges any time before completed qualification or final rounds are flown. Exceptions from this shall be made only when new judges are trained.

Consistency: Judges in charge of qualifying competitors, having travelled far to participate, are qualified individuals deserving high respect. Consequently, their judgement is firm and binding. It will be highly consistent, not influenced by local matters or short-lived theories of all kinds. The rule is the rule, and the best man following it shall win.

APPENDIX B

TECHNICAL RULES FOR CONTROL LINETEAM RACE JURY GUIDE

It is the intent of this jury guide to aid both the team race jury and the competitors in realising a Fair and enjoyable competition. The guide is an indication of the current consensus of the Team Race rules as written in the Sporting Code. Problems with the rules or the guide, with suggestions for improvement, are welcomed by the Control Line Subcommittee and will be considered at its annual meeting.

Team Race Jury

The Team Race Jury is composed of three members, each of whom should have had recent experience in National competition or judging at that standard.

It is the duty of the Team Race Jury to assure a Fair competition between the teams and their models, and to disallow unfair actions that would result in placing one team at an advantage or another team at a disadvantage.

The Team Race Jury's responsibilities regarding issue of warnings, eliminations, reflights, only start with the GO signal; however, to help in the smooth running of the contest, they should assist the Circle Marshal by checking all other aspects of the contest are according to the rule book.

Examples of this are:

Pilots and pitmen wearing helmets;

The correct 90 second warm-up and 30 second countdown are allowed;

Competitors using the circle for unauthorised practice.

Transgressions should be brought to the attention of the Circle Marshal for him to rectify.

Jury members should allocate the specific tasks of warnings operation, microphone use, note taking, before the commencement of the contest. They should also practice working together either by observing the official practice flights or, preferably, by viewing videos from recent previous championships. It is recommended that a video be situated in the jury tower. This should not be used by the jury before decisions are made nor will it be made available to teams before the end of the round but it will be useful for:

Later discussions between the jury members to aid better coordination;

Viewing by the Jury in case of protest;

Viewing by teams and jury members for a better all-round understanding; and

To be available for judges to train on before the next championships.

Jury members are recommended to adopt the following procedure during races:

Before the start, each jury member selects one team that he will watch at pit stops. His specific responsibilities are to check for:

Starting before GO,

Landing model outside circle,

pilot foot out,

Handle off ground, etc.

The other jury members without discussion and the appropriate penalties given must accept his decision on violations.

For the remainder of the race, all three jury members should observe all three competitors. It is recommended that the jury members adopt a running commentary of the race as this will allow them to centre in on any infringements quickly.

Warnings/eliminations should be given when verbal agreement of two jury members is obtained and no verbal disagreement is heard from the third jury member.

The jury should give clear decisions immediately regarding teams that have been obstructed. It should not put the responsibility for Fair play on the jury who probably will not have observed the incident.

It is a central part of the rules that protests can be made by teams who feel that they have not

received a fair result. Juries should encourage teams to use this facility.

It is equally important for jury members to observe model positions in flight in case collisions occur.

Warnings should be communicated to the teams quickly, however, all warnings are effective at the lap or race time when the infringement occurs, not when verbally communicated to the team.

Three warnings within a 100-lap heat (or 200 lap final) constitute an elimination.

Warnings should be given using short standard phrases whenever possible, the more common ones are shown below in inverted commas under section 2. Verbal communication from the jury should be kept to a minimum to prevent pilot distraction. Teams should be called by their flying colour and not by name.

Most Common Warnable Offences

“WHIPPING” is the application of physical force to increase the speed of the model. This occurs when the model is behind the line perpendicular to the pilot's body (“**Race From Start to Finish**” para vi). See also figures 1 and 2 at the end of this guide. This depends on the position of the pilot's handle (H) relative to the centre of the circle (or centre of rotation CR) and the model M. The CR can be determined as illustrated in figure 2 by observing the rotation of the pilot's handle and taking the midpoint of the maximum left and right movement of the handle.

“BLOCKING” is defined as obstructing another pilot either by body position or arm position, preventing the other pilot taking his correct piloting location and thus slowing his model. See figures 1 d and figure 4. Blocking is caused by the position and attitude of the blocking pilot. With the body between lines 3 and 4 blocking can be caused, rotation of the shoulders can cause more (a) or less (c) blocking action. Warnings should be given as soon as the overtaking pilot is impeded, delays can lead to more serious and potentially dangerous situations occurring. Pilots being blocked by a slower opponent will frequently attempt to clear the situation by crossing lines. Where the blocking pilot has received a warning for this but remains in the same position, then the overtaking pilot should not be penalised for line crossing for a short duration while he clears the obstruction. Excessive blocking to directly prevent being overtaken is an elimination offence (“**A TEAM SHALL BE ELIMINATED FROM A RACE**” part v).

