



**BRITISH MODEL FLYING ASSOCIATION**  
**CONTEST RULES**  
**SECTION 4**  
**CONTROL LINE**  
**SPEED AEROBATICS**  
**TEAM RACING COMBAT CARRIER**

To be read in conjunction with the General Rules, Sections 1 and 2, which are available free of charge from the BMFA.

Effective January 2024

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Price £5.00

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# SECTION 4 - CONTROL LINE

## CONTENTS

**NOTE: All FAI class rules are excluded and you should refer to the FAI Sporting Code for those rules.**

<b>4.1</b>	<b>General Rules</b> .....	<b>3</b>
<b>4.2</b>	<b>Team Selection Rules</b> .....	<b>5</b>
<b>4.3</b>	<b>Domestic Team Rules for F2D Combat</b> .....	<b>9</b>
	Safety Strap Notice .....	10
<b>4.4</b>	<b>Speed</b>	
4.4.1	BMFA Variations on F2A and F2G .....	10
4.4.2	BMFA Control Line Speed Rules.....	10
4.4.3	Sport Jet Speed .....	16
4.4.4	The F2A and Open Speed Leagues.....	17
4.4.5	Vintage Speed .....	18
4.4.6	Vintage Proto Speed.....	22
4.4.7	Weatherman Speed .....	22
<b>4.5</b>	<b>Aerobatics</b>	
4.5.1	BMFA variations on F2B and F2B Judges Guide .....	24
4.5.2	C/L Technical Committee Aerobatics Judges Training Programme .....	25
4.5.3	C/L Clubman Aerobatics .....	27
4.5.4	C/L Junior Clubman Aerobatics.....	28
4.5.5	Vintage Stunt .....	28
4.5.6	Classic Aerobatics.....	36
<b>4.6</b>	<b>Team Race</b>	
4.6.1	BMFA Variations on F2C.....	37
4.6.2	General Team Race Rules.....	37
4.6.3	Semi Scale Class Rules.....	43
4.6.3.1	1/2A, B and Barton B .....	43
4.6.3.2	1/2A Team Race .....	43
4.6.3.3	B Team Race .....	44
4.6.3.4	Barton B Team Race.....	44
4.6.3.5	Barton Classic 15.....	46
4.6.4.1	Profile Class Rules.....	48
4.6.4.2	Open Goodyear .....	49
4.6.4.3	British Goodyear .....	50
4.6.4.4	Mini Goodyear.....	51
4.6.4.5	F2CN .....	52

*cont/...*

.../cont

<b>4.7</b>	<b>Vintage Team Race</b>	
4.7.1	Vintage Team Race .....	53
4.7.2	Vintage 1/2A Team Race .....	56
4.7.3	Vintage Class A Team Race .....	57
4.7.4	Vintage Class B Team Race .....	59
<b>4.8</b>	<b>Combat</b>	
4.8.1	BMFA Variations on F2D.....	63
4.8.2	1/2A Combat.....	63
4.8.3	1/2A Diesel Combat .....	68
4.8.4	Vintage Combat .....	69
4.8.5	Oliver Tiger Combat.....	82
4.8.6	BMFA Variations on F2E.....	83
<b>4.9</b>	<b>Carrier Deck</b>	
4.9.2	Class 1 Carrier Deck.....	84
4.9.2	Basic Carrier Deck .....	86

## Notes

Changes to the rules, other than consequential sub-paragraph re-numbering, are denoted by a side-bar as shown on the right.

## Gender

Words of masculine gender should be taken as including all genders.

## Synopsis of 2024 changes.

### 4.4 - Speed changes:

- 1) Introduce new class Italian Sport Jet.
- 2) Introduce new classification for 12 class Personal Record Ratio.
- 3) Remove 21N rule entry requirement of <80% of any Speed class national record.
- 4) Remove requirement to use commercial fuel in the 12 class
- 5) Introduce Personal Record Ratio classification in the 12 class.

### 4.6.4.5 CLASS F2CN

Change to Engine description

## **4.1 CONTROL LINE GENERAL CONTEST RULES.**

### **4.1.1 Safety Precautions**

- (a) No control line model aircraft shall be flown in a contest unless arrangements are made to keep spectators at least 25 feet outside the flight path of the model aircraft unless the model aircraft are flown inside a safety cage.
- (b) No model aircraft or equipment shall be used in a contest if it is considered by the Contest Director to be unsafe or in a dangerous condition.
- (c) Any competitor releasing the controls whilst the model aircraft is in motion shall be under the penalty of disqualification from the contest.
- (d) In ALL CLASSES the use of either a spinner or a safety spinner nut is compulsory.
- (e) Most Classes have specific propeller safety rules and you should refer to the individual class sections for more information.
- (f) It is mandatory that safety wrist straps are worn by all pilots during flying including practice flying.
- (g) It is mandatory that all mechanics for Team Race, Vintage Team Race and Combat wear safety helmets during practice flying.

**4.1.2** With the exception of Open Speed control line model aircraft employing multi-line control, it shall not be permitted to link the two lines together in any way between the point of exit on the model aircraft and a point 300mm from the control handle.

**4.1.3** The order of flying shall be decided by means of a draw when considered necessary by the organisers.

**4.1.4** The jettisoning of any part of the model aircraft or attachments in flight is prohibited. In such an occurrence, the flight shall be deemed to be a non-scoring attempt.

**4.1.5** Other than that exercised by the pilot through the control lines, no other means of controlling the model aircraft or the engine may be employed during the flight.

### **4.1.6 Control Line Contest Records.**

Team Race Records.

- (a) Team Race record claims will only be eligible when the flights have been made at:
  - i) any BMFA Centralised competition;
  - ii) any competition run by, or on behalf of, a recognised National Body;
  - iii) any international competition that appears on the FAI International Contest Calendar.
- (b) Only races where 3 (three) aircraft start the heat/final and complete at least 75% of the race will be considered eligible for record claims.

### **4.1.7 Interruption of the Contest**

The start of the contest may be delayed or the contest interrupted if the wind speed is continuously stronger than 9m/s (20mph) for 30 seconds when measured at two metres above the ground at the centre of the circle.

#### 4.1.8

#### Protests and Appeals

- (a) It is the right of a competitor to protest against any decision by a Contest Director (CD). Any such protest, however, must be made officially to the CD, and must be made on the day. The protests and appeals procedure to be followed at the contest is also set out in the General Regulations and Rules, Section 2, and in the event of discrepancies they shall take precedence.
- (b) If not satisfied with the CD's decision the competitor must, on the day, hand the CD the protest in writing, together with a fee of double the standard entry fee. The CD will then immediately empanel three appropriate persons to deal with the protest.
- (c) The panel's decision is final, subject to the right of the competitor who submitted the protest to appeal to the BMFA Council.
- (d) Appeals to Council about a decision made at a contest must be made as follows:
  - (i) Notification that an appeal is pending must be sent to the BMFA Competition Secretary to arrive not later than two weeks from the date of the contest.
  - (ii) The appeal itself, together with any supporting evidence, must be sent to the BMFA Competition Secretary to arrive not later than two months from the date of the contest.
- (e) Protests made to Council after the contest may only be made direct to the BMFA Competition Secretary who, after considering the details of the protest, may bring such protests to the attention of BMFA Technical Council. Notification of an "after the contest" protest must be made to the Competition Secretary within 7 days of the contest and the protest and evidence submitted not later than two months from the date of the contest.
- (f) Protests or appeals arising from a decision made by a Technical Committee on contest related matters may only be made directly to the Competition Secretary and must be accompanied by a £50 fee. The Competition Secretary will then convene a Panel comprising three Technical Committee Chairmen and not including the Chairman of the Technical Committee concerned. This Panel, plus the Competition Secretary, will study the appeal and examine the reasons for the Technical Committee's decision.
- (g) If the protest or appeal is not upheld, then the appellant(s) must be informed of the reasons for the decision. This procedure does not preclude an appellant(s) taking a failed protest or appeal to the BMFA Full Council.
- (h) If the written protest or appeal is upheld, the protest fee will be returned, however if the protest or appeal is unsuccessful the fee will be allocated to the team travel fund of the relevant discipline.

## 4.2 TEAM SELECTION RULES

- (a) The team selection competitions will be run throughout the season in the year immediately prior to that in which the World or European Championship will be held.
- (b) When the British National Championships (Nationals) are designated as Team Selection competitions and they coincide with the FAI F2 Championships, then the following applies for the team selection (for the following year's Championships) for those F2 team members competing in the current year's Championships:
  - i) Each Team Member's points (or best two times for F2C) accrued at qualifying competitions up to the British National Championships in the year in question will be averaged.
  - ii) If the calculated average is not a whole number then it will be rounded down to the nearest whole number. For F2C the times will be averaged in the usual way.
  - iii) The final points (or two times in F2C) shall be included in the Team Selection tables as if they had occurred as a result of the British National Championships.
- (c) If it is not possible to run a league system due to exceptional circumstances, a team trials event shall be held to determine the team members
- (d) Team Members will be responsible for organising a centralised competition if requested.

### 4.2.1 F2A Speed Team Selection Rules

4.2.1.1 The team selection contests will be designated as such in the BMFA News Contest Calendar.

4.2.1.2 Points will be awarded to the final placings as follows:

First place	=	ten points
Second place	=	seven points
Third place	=	five points
Fourth place	=	four points
Fifth place	=	three points
Sixth place	=	two points
Seventh place	=	one point

#### 4.2.1.3 Classification

- (a) A league results table will be maintained and updated after each team selection competition.
- (b) At the end of the season, a summation of the best five place points for each competitor will determine the final team selection points for that competitor.
- (c) In the event of a tie, the best individual officially recorded speed will be used to break the tie. If the tie still exists after this, then the next best individual officially recorded speed will be taken into account and so on until the tie is broken.
- (d) Under normal circumstances, the three top placed fliers will be proposed as the F2A team for the following Championships.
- (e) The fourth placed flier will be proposed as the reserve F2A team member.

## 4.2.2 F2B Aerobatics Team Selection Rules

4.2.2.1 The team selection contests will be designated as such in the BMFA News Contest Calendar.

4.2.2.2 Points will be awarded to the final placings as follows:

First place	=	ten points
Second place	=	eight points
Third place	=	seven points
Fourth place	=	six points
Fifth place	=	five points
Sixth Place	=	four point
Seventh Place	=	three points
Eighth Place	=	two pints
Ninth Place	=	one point
Subsequent places	=	nil points

Points will be allocated only to those competitors eligible to hold a UK FAI licence. For the purposes of team selection league points, the top placed competitor eligible to hold a UK FAI licence will be allocated "first place" points and so on down to the ninth eligible competitor

Any F2B flier who judges at a competition that includes F2B Team Selection, thus giving up his opportunity to enter that competition, shall be compensated in the following way:

- (a) He shall be awarded points that are equal to the average of the placings he achieved at the competitions that include F2B Team Selection during that season.
- (b) The points shall be rounded to one decimal place.
- (c) These averaged points shall count for the judged competition.
- (d) In any season, the maximum number of relevant competitions at which an F2B flier may judge, in lieu of flying, is two.
- (e) The calculation shall be made at the end of the flying season.

### 4.2.2.3 Classification

- (a) A league results table will be maintained and updated after each team selection competition.
- (b) At the end of the season, a summation of the best five place points for each competitor will determine the final team selection points for that competitor.
- (c) In the event of a tie, the best individual officially recorded points awarded by the Aerobatic Judge(s) will be used to break the tie. If the tie still exists after this, then the next best individual officially recorded points awarded by the Aerobatic Judge(s) will be taken into account and so on until the tie is broken.
- (d) Under normal circumstances, the three top placed fliers will be proposed as the F2B team for the following Championships.
- (e) The fourth placed flier will be proposed as the reserve F2B team member.

### 4.2.2.4 Number of Rounds

For the second and third rounds, the flight order shall start 1/3 & 2/3 respectively down the first round flight order.



### 4.2.3 F2C Team Race Team Selection Rules

- 4.2.3.1 The two best heat times for each properly constituted team at each team selection competition shall be recorded in a results table which will be maintained and updated after each qualifying competition and published in a timely manner on the CL News page of the BMFA website.
- 4.2.3.2 The Contest Director may, in extreme weather conditions declare, on the day, to run two-up races for that day and the times shall count towards team selection.
- 4.2.3.3 At Team Selection competitions (TSC) where the draw produces a two-up race:
- (a) If there are no teams with re-flights and no volunteer team is available, then the CD will draw a team at random to make a three up-race.
  - (b) That team's extra race time shall be counted for Team Selection.
  - (c) If no team is willing to participate, then the times that the two remaining teams achieve will count for team selection. A volunteer team may be a "scratch" team, whose result shall not count for Team Selection.
  - (d) A "scratch" team is one which is formed on the day and it may contain entrants who have already flown in another team at that competition.
- 4.2.3.4 A maximum of two times shall be taken from any one competition.
- 4.2.3.5 Times shall be eligible only when recorded at:
- (a) The BMFA National Championships.
  - (b) Any BMFA competition designated as Team Selection at the start of the season.
  - (c) Any competition designated as Team Selection by the Control Line Technical Committee.
  - (d) Any UK hosted open international competition.
  - (e) Any BMFA competition designated as Team Selection competition held on an appropriately published reserve date.
  - (f) A maximum of three FAI Open International competitions that appear on the FAI Contest Calendar with results available from an independent source.
- Note: Times from World or Continental Championships do not count.**
- 4.2.3.6 Two reserve dates will be published to cover cancellations caused by situations that are beyond the control of the organisers.
- 4.2.3.7 Venue changes within a reasonable distance (approximately 150 miles) of the original venue are permitted only on the published date.
- 4.2.3.8 The list of eligible Team Selection competitions, including two reserve dates, shall be published on the BMFA website and in the BMFA News Contest Calendar.
- 4.2.3.9 To be eligible for Team Selection a team must:
- (a) Enter a minimum of 4 designated competitions excluding the Nationals.
  - (b) Unless organising a competition (see item 11) when the minimum number is then reduced to 3, teams shall compete in a minimum of 4 BMFA designated Team Selection competitions excluding the Nationals.
  - (c) Should a competition be cancelled because of weather conditions or some other unavoidable circumstance, the team that volunteered to run that competition will be offered the chance to run the competition on one of the reserve dates if the dates have not already been utilised.

**4.2.3.10** Teams may elect, at the beginning of the year when the Contest Calendar is published, to run one of the Team Selection competitions. Any team that runs one of the Team Selection competitions (AND does not participate in it) will only have to record 6 and not 8 times. Only one member of the team is required to run the competition.