“PIVOTING” is defined as keeping the handle in the centre of the circle with the pilot's body behind the centre.

“TAKING CENTRE” is defined as the pilot physically keeping his body in the centre and forcing the other pilots to walk around him. This can also occur when a pilot does not return to walking forward after completion of his overtaking manoeuvre.

“LINE SHORTENING” occurs when either:

The centre of rotation is in front of the pilot's handle, or the handle is pulled back from its correct position in front of the body.

“ILLEGAL HANDLE POSITION” occurs when the pilot does not fly according to rule “**Race From Start to Finish**”. This is frequently the precursor to a blocking situation.

“PILOT INTERFERENCE” is defined as holding or pulling another pilot such that his normal activities may be impeded. Warnings should not be given when a pilot touches another pilot only to help his orientation.

Competitors Activities During the Race.

Proper pilot activity is to attempt to walk a circle at the centre of the 3 m centre circle to keep the control handle moving forward, in the same direction, as the model and that circle should be as small as practicable.

The pilot keeps his controlling hand on the centre-line of his body, with his hand close to his chest (approximately 10 cm). The handle position is restricted to any place between the middle of his chest

and the top of the forehead (rule **"Race From Start to Finish"** para vi). He is allowed to move his handle away from the body (forward) but still on the centreline to better control the model during overtaking for a maximum of three laps. During overtaking, the pilot's head may be removed from the centreline for better vision of his model. During takeoff and landing rule **"Race From Start to Finish"** para vi. does not apply (up to 2 laps).

Rule **"A TEAM SHALL BE WARNED"** states that teams shall be warned for any flagrant breach of the rules. Actions by either team member leading to a dangerous situation during a race shall be considered a flagrant breach. The following specific examples are given:

Pilot flies too high immediately after takeoff.

Pilot stands erect or raises hand above head immediately after takeoff and before fully joining other pilots in the centre.

Pilot does not immediately join other pilots in the centre.

Pilot does not lower his head and bend down during landing approach.

Pilot does not promptly bring his model below 2 m after the engine has cut.

Pilot, when running the model on ground for more than one segment during landing, does not attempt to avoid (hop over) the lines of other models that are refuelling and restarting.

Pilot flies the model at an effectively dangerous radius when passing over another mechanic, i.e. his handle should remain inside the 3 m circle until the last segment.

Mechanic releases his model with physical effort (see section 1D "Take-off").

Mechanic has the model or its lines significantly off the ground during repair, adjustment, change of segment, catch, refuelling or restarting.

Mechanic releases model without properly checking that no other model is overflying his pit position (especially landing) causing it to bypass its mechanic to avoid a collision - reflight for the other team. Note if a collision occurs, the team releasing its model is eliminated.

It is important to remember warnings are given in these situations when the action(s) actually causes danger to other competitors or their models. Generally, this means that when a competitor is flying solo and behaves as described above, he will not be warned. Danger to other competitors can only occur when they are racing. A Jury cannot, however, wait until an incident/collision occurs before giving warnings - this would be patently unfair to competitors who have had their flight obstructed and possibly model damaged. The responsibility of the jury to give warnings in these situations must be viewed as a controlling mechanism to maintain a satisfactory standard so that a dangerous situation does not arise.

Rule **"Warnings- Eliminations"** states in case of any serious breach of the rules, the jury may eliminate the team from the race". This should be restricted to unsafe and/or unsporting actions, in addition to those specifically listed under all parts of **"A TEAM SHALL BE ELIMINATED FROM A RACE"**.

When a competitor has been eliminated, he or she should land his model immediately (within 10 laps). If he does not attempt to land, and continues to prevent the other competitors continuing without interference, the Team Race Jury will inform the Contest Jury with a view to his disqualification from the whole contest. Teams eliminated in a race have the right of protest to the Contest Jury. If the protest is upheld, they will be granted a reflight. Their original race time will not be counted, therefore, there is no advantage to be gained by flying on after elimination.