**4.2.3.11 Final Team Selection**

- (a) At the end of the season, the best 8 recorded times of each team will be averaged. The resulting average time shall be made up to the next upper 1/10 of a second and listed in the Team Selection table in ascending order (fastest, first; slowest, last). This order shall determine the placings for team selection.
- (b) In the event of a tie, the best individual officially recorded time of the eight times used to calculate the average time will be used to break the tie. If the tie still exists after this, then the next best individual officially recorded time of the eight times will be taken into account and so on until the tie is broken.
- (c) Under normal circumstances, the three top placed teams will be proposed as the F2C team for the following Championships.
- (d) The fourth placed team will be proposed as the reserve F2C team.

**4.2.4 F2D Combat Team Selection Rules**

**4.2.4.1 Contests**

- (a) The team selection contests will be designated as such in the BMFA News Contest Calendar.
- (b) Qualifying competitions shall be all five team selection contests and the Nationals plus a maximum of one foreign competition excluding World & European Championships (they are not open competitions).
- (c) For a foreign contest to be included, it must appear on the FAI Calendar either as a World Cup or an Open International and the results must be available from an independent source.
- (d) The season will be deemed to have finished at the end of the last scheduled contest unless a flier has notified the F2D CD (currently John James) that he plans to attend a foreign contest after that date and that he wishes to earn team points from that contest. The CD needs to be notified, at the very latest, immediately after the last bout of the final team selection contest otherwise the foreign contest shall not be counted.

**4.2.4.2 Team Points**

- (a) Points are accrued on the following basis:
  - i) 1 point for each team selection contest entered, plus 1 point for entering the Nationals.
  - ii) In the event of a contest being cancelled on the day at the flying site, those fliers who turn up will get an attendance point; a second attendance point shall be accrued if they also turn up at the re-scheduled competition.
  - iii) 1 point for entering a foreign F2D competition. Only 1 foreign attendance point may be accrued, no matter how many foreign contests are entered.
  - iv) In order to qualify for the UK attendance point, the flier must stay on the field, to help out with the organisation if required, until the end of the event. (This requirement may be waived in any case of extenuating circumstances.)
  - v) 1 "win" point for each bout won, when a bout is flown, during any qualifying competition including a maximum of one foreign competition.

*cont/...*

- (b) The summation of the best 6 scores of each competitor shall determine the final points for that competitor. This means that if a flier does not attend a foreign contest, all 5 team selection contests plus the nationals will be have to be counted. If any points have to be dropped, then they shall be "win" points; attendance points shall be retained.
- (c) All fliers who wish to be considered for the British Team for the next Championships shall attend and compete in the last competition of the season. (This requirement may be waived in the case of extenuating circumstances.)
- (d) Under normal circumstances, the three fliers with the most points will be proposed as the F2D team.
- (e) The fourth placed flier will be proposed as the reserve F2D team member.

#### 4.2.4.3 Tie-Break

- (a) In the case of a tie of points for the final team place(s) at the end of the season, there shall be a fly-off between the pilots involved. This shall be a one-off bout held at the end of the final team selection contest. If more than two fliers are tied, then they shall all fly against each other in a "round robin" until a winner is, or winners are, found.
- (b) If, after the final bout of the last team selection contest, any flier involved in a tie elects to attend a later foreign contest, and if this might affect the people involved in this fly off for the final team places, then the fly-off shall be re-scheduled to take place on the first reserve date.
- (c) Should it be impossible to hold a fly-off for reasons such as weather, then there will be a count back of actual placings during the season, counting the number of first places initially and then if the result is still tied, counting the number of second places and so on.

### 4.3 DOMESTIC TEAM RULES FOR F2D COMBAT

- (a) A Domestic Team (DT) will consist of no more than four pilots.
- (b) The sole purpose of a DT is to enable fliers from the same team to be kept apart in the draw for the first two rounds only.
- (c) A flier must nominate his DT with his first entry of the season.
- (d) A flier may join only one DT throughout the flying season.
- (e) A flier may elect to leave that DT if he wishes but may not then join another DT. Additionally that DT cannot replace him.
- (f) A flier does not have to be a member of any DT.
- (g) If a flier does not select a DT at the time of his first entry, he will be considered to be a solo entrant for the remainder of the season.
- (h) DT members will be drawn apart from each other when possible for the first two rounds only. After that, the draws will continue in the usual way.

---oOo---

**NOTE**

In accordance with CIAM General Rules B1.2.2(e) for all F2 classes a safety strap connecting the competitor's wrist to the control handle must be provided by the competitor and used during all flights. A pull test shall be applied separately to the safety strap. This pull test will be applied according to each class specification concerning the lines' pull test.

**4.4 SPEED**

**4.4.1 BMFA VARIATIONS ON F2A AND F2G**

As Section 4.4.2 BMFA Control Line Speed Rules.

**4.4.2 BMFA CONTROL LINE OPEN SPEED RULES**

**4.4.2.1 Definition of speed models**

**TABLE A**

BMFA Class	Engine Capacity (cm <sup>3</sup> )	Min. Diameter of Lines (mm) Monoline 2 Line	Radius of Flight (metres)	Number of Laps (1 km)	Max Dry Weight (grams)	Pull Test (kg)	
.049	0 - 0.9	N/A 0.25	14.15	6 (0.53 km)	250	10	
0.12	0.9 - 2.1	N/A 0.30	15.92	10	500	15	
0.15	1.51 - 2.5	0.50 0.40	17.69	9	550	30	
F2A	Max 2.5	N/A 0.40	17.69	9	n/a	50G	
F2G	N/A	N/A 0.40	17.69	9	600	50G	
F21	2.51 - 3.5	N/A 0.45	17.69	9	700	30	
21N	2.51 - 3.5	N/A 0.40	17.69	9	750	30	
F29	3.51-5.0	N/A 0.45	19.90	8	1075	35	
0.29	3.51 - 5.0	0.60 0.45	19.90	8	950	40	
F40	5.01 - 7.0	N/A 0.50	19.90	8	1075	40	
0.40	5.01 - 7.0	0.60 0.50	19.90	8	950	40	
0.60	Light	7.01 - 10.0	0.75 0.55	19.90	8	1050	55
	Heavy	7.01 - 10.0	0.75 N/A	19.90	8	1300	65
Fast Jet		0.75 0.60	19.90	8	1150	65	
	At its minimum diameter, the tailpipe shall not be greater than 806.45mm <sup>2</sup> (1.25in <sup>2</sup> ).						
Sport Jet		N/A 0.50	19.90	8	1150	45	
Italian Sport Jet		N/A 0.50	17.69	9	850	28	

cont/...

## NOTES

- i) Class 0.12, is for commercially available engines up to 2.13 cc (0.13 in<sup>3</sup>).
- ii) For the Jet classes, an additional allowance of 200gm (100gm for Italian Sport Jet) for fuel has been taken into account to determine the correct pull test.
- iii) For 0.12 class fuel is up to 25% Nitromethane by volume.

### 4.4.2.2 Qualification of Competitors

For BMFA classes, F2G and for F2A non Team Selection flights it is not mandatory that the entrant flies the model aircraft. If the entrant elects not to fly the model aircraft himself, then only he may adjust or set the engine and the designated pilot must show valid BMFA membership. The entrant may change his elected function up to the start of the attempt.

**Reason** To encourage those who may not be able to fly because of physical impairment to be able to compete regardless. However, in such a technical class as F2A Speed, it is important that the competitor adjusts or sets the engine himself.

Note that this amendment applies only to non-Team Selection flights.

### 4.4.2.3 Fuel

Composition of fuel is not restricted except for the use of **DIOXINS, TETRANITROMETHANE or NITROBENZENE**, which are prohibited.

### 4.4.2.4 Control Lines

- (a) All classes except 0.12, F21, 21N, F29, F40 Sport Jet and Italian Sport Jet may use one or more control wires which may be linked or grouped together provided that control response is not impaired.
- (b) In classes 0.12, F21, 21N, F29 F40, Sport Jet and Italian sport Jet only two wire control may be used and no intentional linking or twisting together of the lines is permitted from the point of exit from the model to the control handle.
- (c) Sizes of wire are as shown in Table A with a tolerance of minus 2.5%
- (d) Control wires shall be of uniform diameter piano wire of good quality and in sound condition at least equal to BS 5216.
- (e) Wires bearing marks caused by gripping with pliers or similar shall not be used.
- (f) Wires may not be spliced together.

### 4.4.2.5 Control Line Connections

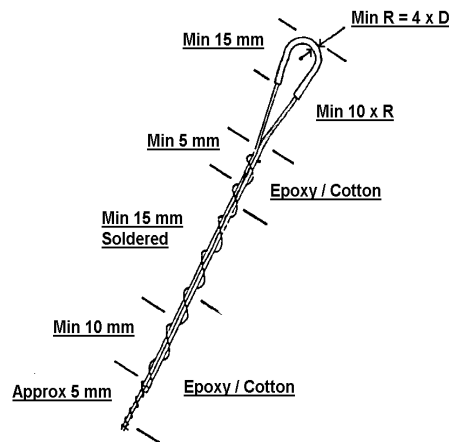
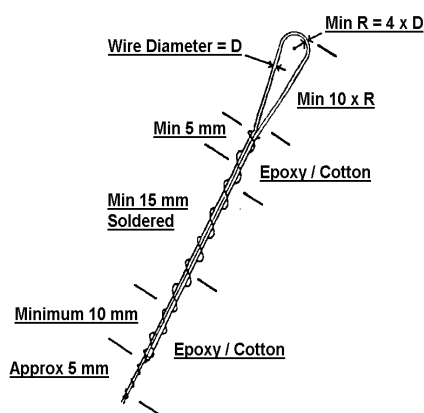
- (a) Loop connections on ends of control lines shall be constructed essentially as described and illustrated below.
- (b) Loops shall be bent cold around a suitable circular former (wood dowel, metal rod or similar) whilst the wire is under tension so as to produce a bend of constant minimum radius as shown. The wire must not be heated at any time during the bending process.

*cont/...*

- (c) Binding shall be tinned copper wire, minimum diameter 0.2 mm or similar, wound in an open spiral to promote complete penetration of solder to the control line wires.
- (d) Only 'soft' solder shall be used, applied with a suitable flux and using a soldering iron at only sufficient temperature to obtain proper tinning of the wires and adhesion of the solder. Excessive heating must be avoided and soldering by flame heating must NOT be used. Do not use hard solder or silver solder. If the flux used

is an acid type, it must be neutralised after soldering with an alkaline solution (baking powder or similar).

- (e) Each side of the soldered area, the binding shall be reinforced by a coating of epoxy adhesive, over-binding with cotton or similar.
- (f) Un-sleeved loops shall be attached to models and/or control handles via pins, shafts or 'buttons' with shank diameter sized to fit the loop
- (g) Pins, shafts or 'buttons' (as in (f) above) where attached to any component which will impart any rotary motion to the pin etc. by reason of normal operation of the models controls (e.g. bellcranks, rigid parts of control handles etc.) shall be attached via a concentric axle allowing the pins etc. to rotate freely when the control system is operated under tension equal to the appropriate pull test.
- (h) Sleeved loops shall be protected from deformation by sleeving the wire before bending with brass, copper or aluminium tube or similar of a bore not more than 0.1 mm greater than the control line wire.



UNSLEEVED LOOP CONNECTIONS

SLEEVED LOOP CONNECTIONS

#### 4.4.2.6 Control Handle

Handles for use with the single point pylon top shall incorporate a 'hook' or other device which, when engaged with the pin on the pylon top, can sustain the entire load generated by the model in flight.

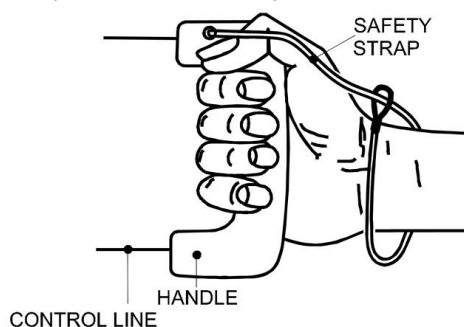
#### 4.4.2.7 Safety Strap

In order to ensure that a speed model is prevented from flying away if inadvertently released by the pilot during a flight a safety strap connecting the competitor's wrist to the control handle must be provided by the competitor.

- ( i ) The safety strap must be of the "noose" type, see drawing overleaf.
- ( ii ) There is no restriction as to where the strap is connected to the handle, however it is recommended that it is NOT attached at the bottom of the handle grip.

cont/...

- (iii) Safety straps may be examined by the Contest Director to ensure that the intent of this rule is met.



**.4.2.8**

**Pylon Top Details**

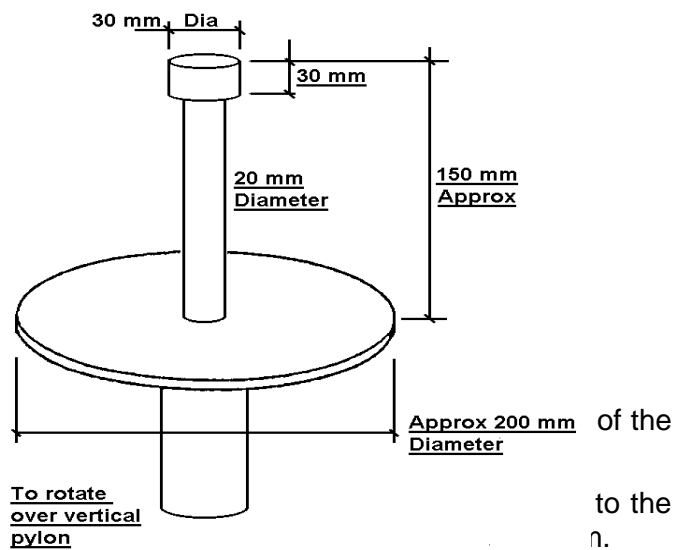
All dimensions in millimetres.

For the FAI Top see the FAI Sporting Code.

The Standard Top is the same as the FAI top but without the handle cross bar locators.

The Single Point top is as the drawing at right.

**SINGLE POINT TOP.**



**4.4.2.9**

**Line Tests**

- (a) The distance between the centre of the propeller is to be as detailed
- (b) If an FAI type of handle is used, the distance from the axis of the propeller must be as detailed
- (c) If the single point pylon top is used, the distance from the hook or bar to the axis of the propeller must be as Table A, radius of flight, plus 10 mm.
- (d) Where two propellers are employed, the axis of symmetry is taken as the reference for measurement.
- (e) For Jet reaction motors, the centreline of the motor is equivalent to the axis of the propeller.

**4.4.2.10**

**Load Tests**

- (a) A load test shall be applied to the assembled control handle, lines and model equal to the load detailed in Table A, pull test.
- (b) In each case the pull shall be applied slowly, increasing to maximum load and releasing at a similar rate.

cont/...

- (c) The pull test must be applied to the handle grip, not to the point of attachment of the lines and, when the handle is to be used on an a single point pylon top the load test must also be applied to the 'hook' or 'ring'.
- (d) The safety strap/handle assembly must be pulled to the same load as specified in para (a) above.
  - i) This test may be done separately from the line load test.

- ii) The safety strap does not have to be on the wrist when this test is made.
- (e) In the Jet Speed classes, a load test of 22.5 kg shall be applied to the mounting brackets which attach the pulse jet to the model.

Note: For the wrist strap, the Speed Committee recommends a minimum of 80lb (36Kg) capacity cord for classes up to and including 21 and a minimum of 160lb (73Kg) capacity cord for all classes above 21.

Supplies of suitable rope are available from most DIY stores. Parachute cord is available online from Amazon and Dick Hart has a plentiful supply of cord which he is happy to supply free of charge.

#### **4.4.2.11 Number of Models**

A competitor may enter a maximum of two models in each class.

#### **4.4.2.12 Engines**

Spares may be fitted to engines during the contest but any individual engine may only be used by one competitor during a contest.

#### **4.4.2.13 Exhaust Systems**

- (a) Except for classes 0.12 and 21N, there are no restrictions on exhaust systems.
- (b) For class 21N, the overall length of the exhaust system must not exceed 240 mm measured from the centre line of the cylinder to the furthest point of the exhaust system. This dimension is to be measured along the centreline of the exhaust. The internal diameter of the exhaust outlet shall not exceed 6.5 mm.
- (c) For Class 0.12, the overall length of the exhaust system must not exceed 200 mm measured from the centre line of the cylinder to the furthest point of the exhaust system. This dimension is to be measured along the centreline of the exhaust. The internal diameter of the exhaust outlet shall not exceed 6.0 mm.  
**Note:** for the 12 and 21N classes open exhaust is not allowed.

#### **4.4.2.14 Length of Course**

The measured distance to be covered by the model must be at least one kilometre for all classes except class (1) 0.049 where the distance to be covered by the model must be at least ½ kilometre.

#### **4.4.2.15 Number of Flights**

A competitor is entitled to three flights unless otherwise advertised or stated in the class rules.

#### **4.4.2.16 Definition of Attempts**

A competitor is allowed two attempts per flight, an attempt taking place when:

- (a) The competitor enters the circle, the model flies but the competitor does not engage the pylon with his handle or wrist within the three minutes of being given permission to fly.
- (b) Having engaged the pylon with his handle or wrist, the competitor's model does not complete the timed kilometre.

*cont/...*

- (c) The competitor, having engaged the pylon with his handle or wrist, removes the handle or wrist from the pylon without completing the timed kilometre.
- (d) In the opinion of the timekeepers, the model exceeds a height of 4.50 metres during the timed kilometre.
- (e) The model fails to get airborne within three minutes of the competitor being given permission to fly.



- (f) The competitor is judged to have used physical effort to increase the speed of the model after engaging the pylon.
- (g) Jettisoning occurs during the official flight.

#### **4.4.2.17 Timing**

- (a) Timing commences when the competitor has engaged the pylon with his handle or wrist and the model has made two complete laps in flight and reaches the marker or the electronic sensor at the end of the second lap.
- (b) The flight time must be taken by two timekeepers equipped with stopwatches recording to 1/100th of a second or with an electronic apparatus approved by the BMFA.
- (c) The time recorded is the mean of the two times indicated on the watches or the time recorded by the approved apparatus.
- (d) When using stopwatches for timing and the difference between the two times indicated is greater than 12/100 of a second, the competitor has the right to repeat the flight or to accept the slowest speed.

#### **4.4.2.18 Height of Flight**

During the timing of the official flight the flying height must not be less than one metre or more than three metres.

#### **4.4.2.19 Number of Helpers**

Each entry is permitted a maximum of three helpers at the starting zone.

#### **4.4.2.20 Team Entries**

In addition to individual entries, teams of no more than two people are eligible to compete. No member of such a team may enter the same class in which his team is competing, either as an individual or as a member of another team.

#### **4.4.2.21 Classification**

- (a) Unless otherwise announced, all national speed contests will be organised as 'combined speed' events for F2A and F2G models as defined in FAI 4.1 and BMFA class models as defined in 4.4.2.2.
- (b) For Speed Team Selection or for Open Speed League Centralised competitions, then the following rules apply:
  1. Specific Centralised competitions may be held in two different locations on the same date or on the previous or following weekend.
  2. These competitions are to be known as "CL Area Centralised" (ACs) competitions.
  3. There shall be a maximum of five AC competitions in any given year.
  4. AC competitions for a particular date as outlined in Clause (1) must be held in two different BMFA Areas that give competitors a fair choice of competition location relevant to where they live.
  5. If it is not possible to schedule two AC competitions as outlined in Clause (1), then the single competition shall count for classification purposes as long as it complies with BMFA General Rules.

*cont/...*

6. If an entrant competes in both the AC competitions under Clause (1), then only the score at the first of the two scheduled competitions counts towards Team Selection and the Alan Woodrow trophy or, for Open Speed, the Johnnie Hall trophy.
  7. The TransiTrace (TT) system must be used for timing the competition flights.
  8. The TT files (logs) must be sent to the SpeedCom Secretary within four days of the end of competition for collation into the final results for the separate competitions.
- (c) (i) The speed used to calculate the percentages for results shall be the current highest speed attained in a particular class in a BMFA or FAI competition. This speed may, or may not, be the same as the current BMFA national record.
- (ii) Contest Directors must maintain accurate records of the highest speeds, the date and the venue of the appropriate competition and the competitor's name.
- (d) Contest placing will be determined according to the percentage scored, the highest percentage to win.
- (e) Only the entrant's best single class performance is to count.
- (f) In the case of a tie, the mean of the competitor's two best flights in that single class will be taken to determine the final placings.
- (g) If this still produces a tie, the mean of the competitor's three flights will be taken.

#### **4.4.2.22 12 Class Personal Record Ratio (PRR) Speed**

Note:- This class is designed as an introductory speed class to encourage participation by newcomers, allowing them to compete against their own personal best times throughout the contest season. The goal is for newcomers to flourish through self-improvement. Competitors should note that for both the 'Johnny Hall' Open League and the 'Irvine' PRR League Trophies five competition results count towards the annual total. This means that competitors need to choose which league they wish to enter each year. The model and engine rules for 12 PRR speed are the same as for the 12 class.

#### **4.4.2.23 Classification**

The speed used to calculate the percentages for results shall be the highest speed greater than 105MPH attained by the competitor in the 12 class at a BMFA registered competition.

- (a) Contest Directors must maintain accurate records of the highest speeds, the date and the venue of the appropriate competition and the competitor's name. These results must be forwarded to the Speedcom results officer without delay after each competition.
- (b) Contest placing will be determined according to the percentage scored, the highest percentage to win.
- (c) Only the entrant's best single performance is to count.
- (d) In the case of a tie, the mean of the competitor's two best flights will be taken to determine the final placings.
- (e) If this still produces a tie, the mean of the competitor's three flights will be taken.

Note:- The results will be collated into an annual league with the winner being presented with the "Irvine" trophy.

*cont/*

#### 4.4.2.24

### Contest Rules

All other rules shall be as BMFA Class 4.4.2 BMFA Control Line Speed Rules.



### 4.4.3

## SPORT JET SPEED

#### 4.4.3.1

### Lines and Controls

Only two line control is allowed.

The line length shall be 19.90 metres and each line shall be a minimum of 0.50 mm diameter.

The control system must be mounted external to the normal aircraft contours. The control system includes the bellcrank, lead-outs or control lines, pushrod, and elevator horn.

The lead-out guides may enclose no more than 25mm of the lead-outs or control lines.

#### 4.4.3.2

### Engine

The permitted jet engines are the Dyna-Jet, Bailey Sport Jet, OS type II, Jet Bill Sport Jet, HobbyKing Red Head and the PCPJ Sport Jet. Other engines may be used at the discretion of Contest Director provided that they comply with the intent of the rules below.

Interchanging of parts between the above listed engines is permitted. (Eg use a Dyna-Jet head with a Bailey pipe).

It is required that the engine shall be in stock condition internally. No material may be removed or added to the engine, except as follows:

(a) Engine Head

The last three fins on the head may be machined to a diameter of 0.5mm less than the fourth fin in order to locate a mounting strap or ring. Alternatively, holes may be drilled into the head for purposes of engine mounting. The fins on the head of the engine must be exposed. Streamlined fairings ahead of the engine cannot be attached to the head. The valve face may be lapped as needed for routine maintenance.

*cont/...*

In engines that have previously had their fins machined off, all or part of the fins may be removed from the head, but the anodizing must be present in the intake throat and the 10 air passages.

(b) Cowling

The only engine which is permitted to have a cowling is the OS type II.

(c) Flowjector

Fuel feed holes may be drilled out to larger size, or filled and re-drilled but only in their original location.

If a tyre pump is used to start the engine then a short piece of metal tubing may be installed into the tire pump connection to facilitate quick removal of the air supply hose. Alternatively, the threads on the tire pump connection may be filed off or filled in to make a smooth surface to facilitate quick removal of the air supply hose.

(d) Metering Jet

Any metering jet may be used, and may be located anywhere between the tank and the flowjector.

(e) Tailpipe

A stock pipe must be used. Repaired pipes are permissible, provided that the

original stock dimensions are retained. The tailpipe pipe must have at least one point along its length where the maximum cross section area is 806.45 sq mm (1.25 sq in). The front surface of the pipe (combustion chamber screw ring) and the lock ring may be lapped.

(f) Reed valve

Any commercially available valve may be used.

#### 4.4.3.3 Fuel

Fuel shall be 80% methanol/20% nitromethane.

Fuel delivery to the engine shall be by suction; no pressure feed is allowed.

#### 4.4.3.4 Contest Rules

All other rules shall be as BMFA Class 4.4.2 BMFA Control Line Speed Rules.

#### 4.4.3.5 ITALIAN SPORT JET

The competition is flown in accordance with FAI Sporting Section 4 Volume F2 category F2A with the following exceptions.

#### 4.4.3.6 Lines and Controls

Only two line control is allowed.

The complete control system must be mounted externally to the model surfaces. The entire control system must be subjected to a tensile test of 200N (20.4 kg).

#### 4.4.3.7 Engine

Any pulse jet engine may be used provided the exhaust pipe has at least one point, along its length, where the maximum internal diameter is 32 mm.

#### 4.4.3.8 Fuel

- i) Fuel shall be standard unleaded gasoline (95 octane) supplied by the contest organization.
- ii) Fuel delivery to the engine shall be by suction; no pressure feed is allowed.

#### 4.4.3.9 Flights

The competition is over two rounds, piloting by proxy is permitted in accordance with 4.4.2.2.c). Any competitor who has not recorded a time at the end of round 2 will be offered an additional flight.

#### 4.4.3.10 Piloting

- i) It is strongly recommended that piloting is done in accordance with FAI F2A rules.
- ii) It is also possible for the pilot to fly with his wrist in the pylon fork, or to fly with his handle adjacent to the pylon fork while gripping the pylon with his other hand. In this last case the vertical axis of the handle must never be behind the axis of the pylon.
- iii) The flight will be cancelled if the wrist or the handle is detached from the pylon or the pilot fails to keep the axis of the handle in front of the pylon vertical axis or the grip on the pylon is interrupted for more than a lap during the timed flight.

## 4.4.4 F2A and OPEN SPEED LEAGUES

### 4.4.4.1 Open Speed League - for the Johnny Hall Trophy 12 Personal Record Ratio League - for the "Irvine" Trophy.

#### 4.4.4.1.1 General

The open speed league will be run throughout the season.

#### 4.4.4.1.2 Qualifying contests

- (a) All BMFA approved Handicap Speed contests will qualify.
- (b) F2A results are excluded from this league.

#### 4.4.4.1.3 Format

- (a) For each competition, points will be awarded to the percentage scores as follows:

First place	=	ten points
Second place	=	seven points
Third place	=	five points
Fourth place	=	four points
Fifth place	=	three points
Sixth place	=	two points
Seventh place	=	one point

*cont/...*

- (b) A league results table will be maintained and updated after each team selection competition.
- (c) At the end of the season, a summation of the best five scores for each competitor will determine the final points for that competitor.
- (d) In the event of a tie, the best individual officially recorded speed will be used to break the tie.
- (e) The competitor with the highest number of points wins the league.

### 4.4.4.2 F2A Speed League - for the Alan Woodrow Trophy

4.4.4.2.1 The competitor with the highest number of points wins the league.

4.4.4.2.2 See 4.4.4 F2A Team Selection for the rules for this league.

## 4.4.5 NOSTALGIC SPEED

### 4.4.5.1 Nostalgic Speed BMFA National Record Speeds

Current BMFA national records can be seen in the BMFA Records List available:

- i) to read or download from the BMFA website, address:  
<<http://www.bmfa.org/publications/rulebooks/index.html>>;
- or
- ii) from Sam 35 – call the BMFA office (01162-440028) for contact information or see [www.sam35.org](http://www.sam35.org).

NB: See rule 4.4.5.1.14 for information on the speeds used to calculate results percentages

### 4.4.5.2 VINTAGE SPEED With acknowledgement to SAM 35

#### 4.4.5.2.1 Object

To provide a handicap competition to enable all classes of vintage speed models to compete on an equal basis. Competitors should note the details in BMFA Speed Rules, section 4.4.2 for information on safety and general procedures.

#### **4.4.5.2.2 Model**

- (a) Eligible models are any C/L model which is kitted, or its plan published, before 31st December 1958.
- (b) The structure of the model shall be as near to the original as is practicable.
- (c) Linear dimensions may be increased by up to 30% to increase stability providing the appearance remains close to the original.
- (d) No rescaling of models is allowed apart from (c) above unless shown on the original plan.
- (e) An unscaled kit or plan may be used in more than one class (1-7 only).
- (f) Minor modifications are allowed to enable fitting of alternative engines.
- (g) All engines must be fitted with a domed safety nut or spinner with a rounded nose. These are to have a minimum radius of 5 mm through an arc of 90 degrees. Where a plastic spinner is used, this radius may be reduced to 3 mm.