A contest consists of three distinct sections: heat, semis and final. Each section poses its own unique problems for the jury and the competitors. The first couple of heats will have a significant effect upon the standard of the rest of the contest. It is important that both the competitors and jury are aware of

this. The jury has to maintain an even standard throughout the two rounds of heats. It will be aided in this if the competitors in the early heats recognise this fact. Juries' decisions are made in response to actions taking place in the flying circle. It is very important that jury members have got a unified understanding between themselves before the first heat.

Semi finals are between the top placed competitors, with very little difference in speed and ability between them. The jury should aim to keep a similar standard to the heats, however, this may not always be possible (nor is it essential) as the emphasis is likely to be different with teams having less speed differential, overtaking is more difficult, tension is higher, blocking situations are more frequent. Again, the prime responsibility of the jury is to maintain an even standard across all semis.

The final is a unique race between the three best teams at the championships. It is double the distance, but teams are still allowed two warnings before elimination! It cannot be juried in exactly the same manner as the heats, the jury must issue warnings where safety is at risk, teams are gaining an unfair advantage or are obstructing other teams, but should be more lenient on purely technical infringements that will not affect the result of the final. Where teams have already received two warnings, and are equally guilty of a third warnable offence, juries are recommended to allow the race to continue and be decided by stopwatch. It is preferable that the results are determined by the competitors and not by a dictatorial jury.

All competitors should recognise that variations on warnings given will occur during the contest, and that the jury will miss/not observe some incidents. The jury operates from a fixed location and must allow for this. It should not give warnings for technical infringements where by virtue of position it cannot treat all teams equally, unless there is a significant safety risk or gross misconduct.

The rules state that the models cannot fly for more than two laps without the engine running. When this occurs close to the end of the race, it is important that the jury is given a clear signal from the timekeepers at the 98-lap stage.

The draws for flying order should be made by the Team Race event director in the presence of the jury as early as possible so that competitors are given the maximum time to prepare. The second round of heats should be drawn immediately after completion of the first round. For semis both rounds are drawn at the same time using the following matrix. If three competitors of one nation have qualified, they are placed diagonally across the matrix (A); other multiple teams are placed in the matrix randomly across the X-axis (B).

- ABF The 1st round is selected horizontally
- BAD The 2nd round is selected vertically
- CEA In each case a random draw is made to determine segment choice.

FIGURE 1

Figure 1a
Normal Handle position.
Pilot slightly holding
back his own handle, but
not blocking his opponents.
Radius r must be as small
as possible

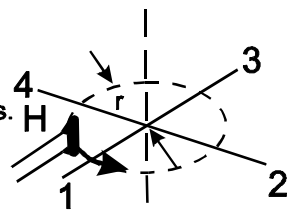


Figure 1c
Whipping and shortening of
flying radius. Severe blocking
of opponents may occur. This
position is very often combined
with walking backwards.
(e.g. walking backwards after
overtaking)

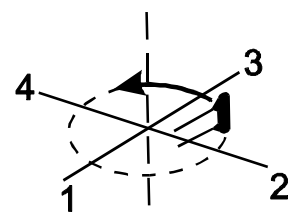


Figure 1b
Classical whipping position.
If pilot walks forward, no
blocking occurs.

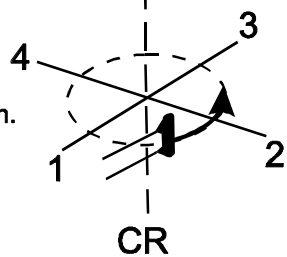
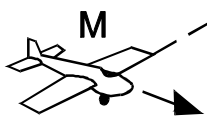


Figure 1d
Walking forward but in the wrong
segment results in blocking of the
opponents as well as in shortening
of the flying radius

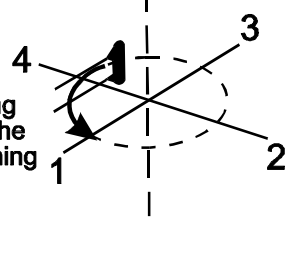
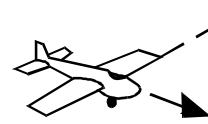


FIGURE 2

With a little practice the CR
is very easy to find in this
way, and if one can,
one can understand a lot more
about what happens during a race.