### **4.4.5.3 Engine**

- (a) Any engine produced or in production at 31/12/1958.
- (b) Later derivatives, ie manufacturers developed versions using largely interchangeable components.
- (c) Specifically excluded are engines incorporating technology not commercially available in the model aeroplane world at 31/12/1958.
- (d) Replicas of pre 31/12/58 engines are allowed.
- (e) Where replacement internal parts are not available commercially, it is permitted to substitute equivalent parts from another manufacturer providing it conforms with (c) above.

### **4.4.5.2.4 Verification**

The competitor must be prepared to produce documentation to verify authenticity of both airframe and engine if so requested by the Contest Director.

### **4.4.5.2.5 Propeller**

Any wood, thermoplastic or GFRP/carbon propeller may be used & re worked as required. Metal propellers are not permitted.

### **4.4.5.2.6 Fuel**

Fuel is unrestricted within the limits of BMFA safety rules (see 4.4.2.4).

### **4.4.5.2.7 Entrant**

- (a) Proxy pilots are permitted.

### **4.4.5.2.8 Number of Entries**

- (a) Competitors may enter more than one model in any class.
- (b) Only the model with the fastest speed will count for classification purposes.

### **4.4.5.2.9 Lines**

- (a) Line length and diameter shall be as noted in the table below and will be measured from centre of handgrip to centre of crankshaft of the engine.
- (b) Model, handle and lines shall be pull-tested prior to each attempt in accordance with the table below.
- (c) A safety strap must be worn between handle & wrist which is securely attached to both and has a breaking strain of at least twice that of the pull test for that class.
- (d) Line diameters shown in the table are minima and are single strand piano wire. Multi strand wire may need to be of larger diameter in order to pass the pull test.
- (e) Multi strand wire is not permitted in mono-line classes.
- (f) U-Reely and similar control handles which allow the line length to be varied shall not be allowed.

### **4.4.5.2.10 Timing**

- (a) The timed distance will be one half mile for all classes.
- (b) Timing will commence two laps after the pilot enters the pylon, or if a pylon is not used, two laps after the pilot's "ready" signal.
- (c) Proto Speed is timed from the moment of release.
- (d) Timing shall normally be with two watches with the average of them being recorded. If times differ by more than 0.2 seconds, the pilot will be offered the option of the slowest time or a re-flight.
- (e) Speed (mph) = 1,799.28/ time in seconds for all classes.

#### 4.4.5.2.11 Height of Flight

During the timing of the official flight, the flying height must not be less than one metre or more than three metres.

#### 4.4.5.2.12 Contest Flights

A maximum of three flights per model are allowed, with two attempts per flight. An attempt will be called by the Contest Director when a model fails to become airborne within 5 minutes or if the pilot fails to give a “ready” signal.

#### 4.4.5.2.13 Whipping

- (a) In the event that a pylon is not available:
  - i) The pilot must walk forward at all times.
  - ii) The control handle must be on the pilot’s chin or centre of chest.
- (b) Whipping or shortening the flight path in any way, leading the model etc shall result in a “No flight”. The flight will be declared void and NO second attempt allowed.
- (c) Proto Speed (Class 8) models may be whipped for one lap only, after which, the handle must be on pilot’s chest or chin and the pilot is to be walking forwards.

#### 4.4.5.2.14 Scoring

Placings will be finalised according to a Handicap System similar to that used in the BMFA Speed Rules paragraph 4.4.2.21. The speed used to calculate the percentages for results shall be the current highest speed attained in a particular class and which may not necessarily be the current BMFA national record. These speeds will be held by the Control Line Technical Committee and Contest Directors can contact them via the BMFA Leicester Office.

#### 4.4.5.2.15 Class Definitions

Class	Capacity Cu ins (cc)	Weight (ozs)	Line Length	Line Diameter (Min) (Note where Imperial & where Metric)			Test Pull (lbs)	N° of Laps
				Monoline	2 Line	Swg		
1	0.051 (0.9)	12	35' 0"	0.014"		28	8	12
					0.008"	35	8	12
2	0.10 (1.64)	12	42' 0"	0.014"		28	16	10
					0.008"	35	16	10
3	0.15 (2.50)	16	42' 0"	0.40 mm			22	10
					0.010"	33	22	10
4	0.213 (3.5)	16	52' 6"	0.40 mm			25	8
					0.010"	33	25	8
5	0.305 (5.0)	24	52' 6"	0.022"		24	45	8
					0.35mm		45	8
6	0.49 (8.2)	40	60' 0"	0.028"		22	50	7
					0.40 mm		50	7
7	0.61 (1.0)	40	60' 0"	0.028"		22	75	7
					0.45 mm		75	7
8 Proto	Max 0.305 (5.0)	24	52' 6"	0.022"		24	35	8
					0.012"	30	35	8



### 4.4.5.3 **PROTO SPEED** **With acknowledgement to SAM 35**

#### 4.4.5.3.1 **Model**

- (a) Any control line model, kit or plan, resembling a full size aircraft, having a full fuselage, a cockpit or cabin in proportion, a completely cowled engine and a fixed two wheel undercarriage, and published by 31/12/1958.
- (b) The wing area, including the projected area within the fuselage, to be at least 125 sq ins.

#### 4.4.5.3.2 **Engine**

The engine capacity is a maximum of 0.305 cu ins (5.00cm<sup>3</sup>).

#### 4.4.5.3.3 **Rules**

All other rules shall be as BMFA Class 4.4.5. Vintage Speed.

### 4.4.5.4 **WEATHERMAN SPEED** **With acknowledgment to SAM 35**

#### 4.4.5.4.1 **Model**

Cyril Shaw's Weatherman as published by Ian Allen (Model Aviation ~1949). To be built as plan (except classes VI and VII, see below) with no scaling down although wing and tail areas can be increased if desired.

Mandatory; 1¾" diameter spinner or backplate, 2 x 2" minimum diameter wheels, bellcrank fastened to hardwood spar built into wing (position optional), undercarriage approximately as plan, external controls.

Wing dihedral optional but preferred, but wing and spar must be additionally attached to bearers using screws and/or dowel pins. The tail section should be reinforced and pushrod additionally supported as necessary to prevent vibration in flight.

Classes VI and VII to be built as plan, but scaled up by a factor of 1.414 to give a minimum wingspan of 26.6". Spinner to be 2" diameter.

Class 0 to be built as plan, but scaled down by 25% to provide a minimum wingspan of 14". Spinner to be 1¼" diameter, 1½" diameter wheels and fixed 14swg undercarriage.

A safety wire constructed from multi-strand wire with a minimum bulk diameter of 0.45 mm for classes 0 – V, and of 0.70 mm for classes VI – VII must be visibly and safely attached between the bellcrank pivot bolt and the engine. Class I is exempt.

#### 4.4.5.4.2 **Engine**

Any commercially produced diesel or glow engine may be used except class 1 which is for the Mills 1.3 diesel only, all variants and replicas. No performance enhancing exhaust systems or extensions allowed.

Class	0	Up to 1.0cc
Class	I	Mills 1.3cc diesel only
Class	II	Up to 1.5cc
Class	III	Up to 2.5cc
Class	IV	Up to 3.5cc
Class	V	Up to 5.0cc
Class	VI	Up to 6.6cc
Class	VII	Up to 10.0cc

All engines must be fitted with a domed safety nut or spinner with a rounded nose. These are to have a minimum radius of 5 mm through an arc of 90 degrees. Where a plastic spinner is used, this radius may be reduced to 3 mm.

#### 4.4.5.4.3 Fuel

Unrestricted within BMFA safety rules.

#### 4.4.5.4.4 Propeller

Any commercially available 2-blade wood, plastic, GFRP/carbon; no metal.

#### 4.4.5.4.5 Fuel system

Suction only, no pressure from silencer/exhaust or crankcase, no bladders.

#### 4.4.5.4.6 Silencers

Optional, but no tuned pipes or other devices that increase the power allowed.

#### 4.4.5.4.7 Timed Distance

Class 0 and I to be ¼ mile from standing start, all others ½ mile from standing start, handle to be on pilots chest by end of first lap. No whipping after 1st lap allowed, otherwise this will result in disqualification.

#### 4.4.5.4.8 Lines

Only 2 line operation is allowed. Minimum line length and diameter (tolerance  $\pm 2.5\%$ ) shall be as noted in the table below and will be measured from the centre of the handgrip to the centre of engine crankshaft. Model, handle and lines shall be pull tested prior to each flight. A restraining strap must be securely attached to both handle & wrist and use cord with a minimum breaking strain of at least twice that of the pull test for that class. All single strand line ends must be made in accordance with the BMFA handbook, section 4. Line diameters are for single strand carbon spring steel wire. Multi strand may be used, but minimum diameters of 0.3mm ( $\pm 2.5\%$ , class 0) and 0.4mm ( $\pm 2.5\%$ , classes II, III and IV) apply. Classes V, VI and VII must use single strand only.

#### 4.4.5.4.9 Class Specifications

Class	Capacity (cc)	Max Weight (ozs)	Line Length	Line Dia	Test Pull (lbs)	Laps
0	Up to 1.0	12	35' 0"	0.25mm	15	6
I	Mills 1.3	16	35' 0"	0.30mm	10	6
II	Up to 1.5	16	42' 0"	0.30mm	20	10
III	Up to 2.5	16	46' 8"	0.30mm	25	9
IV	Up to 3.5	24	52' 6"	0.35mm	30	8
V	Up to 5.0	24	52' 6"	0.40mm	35	8
VI	Up to 6.6	32	60' 0"	0.40mm	45	7
VII	Up to 10.0	35	60' 0"	0.45mm	55	7

#### 4.4.5.4.10 Handles

U-Reely and similar control handles which allow the line length to be varied shall not be allowed.

#### 4.4.5.4.11 Timing

Ideally there will be 2 watches for timing, the time taken used to be the average of the two. If the difference exceeds 0.2 sec, entrant will be offered choice of the slowest time or a re-flight.

#### **4.4.5.4.12 Jettisoning**

If jettisoning occurs during an official flight then the flight will be considered as an attempt.

#### **4.4.5.4.13 Scoring**

Placings will be finalised according to a Handicap System similar to that used in the BMFA Speed Rules, paragraph 4.4.2.21. The speed used to calculate the percentages for results shall be the current highest speed attained in a particular class and which may not necessarily be the current BMFA national record. These speeds will be held by the Control Line Technical Committee and Contest Directors can contact them via the BMFA Leicester Office.

## **4.5 AEROBATICS**

### **4.5.1 BMFA VARIATIONS ON F2B AEROBATICS & the F2B Judges Guide (Rule numbers refer to the relevant FAI F2B rule number.)**

#### **FAI 4.2.4 Line Tests**

Add

After the structural integrity test of the handle, lines and model combination has been completed, the following test of the Safety Strap shall be carried out using the values specified in the previous paragraph. Attach the loop part of the Safety Strap, which normally fits over the wrist, to the static load or spring balance, and allow the loop to tighten around the test load or spring balance hook. Apply the load by pulling on the control handle such that the entire test load is reacted through the Safety Strap and its connection to the control handle. If the load is sustained without any failure of the Safety Strap and Control Handle then the test has been successful and the safety strap is satisfactory.

#### **FAI 4.2.5 Contest Weather**

(a) For BMFA contests the Contest Director and Judge(s) shall be the officials involved in delay or cancellation of a contest in the case of bad weather.

#### **FAI 4.2.7 Contest Flights**

At BMFA contests the number of flights shall be determined by the Contest Director.

#### **FAI 4.2.8 Number of Rounds**

At the British National Championships, the number of fliers in the fly-off will be limited to 10.

#### **FAI 4.2.11 Judging**

- (a) If significant changes in wind direction occur, the judges may adjust their position accordingly as they see fit during the flight.
- (b) At BMFA Contests the number of judges shall be determined by the Contest Director.
- (k) To ensure that the judges are working to the same judging criteria, a calibration flight must take place at the beginning of each day before any official flights commence. The calibration flight must be scored, notated if required, and analysed by the judges in question in order to reach common agreement on the judging elements.

In the case where there is only one judge at a contest, a calibration flight must still take place before the official flights but scoring, notation and analysis is not necessary.

#### **FAI 4.2.12 Classification**

Add to sub-section (a), paragraph 2

For final classification of the 15 finalists:

In the event of a tie, a countback system will come into force. The next available score(s) from the finals will be used to break the tie. If this does not produce a result then the qualifying rounds scores (i.e. the highest from each circle) will be used.

If none of the above procedures produces a result then a one round fly-off may be held to break the tie.

#### **FAI 4.2.15.16 Four-leaf clover manoeuvre**

Replace:

- (j) End of manoeuvre: at the end of the last "vertical" climb, as the model aircraft passes through a point above the centre of the circle.

With:

- (j) End of manoeuvre: as the model passes through the 42° point in the vertical climb.

Replace:

**Recommended exit procedure:** continue the Wingover path from the last vertical climb (paragraph (i) above) into a vertical dive, then recover into normal upright level flight at 1.5 metres. Other manoeuvring after completion of the cloverleaf is permitted.

With:

**Recommended exit procedure:** Continue a line over the pilot's head to the upwind side of the circle, or in windy conditions, to perform a further outside loop section pulling out into level flight at the pilot's discretion. Other manoeuvring after completion of the cloverleaf is permitted.

### **BMFA VARIATIONS ON THE FAI F2B JUDGES GUIDE**

#### **Addition**

Should a judge see an incident which could result in cancellation or terminating a flight, he/she should not cease scoring at that point if the flyer continues the schedule. However, the incident and the point at which it occurred should be noted on the score sheet. Thus, in the event of an appeal, a score is available. If the flight is deemed to be terminated or cancelled the relevant part of the score sheet should be struck out.

## **4.5.2 CONTROL LINE TECHNICAL COMMITTEE - AEROBATICS JUDGES TRAINING PROGRAMME**

### **4.5.2.1 Introduction**

- (a) The Control Line Technical Committee (CLTC) is committed to providing training for judges for the BMFA Aerobatics Centralised, Team Selection competitions and British National Championships and has instituted an Aerobatics Judges Training Programme.

### **4.5.2.2 Outline**

- (a) The CLTC shall:
  - i) maintain a list of available judging personnel with their judging credentials;
  - ii) maintain a list of those personnel attending each judges training seminar;
- (b) At least one judges training seminar will be held annually unless circumstances beyond the control of the CLTC prevent this.
- (c) There is a small training budget available for this initiative and travelling expenses will be paid at the end of each year to each person who attended a formal CLTC training seminar on condition that he was available to, or did, judge as requested by, or on behalf of, the CLTC. Travelling expenses will only be paid on receipt by the CLTC of a properly completed BMFA expenses claim form.