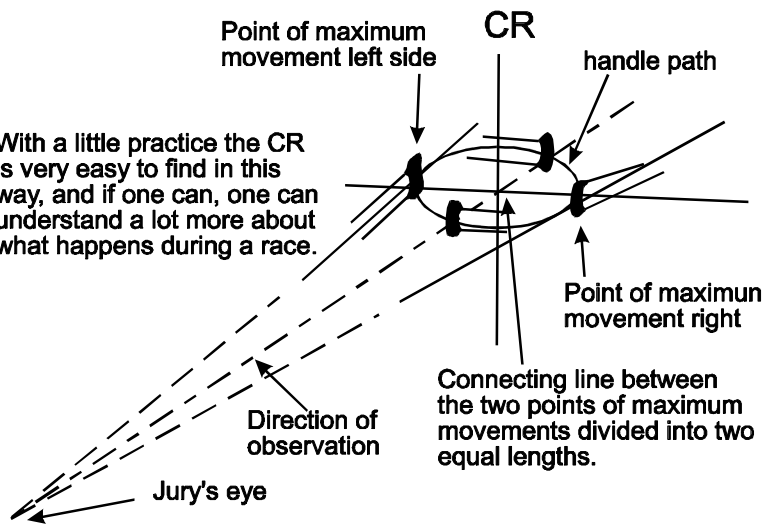


FIGURE 3

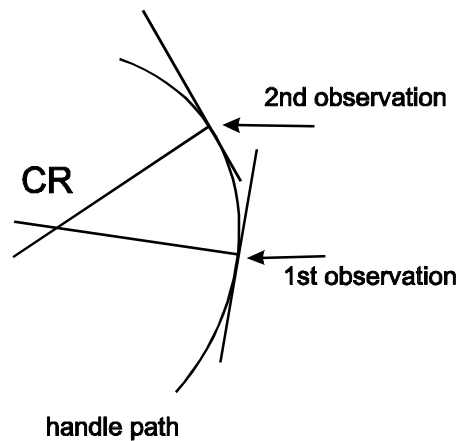
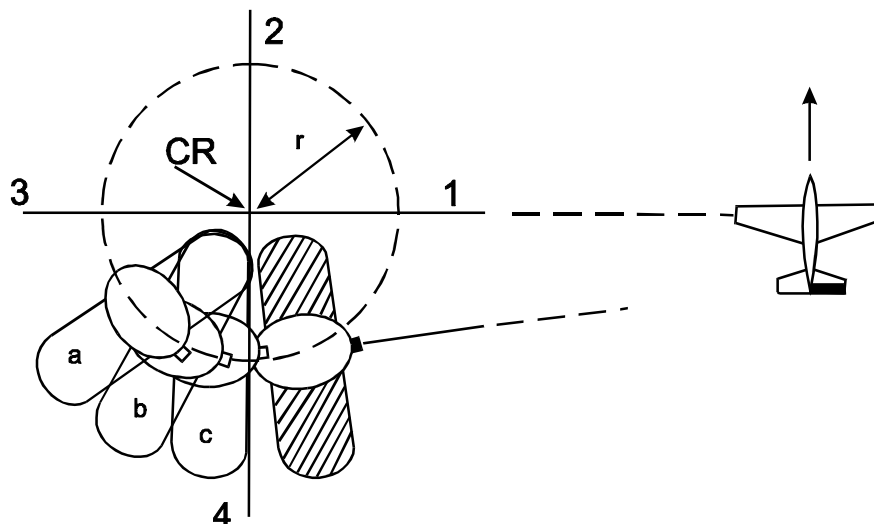