*cont/...*

- (d) Each person who attends a training seminar will be issued with a 'Judge's Record Card'. This is a personal record of attendance at seminars and judging at competitions (either solely, in tandem or "shadowing"). It is the individual's responsibility to ensure that the details are properly recorded and the card signed by an official at the seminar or competition.
- (e) Other than for F2B, judges or those applying for judges training do not need to be members of the BMFA.

#### 4.5.2.3 Judging Conditions

- (a) Unless circumstances beyond the control of the CLTC prevented any judges seminars from taking place, judges for any class must have attended at least one judges training seminar each year.
- (b) When the required number of qualified judges are not be available then experienced fliers may act as judges or an experienced volunteer can be assessed on the day to carry out judging duties.

Any flier acting as such may not compete in that competition and in the case of F2B shall be compensated for giving up an opportunity to gain team selection points in line with rule 4.2.2.2.

- (c) Domestic Judges

Unless competing, the judge shall make himself available to judge at the British National Championships at least once in each two year period.

- (d) F2B Judges

- i) The judge must judge at least one Centralised competition each year.
- ii) Unless competing in F2B at the Nationals, the judge must make himself available to judge for the three days of the F2B competition at the British National Championships at least once in every two year period.

**Note** (a) In extenuating circumstances the conditions in 4.5.2.3 may be waived by the CLTC.

(b) "Available" does not mean that the person has to judge.

- (e) FAI International Judges List

- i) Personnel shall be members of the BMFA.
- ii) Personnel must be prepared to travel outside the United Kingdom.

#### 4.5.2.4 Categories of Judges

F2B (FAI)	Clubman	Vintage
F2B (BMFA)	Classic	

#### SAFETY NOTE

**For all Control Line Aerobatics classes a safety strap connecting the competitor's wrist to the control handle must be provided by the competitor and used during all flights.**

**A safety pull test must be applied as defined in 4.2.4.**

## 4.5.3 C/L CLUBMAN AEROBATICS

4.5.3.1 The rules for this contest are based on the FAI class F2B aerobatics rules. Deviations from these rules are listed as follows:

- (a) 4.2.11 b) & c) change to 'the organisers must appoint a panel of *up to* three judges approved for their proficiency and experience'.
- (b) Addition - In the event of a crash or premature engine cut, a competitor may (at the judges discretion) re-launch and continue the schedule within the remainder of the 7 minute period.
- (c) A safety strap connecting the competitor's wrist to the control handle must be provided by the competitor and used during all flights. Refer to the safety note at the beginning of the Aerobatics section.

### 4.5.3.2 List of Aerobatic Manoeuvres

All definitions as in F2B Aerobatics, 4.2.15

1	Starting	K = 1
2	* Take-off, rise off ground with undercarriage - Max 10 points *	K = 2
	* Take off, hand launch - Max 5 points *	K = 2
3	Reverse wing-over	K = 8
4	Three inside loops	K = 6
5	Inverted flight (two 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 eights	K = 10
11	* Landing, with undercarriage *	K = 5
	* Landing, without Undercarriage *	K = 2

Apart from the exceptions noted \* thus \*, the 'K' factors for all manoeuvres are as for F2B Aerobatics.

### 4.5.3.3 Classification of Competitors

- (a) Two categories of competitors are eligible for BMFA Clubman Aerobatics contests.
  - (1) Clubman Aerobatics competitors who have been designated as such by the BMFA Control Line Technical Committee.
  - (2) Juniors (see 4.2.4, Clubman Aerobatics).
- (b) A flyer is transferred out of Clubman Aerobatics status when he achieves a level of proficiency determined by his scores in Clubman Aerobatics or FAI competitions.  
These scores are: Clubman Aerobatics - 480 points and F2B/Open - 700 points  
These scores must be equalled or exceeded in four competitions.

## **4.5.4 JUNIOR CLUBMAN AEROBATICS**

**4.5.4.1** The rules for this class are as for 4.5.3, Clubman Aerobatics, except as noted below.

**4.5.4.2** Competitors must be under 18 years of age on 1st January of the year of the contest.

**4.5.4.3** A handicap system will operate allowing a 10% bonus increase to a juniors flight score if under 14 years of age on 1st January of the year of the contest.

**4.5.4.4** A junior (as defined in 4.5.4.2) may enter a Junior Clubman Aerobatics event in his own right as a junior irrespective of having exceeded the transfer score (as defined in 4.5.3.3.(b)). Qualifying scores may be accrued by the competitor for use at 18 years

## **4.5.5 VINTAGE STUNT**

**With Thanks to SAM 35**

### **4.5.5.1 Objective**

- (a) To provide a standard set of rules for use in competitions for control line stunt models designed during the period when this class of model was being developed.
- (b) The schedule of manoeuvres is based on the schedule(s) that were in use during this period both in the USA and in the UK These manoeuvres were chosen to allow the pilot to demonstrate the model's ability without over-stretching the ability of a reasonably competent C/L stunt flyer.

### **4.5.5.2 Aircraft**

- (a) Design must have been available in kit or plan form prior to 31st December 1957. Exceptions to this rule may be permitted as follows:
  - (1) Where evidence of the existence of the kit or plan prototype before 31st December 1957 is available (eg a magazine photograph published prior to 31st December 1957). January 1958 magazines being accepted as published in 1957.
  - (2) Where only photographic evidence of a design was published before 31st December 1957 but the original designer can provide accurate details of the model's design.
- (b) No modifications shall be permitted other than structural changes to strengthen the aircraft and changes to the lead-out position and/or tip weight as trimming aids.
- (c) Any modifications which, in the opinion of the judges, significantly change the appearance and/or the performance of the aircraft as originally designed shall not be allowed.

### **4.5.5.3 General**

- (a) Line tests are as Rule 4.2.2 (BMFA Variations on F2B Aerobatics) Rule FAI 4.2.4.
- (b) A safety strap connecting the competitor's wrist to the control handle must be provided by the competitor and used during all flights. Refer to the safety note at the beginning of the Aerobatics section.
- (c) The contest will consist of two official flights, the best score to count. At the discretion of the CD the contest may consist of three flights where the two highest scores will be totalled but the competitors must be notified prior to the start of the contest.



- (d) The competitor is allowed two attempts at each official flight. An official flight begins when the competitor signals the next manoeuvre after level flight.
- (e) All manoeuvres must be signalled before they are started by the raising of the free hand for at least half a lap.
- (f) Manoeuvres are to be performed in accordance with the attached schedule.
- (g) All current BMFA safety rules (pull test, line diameter etc.) shall be applied with the exception of rule 4.0.1.4.
- (h) No appearance points shall be awarded.
- (j) Silencers should be used whenever possible. Local silencer rules **MUST** be obeyed.
- (k) Pressurised fuel systems are permissible.
- (l) Scaling up or down of designs is not permitted.
- (m) Aircraft designs that did not include a fixed undercarriage may be fitted with an undercarriage of the two wheel, tail dragger type.
- (n) Models that do not have an undercarriage may be entered. In this case, 'take-off' will be judged on the smoothness of the fly away from hand launch. Landings will be judged on smoothness of approach.
- (o) Each entrant will be given a slot of 10 minutes to complete the schedule.  
Some smaller model designs were such that the largest fuel tank size that could be installed was insufficient to complete the full schedule of manoeuvres. In this case the competitor may land, refuel, restart and relaunch the model. When this is to be done, the competitor will inform the judge(s) as to which point in the schedule the flight will be broken. The first start and take-off and the last landing will be judged. In the event of failure to restart, the one landing will be scored.
- (p) Aircraft designs that were originally fitted with operating wing flaps must have operating wing flaps. Fixing the wing flaps constitutes a design modification and is not permitted under 4.2.5.2.(b).

#### **4.5.5.4 Schedule**

- (a) A minimum of 2 laps level flight must separate each manoeuvre.
- (b) All hand signals must be clearly given.
- (c) 25 bonus points will be awarded only if each manoeuvre is (a) completed and (b) completed in the correct order. Incomplete manoeuvres will be marked but no bonus points will be awarded.
- (d) The points spread to be awarded by the judges for each manoeuvre will be as noted on the Vintage Stunt score sheet (see 4.4.5.7).
- (e) The competitor may attempt a manoeuvre only once in any flight. The competitor must complete the flight programme within 10 minutes including the take off and landing and any re-fuelling stops. The 10 minute time limit commences when the competitor gives a hand signal prior to starting the engine.
- (f) The bottom level of all manoeuvres except the Overhead Eights is between 5 feet (1.5 m) and 7 feet (2.1 m).

*cont/...*

## 4.5.5.5 Schedule Descriptions

### 1 Take-off Within One Minute

5 points

The time allowed to obtain 5 points for getting the model airborne within one minute starts when the competitor or helper signals that he is ready to start. The competitor has a total of 3 minutes to get the plane into the air from the time the handle is placed in the centre of the flight circle. Failure to become airborne within the 3 minute limit will constitute an attempt. The engine must be started by the competitor. The use of a starter is permitted.

### 2 Take-Off

Maximum - 5 points

Upon release the model must be seen to roll forward under proper control and rise smoothly to level flight within one lap. If hand launched, the model must be seen to be under control after release and to rise smoothly as with ROG.

### 3 Level Flight

2 laps at 6 feet altitude - maximum 5 points

Starting one lap from release the model flies at a constant altitude between 5 feet (1.5 m) and 7 feet (2.1 m). No signal from the pilot is required.

### 4 Vertical Climb

Maximum - 10 points

The model climbs vertically for a minimum of 15 feet (4.6 Metres) and returns to a horizontal attitude before reaching a point directly over the pilot.

### 5 Vertical Dive

Maximum - 10 points

The model enters a vertical dive from a level below the overhead point, dives for a minimum of 15 feet (4.6 metres) and then pulls out into level flight.

### 6 Wing Over

Maximum - 15 points

The wing over starts from level flight and climbs vertically, passing directly over the pilot, down the other side of the circle and pulling out into level flight again, cutting the circle in half.

### 7 Five Consecutive Inside Loops

1st loop maximum - 10 points

2nd to 5th loops inclusive maximum- 5 points each

Total maximum - 30 points

Inside loops are entered and exited from level flight. The line angle must not exceed 60° and all loops are to be circular and superimposed

### 8 Five Consecutive Outside Loops

1st loop maximum - 10 points

2nd to 5th loops inclusive maximum- 5 points each

Total maximum - 30 points

These may be entered from a 60° line angle or from inverted level flight after a 'flip-over'. In either case the manoeuvre is entered and exited at the 12 o'clock position. The other conditions are as for inside loops.

**9 Two Laps Inverted Flight**

Maximum - 30 points

Entry is an inside or outside 'flip-over'. The two scored laps begin at the end of the 'flip-over'. Recovery, part of an outside loop, begins EXACTLY two laps later. Both entry and exit manoeuvres are marked as part of the whole manoeuvre.

**10 Three Horizontal Figure Eights**

1st eight maximum - 20 points

2nd and 3rd eights maximum - 10 points each

Total maximum - 40 points

The loops of the horizontal eights must not exceed a line angle of 60°. Each loop must be circular, the intersection vertical and superimposed. The manoeuvre must be entered and exited via the inside loop which is to the left of the pilot.

**11 Three Vertical Figure Eights**

1st eight maximum - 20 points

2nd and 3rd eights maximum - 10 points each

Total maximum - 40 points

This is a vertical version of the horizontal eight with the entry into the bottom inside half loop followed by an outside top loop with a maximum line angle at the top of 90°. The exit is out of the inside loop into level flight. The intersections must be horizontal.

**12 Three Overhead Figure Eights**

1st eight maximum - 20 points

2nd and 3rd eights maximum - 10 points each

Total maximum - 40 points

This is the overhead version of the above eights with the entry and exit at 30° line angle at the bottom of the inside loop, to the left of the pilot. The intersections must be overhead and must split the circle in half.

**13 Square Loop**

Maximum - 40 points.

This is a square inside loop with the horizontal portion covering at least 1/4 lap. The corners should have a radius of approximately 5 feet (1.5 metres). The top of the loop must not exceed 60° line angle. Entry and exit is level flight.

**14 3-Leaf Clover**

Maximum - 40 points

The manoeuvre consists of a single horizontal '8' stretched over approximately half a lap. At the intersection point the model will be travelling downwards, after the outside loop, at an angle of about 30°. At the point of intersection an inside loop is performed to a maximum line angle of 75°. The manoeuvre is completed when the intersection point has been passed and the model returns to level flight.

## 15 Landing

Maximum - 15 points

When the engine stops the model is to make a smooth approach to ground level where it will make contact gently. Models with an undercarriage will roll forward and come to a standstill in an upright position, without bouncing. Those without an undercarriage will slide along for a short distance and settle in an upright position.

Nose over: -1    Rough: -5    Bounce: -10    Smooth: +15

Special points to remember: Competitors may fly as many laps as desired for warming up and testing. When ready to start the flight pattern, a raised arm signal must be given to the judges. It is up to the competitor to give this signal long enough to ensure that the judges have seen it. Holding the signal during the entire level flight manoeuvre is suggested. There must be at least two level laps between manoeuvres. If your model flies fast, it is suggested that you do several laps between manoeuvres in order to give the judge time to complete his scoring.

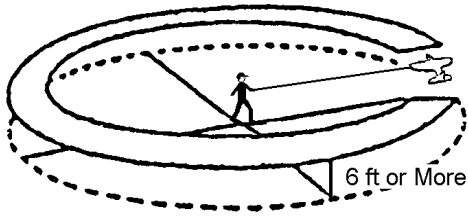
### 4.5.5.6 Rules Interpretation for 4.5.5.4

- 1 Starting: The ten-minute time starts on the signal from the flyer. Electric starters are allowed. The engine must be started by the competitor.
- 2 Take-Off: A smooth take-off requires 'some' rolling distance and ROG without sudden pitch changes. A correctly working drop-off undercarriage is acceptable if originally shown on the plan.
- 3 Level flight is between 5 feet (1.5 m) and 7 feet (2.1 m). altitude.
- 4 As 3 above.
- 5 As 3 above.
- 6 As 3 above.
- 7 Inside Loops: 60° altitude is ideal. Smaller loops are downgraded.
- 8 Outside Loops: 60° altitude is ideal. Smaller loops are downgraded. Outsides are entered from upright start and end at 60°. Bottom of all loops should be between (1.5 m) and 7 feet (2.1 m). altitude.
- 9 Inverted: Entry is an inside or outside 'flip-over'. The two scored laps begin at the end of the 'flip-over'. Recovery is a part outside loop and it begins exactly two laps later.
- 10 Horizontal Eights: are 'lazy eights' ie the inside loop is past the intersection, bottoms between 5 feet (1.5 m) and 7 feet (2.1 m), tops at 60°, and a vertical dive at the intersection is required.
- 11 Vertical Eights: An entry of between 5 feet (1.5 m) and 7 feet (2.1 m) gives a 'lazy eight', half inside loop to 45° altitude then high outside loop back to 45° followed by the second half of inside loop to between 5 feet (1.5 m) and 7 feet (2.1 m).
- 12 Overhead Eights: lazy eight, enter the first half loop at 30°, recover at entry point. Think about your stance!
- 13 Square Loop: Must be 60° high and 90° wide. The top is 1/4 lap inverted at 60° altitude. To the flyer it looks as if it sags in the middle..
- 14 Landing: If a drop-off undercarriage is fitted, see 4.2.5.6.2 above, landing points will be awarded as for models with no undercarriage, ie:

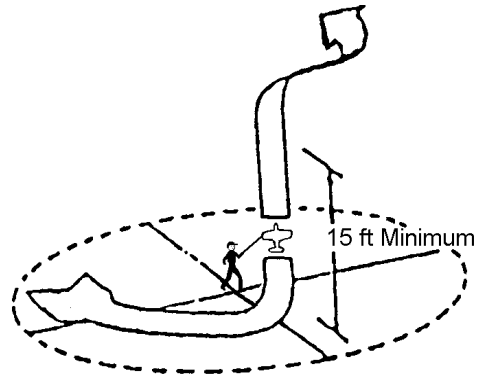
Nose over -1 point; rough -5 points; bounce -10 points; smooth +15 points.

*Vintage Stunt diagrams appear overleaf.*

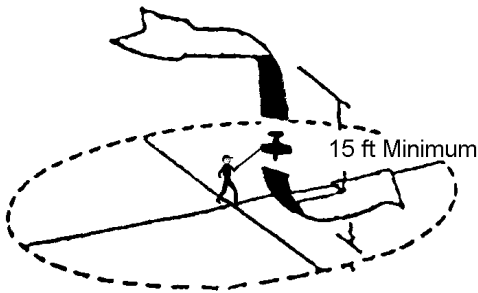
## Vintage Stunt Manoeuvre Diagrams



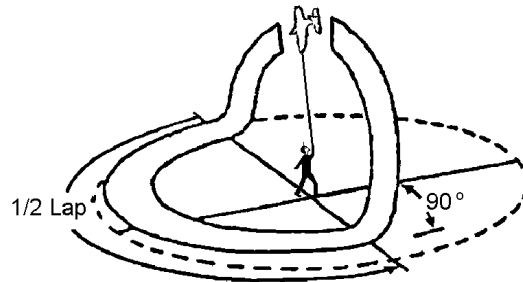
3. Level Flight



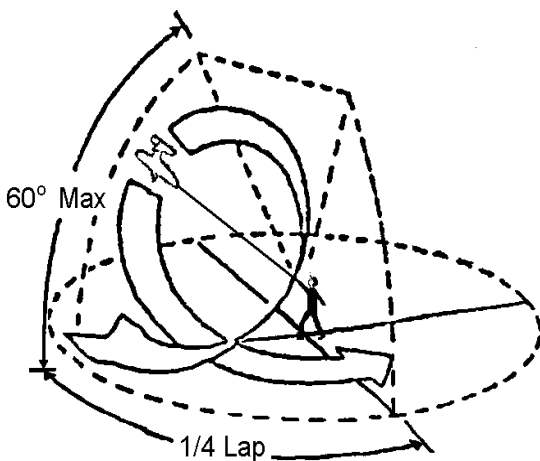
4. Vertical Climb



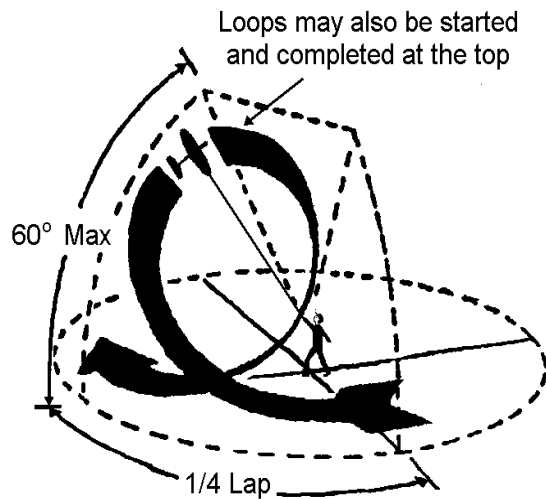
5. Vertical Dive



6. Wing Over

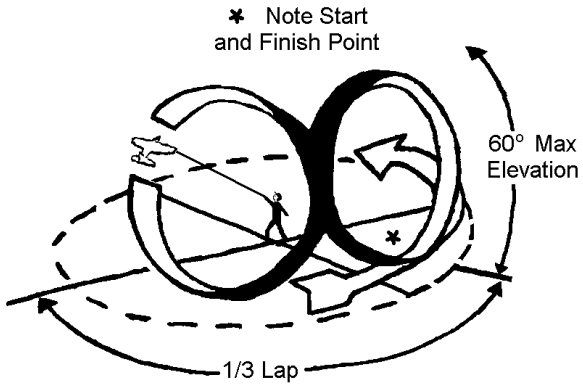


7. Inside Loops

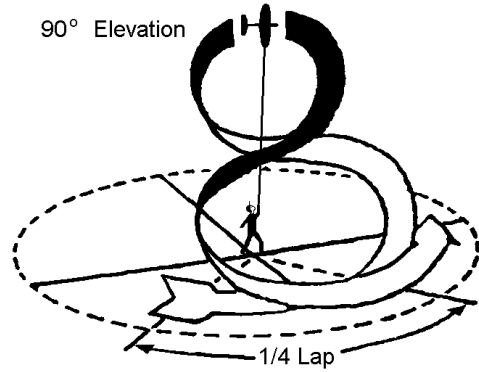


8. Outside Loops

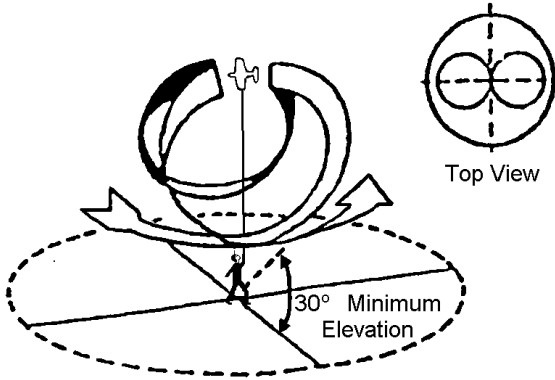
Vintage Stunt Manoeuvre Diagrams (Continued)



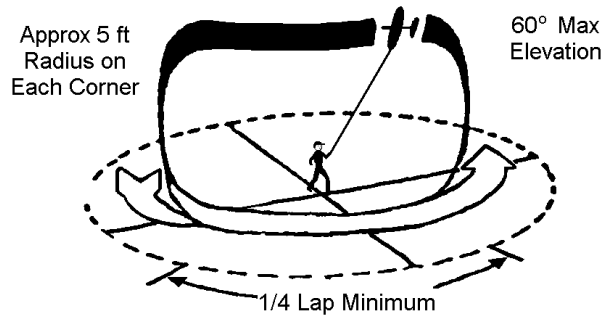
10. Horizontal Eight



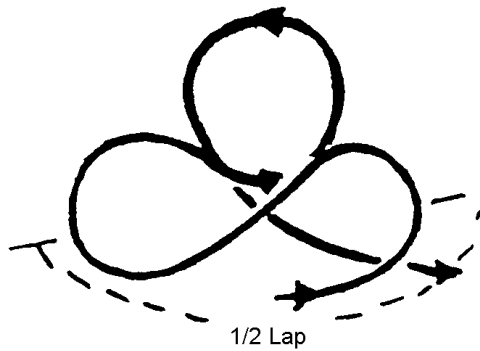
11. Vertical Eight



12. Overhead Eight



13. Square Loop



14. Three Leaf Clover

#### 4.5.5.7 VINTAGE STUNT SCORE SHEET

NAME:				DRAW NUMBER:	
MANOEUVRE	POOR	FAIR	GOOD	EXCEL	SCORE
TAKE OFF WITHIN ONE MINUTE				5	
TAKE OFF	1	3	5	5	
LEVEL FLIGHT (2 LAPS)	1	3	4	5	
CLIMB	3	5	7	10	
DIVE	3	5	7	10	
WINGOVER (1)	3	8	12	15	
INSIDE LOOPS (5)	5	10	20	30	
OUTSIDE LOOPS (5)	5	10	20	30	
INVERTED FLIGHT (2 LAPS)	5	10	20	30	
HORIZONTAL EIGHTS (3)	10	20	30	40	
VERTICAL EIGHTS (3)	10	20	30	40	
OVERHEAD EIGHTS (3)	10	20	30	40	
SQUARE LOOP (1)	10	20	30	40	
3-LEAF CLOVER (1)	10	20	30	40	
LANDING	1	5	10	15	
BONUS FOR COMPLETING THE SCHEDULE IN THE CORRECT ORDER				25	
				TOTAL	

## **4.5.6 CLASSIC AEROBATICS**

### **4.5.6.1 Model**

- (a) Eligible models must have been available in kit or plan form before 31st December 1979. Exceptions to this rule may be permitted as follows:
  - (1) Where evidence of the existence of the kit or plan prototype before 31st December 1979 is available. (eg a magazine photograph published before that date).
  - (2) Where only photographic evidence of a design was published before 31st December 1979 but the original designer has or can provide accurate details of the model's design.
- (b) No modifications shall be permitted other than structural changes to strengthen aircraft.
- (c) Any modifications which, in the opinion of the judges, significantly change the appearance and/or performance of the aircraft as originally designed shall not be allowed.

### **4.5.6.2 Flying Schedule**

The flying schedule will be as is currently used for F2B Aerobatics.

### **4.5.6.3 Scoring**

Scoring will be as for F2B with the exception of 4.5.6.4.

### **4.5.6.4 Appearance Points**

- (a) Models will be awarded appearance points out of 10 by each judge. These marks will be decided before the competitors first flight score sheets are handed to the Contest Director and will be noted on those score sheets.
- (b) A 'K' factor of 5 will be applied to these marks and the total arrived at shall be added to the competitor's highest flight score of the contest.

### **4.5.6.5 Safety Strap**

A safety strap connecting the competitor's wrist to the control handle must be provided by the competitor and used during all flights. Refer to the safety note at the beginning of the Aerobatics section.

### **4.5.6.6**

All other rules shall be as for F2B Aerobatics.



## 4.6 TEAM RACE

### 4.6.1 BMFA VARIATIONS ON F2C

In BMFA contests, the following variations shall apply to class 4.3 F2C Team Race as noted. The rule numbers refer to the F2C rule number affected.

- FAI 4.3.1.(d)** If there are insufficient entries to warrant the running of the semi-final rounds, the Contest Director may place the fastest three teams from the heats directly into the final.
- FAI 4.3.2.** The circle marking shall be a minimum of the flight circle at 19.6m radius, the centre circle at 3m radius and the inner circle at 2m radius.
- FAI 4.3.7.(a)** A minimum of one timekeeper and a maximum of three timekeepers will be assigned to each team.
- FAI 4.3.9.(k)** A team shall be disqualified if the mechanic reaches more than 0.5m into the flight circle, as judged by the Contest Director.
- FAI 4.3.12.(a)** At BMFA centralised competitions, designated team selection competitions and the British National Championships, a minimum of one Contest Director may conduct racing, and act as the team race panel of judges.
- FAI 4.3.13.(b)** Coloured panels may replace lights for notifying warnings to teams.
- FAI Annex 4F, Appendix I** The circle marking shall be a minimum of the flight circle at 19.6m radius, the centre circle at 3m radius and the inner circle at 2m radius.

### 4.6.2 GENERAL TEAM RACING RULES

#### 4.6.2.1 Definition of Team Racing

- (a) A team racing event is a contest in which qualifying races (heats) are followed by semi-finals races and a final race. Three model aircraft participate simultaneously in each race, flying in the same circle, each of them being entered by one team. In exceptional cases a race may be run with only one or two teams.
- (b) Races for heats, semi-finals and finals shall be run over a set number of laps with at least one landing for refuelling in a heat and one in a final. Both the number of laps and the refuelling landings are as specified in the individual class rules.
- (c) A team shall consist of a 'pilot' who shall remain in the centre of the circle, piloting the model, and one mechanic who shall remain outside the circle and who shall catch or recover the model, refuel, start the engine(s) and perform any other necessary duties throughout the race. Where the class rules permit, one assistant may help the pitman.
- (d) The entrant shall be the team.
  - i) The personnel of a team shall remain unaltered throughout a race.
  - ii) Personnel may change teams between races and they may compete in multiple teams during an event.
- (e) Engines must be started by hand, mechanical starters are not permitted.
- (f) During the race the mechanic and his assistant shall each wear a suitable safety helmet retained by a securely fastened chin strap.

#### **4.6.2.2 Team Racing Site**

- (a) The flight circle is divided into six equal segments for the location of the pitting areas of the teams.
- (b) Concentric circles to be used by the pilots and mechanics shall be marked on the flying area in accordance with the individual class rules.

#### **4.6.2.3 Definition of a Team Racing Model Aircraft**

Model aircraft in which the propulsion energy is provided by a piston engine(s) and in which lift is obtained by aerodynamic forces acting on the supporting surfaces which except for control surfaces must remain fixed in flight. The model aircraft must be of a semi-scale type and its general lines must be similar to those of a full-size aircraft.