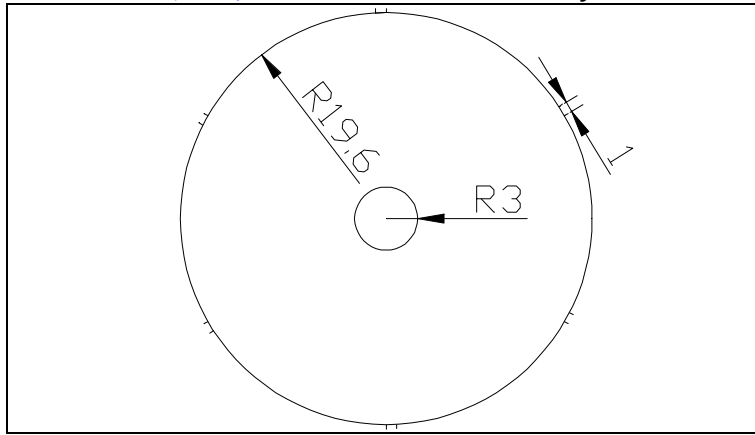
FIGURE 4



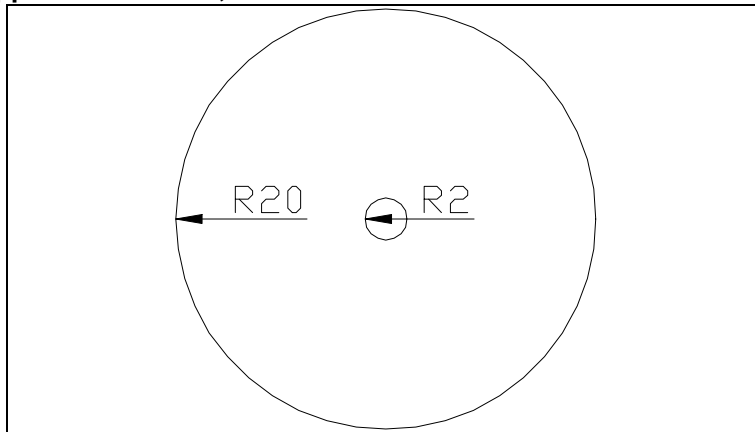
APPENDIX C

SAMAA Control-Line Rules Change Proposal
Name..... SAMAA Number Last competition entered and date:.....
State the page number(s) in the Sporting Code, or its relevant approved amendments, on which the proposal will appear
Quote the relevant paragraph and/or heading from the Sporting Code;.....
Detail exactly what the alteration or addition to the wording is to be;
Give the reason(s) behind the proposed alteration in a short separate paragraph;

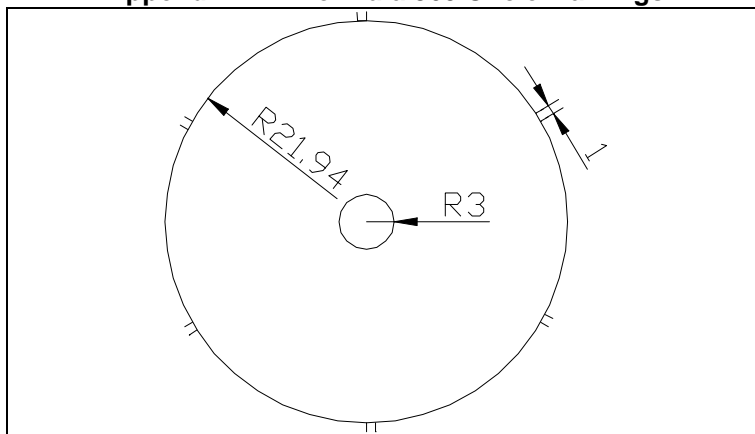
Appendix D F2C, F2F, Unified and Class 2 Goodyear Circle Markings



Appendix E F2D, SAMAA and Novice Combat Circle Markings



Appendix F Formula 360 Circle Markings



APPENDIX G

Reference Records

½A Speed

251.7497km/h 156.43mph

½A Profile Proto Speed

184.7849km/h 114.82mph

A Speed

312.7116 km/h 194.31mph

B Speed

293.9789 km/h 182.67mph

21 Sport Speed

254.904 km/h 158.39mph

Formula 40 Speed

259.0078 km/h 160.94mph

APPENDIX H

SAMAA SAFETY CHECKLIST FOR CONTROL-LINE DISPLAYS

This checklist must be completed by the responsible person before the display.

Responsible
Person: _____

Demonstration
Venue: _____

Demonstration
Pilots: _____

QUESTION	YES	NO	DON'T KNOW
1. Have the SAMAA Chairman or Secretary been informed for insurance purposes? (21 days prior to display date)			
2. Have a Safety Officer and/or suitable person for supervision /scrutineering/crowd control been appointed?			
3. Are the circle and pit areas demarcated?			
4. Is there adequate clearance distance from the crowd (5m)?			
5. Have the lines and connectors been scrutinised? (Swivels prohibited!)			
6. Has all equipment been successfully pull tested? 15G Stunt +Combat; 30G Team racers			
7. Have models been scrutinised for general safety? Condition of bellcranks and control surfaces, safety straps engine/bellcrank if necessary.			
8. Are pilots and pitment wearing protective headgear for demonstration combat matches.			
9. Are all pilots participating paid up members of SAMAA?			
10. Have you inspected the SAMAA documents of the pilots?			

Signature: _____

Date: _____