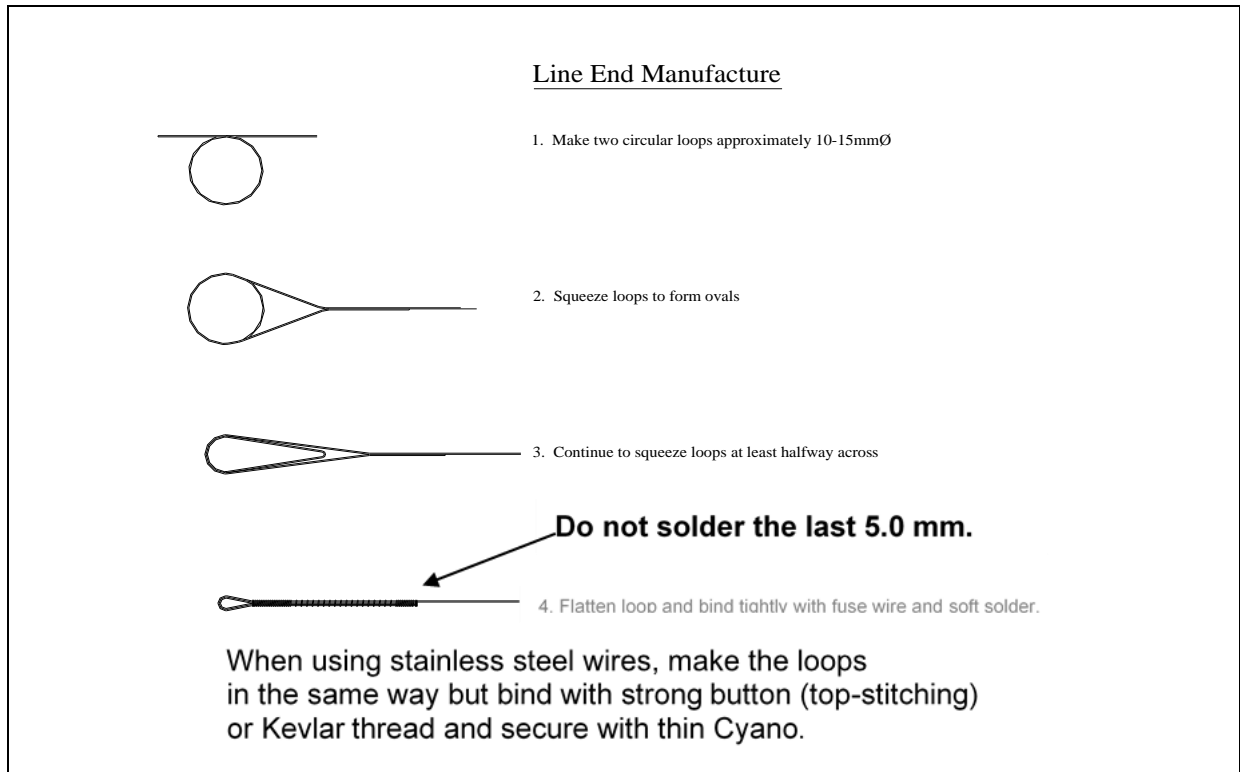
#### **4.6.2.4 Characteristics of a Team Racing Model Aircraft**

- (a) All models shall fly counter clockwise.
- (b) Model aircraft must rise off the ground.
- (c) The undercarriage must be a permanent fixture on the model to permit take off and landing. The undercarriage may retract in flight, but it must return to its correct position before landing.
- (d) The use of all-metal wheels is forbidden.
- (e) Nose skids are permitted, provided that no part of the skid is in front of the point of exit of the skid from the model. The free end of the skid shall point backwards.
- (f) The BMFA number of one of the team members shall be displayed on the wing in numerals at least 25 mm high.
- (g) All models shall carry a marking on the inboard wing tip in numerals 20 mm high showing the weight of the model in grams. The weight shall include a full tank of fuel but not the lines. A tolerance of plus or minus 30 grams of the true weight is permitted.
- (h) Unless otherwise specified in the class rules, the model aircraft must be equipped with an effective engine-stopping device to enable the pilot to terminate the engine run before the fuel tank is completely empty.
- (i) The model must remain in the same condition throughout the race; no jettisoning of parts is permitted.
- (j) The measured fuel tank capacity includes the feed pipe plus any filler valve and/or shutoff device.
- (k) Detailed characteristics of models for each class are defined in the individual class rules.

*cont/...*

#### 4.6.2.5 Controls

- (a) Only two line control is permitted.
- (b) Line lengths and diameters shall be as specified in the individual class rules.
- (c) Line end manufacture. Refer to the drawing below.



- (d) The use of crimps for the manufacture of line ends for all Team Races class is prohibited.
- (d) Intentional twisting and/or linking of the two lines together is not permitted between the point of exit of the model aircraft and a point 300 mm from the handle.
- (e) The use of flexible grouper(s) attached to the wing tip and extending a maximum of 20 mm is permitted.
- (f) A load sufficient to remove only the slack from the lines shall be applied during the line length check.
- (g) A load check as specified in the individual class rules shall be applied to the control system (handle, wires and bell crank) for a period of 10 seconds.  
After the load test the control system shall be checked for correct operation.

#### 4.6.2.6 Number of Models

- (a) A team may enter a maximum of two models in each class at a contest. Only one model may be used in any heat.
- (b) A team may interchange parts between the two models provided that the resulting model still fits the specification for that class and is re-checked by the Contest Director.
- (c) A model or any part of that model may not be used by more than one team at a contest.
- (d) Spare propellers, glow plugs, and general accessories are permitted.

#### 4.6.2.7 Engines

- (a) There is no limit on the number of engines a team may use during a contest. An engine may only be used by one team during a contest.
- (b) The use of T bar compression adjustment screws or compression adjustment screws which have a forward facing projection with cross section area of less than 8 mm<sup>2</sup> is not permitted.
- (c) All engines must be fitted with a spinner or safety nut Needle nosed spinners are not permitted.

#### 4.6.2.8 Race Organisation

- (a) Three competing teams (in exceptions only two, or one) will fly simultaneously in each race after having been drawn for order. Qualifying races with fewer than 3 teams will be put at the end of the draw, to enable three-team races, by including teams who have been granted re-flights.
- (b) The allocation of starting positions will be by random draw. The competitor drawn first will have the choice of starting positions. The remaining competitors will, in order of the draw, select one of the remaining unoccupied starting segments.
- (c) If the race draw, or withdrawals therefrom, results in a single team remaining for a race, teams who have already flown may volunteer to make up a complete race complement. Any time which they then record may be used in the final classification. If there are no volunteers, the team will be allowed to fly alone to complete its qualifying re-flight during the same round.
- (d) Just before entering the circle, teams may be allowed to run their engines only under the organiser's supervision so that the engine running does not interfere with the starting procedure of a race. Mechanics are not allowed to walk with a running engine.
- (e) Each team occupies one pitting area. Teams will select pitting areas in the order of the draw; the first drawn team has first choice. The other teams choose one of the remaining free pitting areas in order of the draw. The chosen pitting areas are considered occupied until the race is finished.
- (f) For the final race, the choice of the pitting areas shall be determined by the results in the semi-finals. The team with the fastest time chooses first, the team with the second fastest time chooses next, etc. In case of a tie in the semi-finals, the teams' second fastest times will decide the order of choice.
- (g) After entry to the circle and unless allowed by the Circle-Marshal, it is forbidden to start an engine before the first signal has been given by the Circle Marshal.
- (h) Models must fly at a normal height of two to three metres except when overtaking, taking off or landing. See also rule 4.6.2.11.
- (i) The landing model has priority.
- (j) If only one team remains in participation before the half distance point of the race has been reached, the race will be declared null and void. That team will then be awarded a re-flight which shall be flown at the end of that same round.

#### 4.6.2.9 Race Procedure

- (a) Up to three timekeepers will be assigned to each team. They will stand outside the flight circle, near the pitting area of the model aircraft that they are assigned to time. They are in charge of the timekeeping and lap counting for their particular team.

*cont/...*

- (b) A first signal gives the mechanic the opportunity to run his engine(s) during a sixty second period unless specified otherwise in the individual class rules.
- (c) A second signal announces the end of that warming up period, and engines must be stopped.
- (d) Thirty seconds are then allowed during which last-minute preparations may be made. The starter counts the last five seconds during which the pilot must be crouching, the mechanic must be standing at the 3 second point and not touching the model which must be on the ground.
- (e) The starting signal is given by means of both a visual signal (flag) and an acoustic signal (whistle/horn). A PA system may be used.

#### 4.6.2.10 Refuelling

- (a) See rule 4.6.2.1.( b).
- (b) The model must not be recovered with the engine running or prior to touchdown with the engine stopped. See rule 4.6.2.15 (d) viii).
- (c) The mechanic must refuel his model at his allocated pit segment. If the model stops away from his segment, he must move to the nearest unoccupied segment rearwards of the stopping point of the model.
- (d) Only when this pitting area is already occupied by another competitor, may he occupy the pitting area forward of the stopping point.
- (e) In the case of a model stopping in a sector where the adjacent pitting areas are already occupied, the mechanic must go backward to the nearest free pitting area.
- (f) During refuelling and restarting, the model must remain in contact with the ground, lines and control handle must remain close to the ground as defined by the CD.
- (g) After the mechanic has caught the model, but only then, is the pilot allowed to put one foot outside the pilots' circle.
- (h) A complete lap must be flown between starting and further restart for the stop to be classified as valid.

#### 4.6.2.11 Altitude of Flight and Overtaking

Racing height shall not exceed 3 metres, and the height of overtaking models shall not exceed 6 metres. In overtaking, the faster model must pass over the top of the slower unless forced by exceptional circumstances to do otherwise.

#### 4.6.2.12 Race Format

- (a) The competition shall be divided into a maximum of three qualifying rounds and, two rounds of semi-finals and a final. Each team shall be given the opportunity to fly in each of the qualifying rounds.
- (b) It is not permissible for any person to be a member of more than one team in a final. See also rule 4.6.2.1.(d).
- (c) The number of teams qualifying for the semi-finals will depend on the total number of teams entered in the competition. Each qualifying team may take part in two semi-final races.

Number of teams	Number of semi-finalists
2 up to and including 8	0
9 up to and including 11	6
10 up to and including 39	9
40 or greater	12

*cont/...*

- (d) In the case of a tie for the semi-finals, the second qualifying round result will decide the teams.
- (e) The three teams which have recorded the three fastest times in either round of the semi-finals will qualify for the final.
- (f) If there is insufficient time to run the semi-final rounds, the Contest Director may, at his discretion, place the fastest three teams from the heats directly into the final.
- (g) In the event of a tie in the final, the two teams must have a fly-off over the same distance to decide the placing.
- (h) If, through interference or obstruction, a team is forced to retire from a race through no fault of its own, it shall be given the opportunity of a further attempt.
- (i) The race time of each team is decided from the moment of the starting signal to the moment of completion of the final lap of the specified race distance.

#### **4.6.2.13 Finish of the Race**

The race shall have ended when the competitors' models have completed the required distance, or the maximum time as defined in the individual class rules, has elapsed.

#### **4.6.2.14 Classification**

The final placing of the first three teams is established solely on the results of flights in the final. The remaining teams are placed according to their best flight time in the semi-finals, if they qualified for those races, or in the qualifying rounds.

#### **4.6.2.15 Warnings and Disqualifications**

- (a) Warnings may only be given by the Contest Director. Warnings must be given both verbally, with at least a megaphone (or similar PA system), and visually. Warnings are given to the team.
- (b) Any team receiving three warnings shall be disqualified from that race.
- (c) **A Team Shall Be Warned If:**
  - (i) A pilot interferes with, or obstructs, another pilot either by his conduct in the circle or by a manoeuvre of his model which prevents another model from flying or landing normally.
  - (ii) A pilot stands in the centre, or walks backwards, instead of walking around the centre.
  - (iii) The pilot applies physical effort to increase the speed of his model during the official flight.
  - (iv) The height of the flight prescribed by the rules is exceeded.
  - (v) During either the start of the race or the pit stops, the pilot does not keep one hand on the ground and the handle and lines close to the ground as defined by the Contest Director.
  - (vi) The mechanic is not standing upright, or moves, prior to the starting signal.
  - (vii) For any other flagrant breach of the rules.
- (d) **A Team Shall Be Disqualified From a Race If:**
  - (i) The pilot steps out of the 3 metre pilots' circle before the mechanic has taken hold of the model.
  - (ii) The mechanic or assistant steps into the flight circle with both feet.
  - (iii) The model is retrieved from inside the flight circle by means of any device.

*cont/...*

- (iv) Under normal flying conditions, overtaking is done by passing under the slower model.
- (v) The pilot whose model is to be overtaken carries out any manoeuvre to impede the overtaking competitor.
- (vi) Either member of the team causes a collision between the models.
- (vii) Jettisoning occurs.
- (viii) The model is recovered with either the engine running or with the engine stopped but prior to touchdown.
- (ix) The model flies more than two laps with the motor stopped
- (x) For any other flagrant breach of the rules.

### 4.6.3 SEMI SCALE CLASS RULES

#### 4.6.3.1 CLASSES 1/2A, "B" AND BARTON B

- (a) The engine(s) must be enclosed. External additions and modifications to the engine shall be permitted to be exposed as long as they conform to the natural shape of the fuselage and do not mar the semi scale appearance of the model.
- (b) The only parts permitted to protrude from the body are the muffler system(s), if carried, and parts which have to be manipulated during the operation of starting or adjusting the engine(s); i.e. fuel needle valves, compression controls, plugs, tank fillers, etc.
- (c) Openings for the entry and exit of air, exhaust, etc. may be provided to enable proper functioning of the engine(s).
- (d) A cockpit or cabin with transparent windshield giving direct forward visibility must be provided.

#### 4.6.3.2 CLASS 1/2 A

- (a) Maximum engine capacity ..... 1.5 cm<sup>3</sup>
- (b) Minimum projected wing area, including area covered by fuselage:..... 6 dm<sup>2</sup>
- (c) Maximum fuel capacity: ..... 6 cm<sup>3</sup>
- (d) Minimum width of the fuselage at the cockpit:..... 40 mm
- (e) Minimum depth of fuselage from the top of the cabin to the bottom of the fuselage, or in the case of an open cockpit model, from the top of the windshield to the bottom of the fuselage: ..... 75 mm
- (f) The engine cowling immediately adjacent to the engine shall not be included in the fuselage depth.
- (g) Minimum wheel diameter:..... 25 mm  
A tolerance of minus 3.0 mm will be permitted to allow for wear.
- (h) The distance between the centre of the control handle grip and the centre line of the model shall be 14.0 metres.
- (i) Minimum line diameter:.....0.25 mm (0.010 inch)
- (j) The load test shall be 20 times model weight.
- (k) The radius of the pilot's circle shall be 3 metres and the radius of the flight circle shall be 17.50 metres.

*cont/...*

- (l) Race Distance:
  - i) Heats and semi-finals shall be 100 laps (8.8 km).
  - ii) Finals shall be 200 laps (17.6 km).
  - iii) Maximum race time will be 8 minutes for the heats & 12 minutes for the final.

#### 4.6.3.3 CLASS "B"

- (a) Engine capacity .....not less than 2.51 cm<sup>3</sup> nor greater than 5.00 cm<sup>3</sup>
- (b) Minimum projected wing area, including the area covered by the fuselage: ... 9 dm<sup>2</sup>
- (c) Maximum fuel capacity: ..... 30 cm<sup>3</sup>
- (d) Minimum width of fuselage at cockpit: ..... 50 mm
- (e) Minimum depth of fuselage from the top of the cabin to the bottom of the fuselage, or in the case of an open cockpit model, from the top of the windshield to the bottom of the fuselage ..... 100 mm
- (f) The engine cowling immediately adjacent to the engine shall not be included in the fuselage depth.
- (g) Minimum wheel diameter ..... 25 mm  
A tolerance of minus 3.0 mm will be permitted to allow for wear.
- (h) The distance between the centre of the control handle grip and the centre line of the model shall be 17.69 metres.
- (i) Minimum line diameters:
  - i) 0.36 mm (0.014") for engine displacements of 2.51 to 3.5 cm<sup>3</sup>.
  - ii) 0.4 mm (0.016") for engine displacements of 3.51 to 5.00 cm<sup>3</sup>.
- (j) The load test shall be 30 times model weight.
- (k) The radius of the pilot's circle shall be 3 metres and the radius of the flight circle shall be 21.2 metres.
- (l) Race Distance
  - i) Heats and semi-finals shall be 90 laps (10 km).
  - ii) Finals shall be 180 laps (20 km).
  - iii) Maximum race time will be 8 minutes for the heats & 12 minutes for the final.
- (m) The maximum noise emitted from the model shall be restricted to 85 dB(A) at 7 metres, measured in accordance with the BMFA noise code.

#### 4.6.3.4 CLASS BARTON B With acknowledgements to Barton MFC

##### 4.6.3.4.1 General

- (a) Other than for safety reasons, the rules for Barton B Team Racing may only be altered with the approval of the Barton Model Flying Club.
- (b) The team may choose to employ an assistant to help start the engine

##### 4.6.3.4.2 Model Specification

- (a) Any class B or scaled up class A model design published before the end of December 1965. Scale models, or original designs along contemporary pre-1965 lines are also permitted. Flying wing or pod and boom designs shall not be permitted.
- (b) Models must have a clear cockpit and carry a dummy pilot.
- (c) Minimum projected wing area outside of the fuselage area .....8 dm<sup>2</sup> (125 in<sup>2</sup>)

*cont/...*



- (d) Maximum fuel capacity .....30cc
- (e) Minimum depth of the fuselage at the cockpit measured from the top of the dummy pilot's head to the bottom of the fuselage..... 95.25 mm (3.75")
- (f) Minimum width of fuselage at the cockpit..... 50.8 mm (2")
- (g) Conventional two wheeled undercarriage to be used, with a minimum wheel diameter of 44.45 mm (1.75"). A tolerance of minus 3.0 mm will be permitted to allow for wear.
- (h) A fuel shut off must be fitted and it may be used during the race.
- (i) Pressure refuelling systems, other than a handheld squeeze bottle, shall not be used.
- (j) Hot glove glow connections shall not be used.
- (k) The use of modern materials in high stress areas to improve safety and longevity is permissible but an all-moulded model is not.
- (l) Models must be brightly coloured and shall have BMFA numbers at least 25.4 mm (1") high on the outboard wing.
- (m) The builder of the model rule does not apply.

#### **4.6.3.4.3 Engine specification**

- (a) Engines shall be the Irvine 25 MK3 fitted with venturi part number X-IRV20-3240.
- (b) The venturi shall not be modified in any way.
- (c) No modifications to, or "blue printing" of, the engine is permitted.
- (d) Specialised bearings shall not be fitted to the engine.
- (e) Additional head shims part number X-IRV25-3065 may be fitted to adjust the compression ratio.
- (f) Glow plug type is not limited provided it fits the original seat.
- (g) A small amount may be machined off each side of the crankcase fins, the exterior of the cylinder head, and the exhaust stack to allow easier installation but the engine must still be capable of having the original silencer mounted by the original means. It is permissible to machine a small amount of metal from the top of the mounting lugs thus rendering them level to facilitate mounting in the model . An extended prop driver may be used.
- (h) Any infringement of the engine rules will mean a lifetime ban from flying this class.

#### **4.6.3.4.4 Control system**

- (a) The distance from the centre of the control handle to the centreline of the model shall be 17.07 metres (56').
- (b) Two high tensile steel cables of minimum bulk diameter 0.457mm (0.018") shall be used. Each of the cables shall have a minimum of three strands of wire.
- (c) The control system, including the wrist strap, shall be subject to a load test of 20 times the weight of the model.
- (d) A wrist strap attaching the pilot's wrist to the handle must be used during all flights.

#### **4.6.3.4.5 Circle layout.**

The radius of the pilots' circle shall be 3 metres and the radius of the flight circle shall be 20.5 metres (67').

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#### 4.6.3.4.6 Propellers

- (a) Propellers shall be APC, Graupner/Schulze Super Nylon or JFX Black Prop 8" x 8".
- (b) The minimum diameter of a propeller of the approved type shall be 7.5 inches to permit balancing and limited dressing of the propeller tips in the event of damage. Re-dressing of the tips of a damaged propeller which has been reduced to the minimum diameter of 7.5 inches may still take place within **0.375** inches of those tips. Apart from the above and boring the hub to fit the prop shaft/spinner, no material may be removed from the propeller. No modification is allowed except to balance the propeller.

#### 4.6.3.4.7 Fuel

- (a) Fuel shall be supplied by the organisers and will be Formula Irvine **Contest 10**.
- (b) All competitors will use the same fuel as supplied on race days.

#### 4.6.3.4.8 Race Distance

- (a) Heats and semi-finals shall be 75 laps.
- (b) Finals shall be 150 laps.
- (c) Maximum race time will be 10 minutes for the heats & 15 minutes for the final.

#### 4.6.3.4.9 Race Conduct

- (a) The pilot must be crouching with one hand close to the ground at the start of the race and during any pit stops.
- (b) In the interest of safety the Contest Director may, at his discretion, group models/teams to their performance/competence
- (c) The conduct of the race shall be in accordance with rule 4.6.2 'General Team Racing with the following exceptions:
  - (1) Models already on the ground must avoid causing an obstruction to any landing models, either in the air or running to their pit station. Unlike 'modern' TR there is no minimum over-fly height. Lines must be on the ground and a pitted model must not be released to undertake or foul a landing model. To do so will result in disqualification from that heat or final. (Ref: General TR rule 4.6.2.10 (f).)
  - (2) A team shall be warned if the pilot does not keep one hand close to the ground at the start of the race and during any pit stops. (Ref General TR Rule 4.6.2.15 v.)

### 4.6.3.5 CLASS BARTON CLASSIC 15 With acknowledgements to Barton MFC

#### 4.6.3.5.1 General

Other than for safety reasons the rules for Barton Classic 15 may only be changed with permission of the Barton MFC.

#### 4.6.3.5.2 Model Specification

- (a) The model must comprise a separate wing and stabiliser, in the style of pre-1970 models, with an all-enveloping (ie not profile) fuselage. Designs published up to 31st December 1969 are acceptable, or builders may produce their own design to the parameters set out in this specification. 'Flying wings' and 'pod and boom' fuselages are not permitted.

*cont/...*

- (b) The fuselage must be fitted with a transparent canopy in a central or forward position, and a visible pilot. The pilot shall have clear forward visibility.
- (c) The minimum total projected wing area (wing and stabiliser, including the area within the fuselage) shall be 12 sq dm (186 sq ins).
- (d) The fuselage shall have a minimum height of 100 mm, a minimum width of 50 mm and a minimum cross sectional area of 39 sq cm at the canopy position. Any wing fillets shall not be considered part of the fuselage width.
- (e) Fuel tank capacity, including tubing, filter, valve, shut-off etc shall not exceed 10 cc.
- (f) A working shut-off must be fitted and may be used during racing.
- (g) Pressurised refuelling systems, other than a handheld squeeze bottle, are not permitted.
- (h) Pressure feed from tank to engine is not permitted.
- (i) Multi-function valves are permitted.
- (j) The tank and fuelling arrangements shall be accessible for the purpose of scrutiny.
- (k) Undercarriages may have one or two wheels of minimum diameter 25 mm, with a maximum wear tolerance of 3 mm. They must be permanently fixed to the model.
- (l) Retractable undercarriages are not permitted.
- (m) Steep or shallow 'V' tails are permitted.
- (n) Any asymmetry in the plan view shall not exceed 15 mm.
- (o) Other than glass cloth/epoxy, the use of materials such as carbon fibre, Kevlar, Rohacel, etc is not permitted except for local strengthening and/or repairs. An exception is made in the use of carbon fibre tube for pushrods, which is permitted.
- (p) Metal wings are not permitted. Aluminium or magnesium engine pans and plates are permitted.
- (q) The engine and tank shall be fully cowled, with openings just sufficient to permit the ingress and egress of air to facilitate the efficient running of the motor.
- (r) The only parts of the motor and tank which may project from the fuselage are those necessary for adjustment, shut-off and fuelling.
- (s) Lead-outs may be set within the wing, and line connections may be internal.

#### **4.6.3.5.3 Engine Specification**

- (a) Engines with a maximum swept volume of 2.5 cc built or designed prior to 1970 and having iron/steel piston/liners may be used. Of currently or recently available engines, the Rothwell, Ridley (Mk3 plus standard and Goodyear Mk4), Parra T3, CS, Rustler Mk3 and Mk4 (but not the ABC version), and Technohobby K12/15 Oliver Tigers/clones may be used, together with non-schnuerle PAWs. Engines may be modified using the 'technology of the period'. The fitting of ABC or AAC piston liners in old or new engines is not permitted
- (b) A safety spinner nut or spinner, and a safety compression screw must be used.

#### **4.6.3.5.4 Control System**

- (a) Lines shall be of high tensile steel, minimum 0.385 mm (0.015") diameter, with at least three strands of wire.
- (b) The length of the lines shall be 15.92 m +25 mm/-0 mm, measured from the centreline of the model to the centre of the handle.

*cont/...*

- (c) Monoline is not permitted.
- (d) A handle safety strap shall be fitted and used at all times when flying.
- (e) The assembled control handle, safety strap, lines and model shall be subjected to a pull test equivalent to twenty times the weight of the model.

#### **4.6.3.5.5 Circle Layout**

The circle marking shall be a minimum of the flight circle at 19.6 m radius, the centre circle at 3 m radius and the inner circle at 2 m radius.

#### **4.6.3.5.6 Propellers**

- (a) Propellers shall be commercially available twin bladed injection moulded glass reinforced plastic, and must not exceed the maximum RPM specified by the manufacturer.
- (b) A total negative tolerance of 13 mm below the nominal propeller size is permitted to allow for balancing and limited redressing of the propeller tips after 'razzing', ie a nominal 6.5 mm off each blade.
- (c) Apart from the above and boring the hub to fit the prop shaft/spinner, no other material may be removed from the propeller.

#### **4.6.3.5.7 Fuel**

Fuel is unrestricted, within the limits of BMFA safety rules, with the exception that lead additives are not permitted.

#### **4.6.3.5.8 Race Distance**

- (a) Heats and semi-finals shall be 100 laps.
- (b) Finals shall be 200 laps.

#### **4.6.3.5.9 Race Conduct**

- (a) Whenever possible, provided conditions permit, races should be flown three-up.
- (b) Races shall be run in accordance with the BMFA general Team Race rules, except that the race warm-up period shall be 90 seconds.

**The Contest Director's decision is final in all matters.**

## **4.6.4 PROFILE CLASS RULES**

### **4.6.4.1 CLASSES OPEN GOODYEAR, BRITISH GOODYEAR AND MINI GOODYEAR**

- (a) Models shall be models of Goodyear racing planes that have flown in Goodyear or Continental Trophy races or other NPRPA Formula 1 races.
- (b) Models shall be painted in a scale like fashion, ie in a colour scheme that might have been used on the full-size aircraft.
- (c) Model profiles shall be within 5% of scale linear dimensions, the scale being 1/8 except where noted below. (Note, to help in scaling up plans all full-size Formula 1 aircraft are required to have a minimum wing area of 66 ft<sup>2</sup>.)
- (d) The tail area may be increased by 25% over the scale area to permit safe handling, either by increasing the mean chord and span equally or, provided that the appearance of the model is not drastically altered, by increasing the span alone.

*cont/...*

- (e) Models shall have profile fuselages and engines shall be uncowed. Fuselage side cheeks shall be permitted but they must not cowl the engine.
- (f) The engine shall be side mounted with the cylinder head outboard. The thrust line of the engine shall be in line with, or outboard of, the outboard side of the fuselage.
- (g) Mono wheel undercarriages are permitted. The undercarriage need not be affixed to the model in the same place as on the full-size aircraft. The undercarriage leg(s) shall emerge from the fuselage profile at approximately the same position as the full-size aircraft.
- (h) The racing number of the full-size aircraft shall be displayed in similar positions on the model.
- (i) The BMFA number of one of the team members shall be displayed at a similar position to the licence number on the full-size aircraft.
- (j) The team, if so requested, shall provide a three view drawing to substantiate the scale outline of his model. The drawing shall be from a source acceptable to the Contest Director.

#### **4.6.4.2 CLASS OPEN GOODYEAR.**

##### **4.6.4.2.1 Specifications**

- (a) Minimum projected wing area, including the area covered by the fuselage 9.6 dm<sup>2</sup>
- (b) Maximum width of fuselage excluding cheeks: ..... 26 mm
- (c) Minimum wheel diameter:..... 25 mm  
A tolerance of minus 3.0 mm will be permitted to allow for wear.
- (d) Minimum line diameter:..... 0.38 mm (0.015")
- (e) The load test shall be 20 times the model weight.
- (f) The distance between the centre of the control handle grip and the centre line of the model shall be 15.92 metres.
- (g) The radius of the pilots' circle shall be 3 metres and the radius of the flight circle shall be 19.6 metres.
- (h) A safety wire constructed from multi strand wire with a minimum bulk diameter of 0.47mm must be visibly and safely attached between the bellcrank pivot bolt and the engine(s)

##### **4.6.4.2.2 Engines**

- (a) Maximum engine capacities shall be:
  - i) Any 2.5cm<sup>3</sup>
  - ii) Any radially ported compression ignition engine of 3.5<sup>3</sup> with an iron/steel piston liner assembly.
- (b) Integrally finned motors are not permitted
- (c) Exhaust extensions are not permitted.
- (d) The team may choose to employ an assistant to help start the engine

*cont/...*

#### **4.6.4.2.3 Fuel System**

- (a) Fuel feed from the tank to the engine must be by engine suction. Pressurised fuel feed systems are not permitted.
- (b) Refuelling must be carried out by use of hand held squeeze bottle. Pressure refuelling systems are not permitted.
- (c) Models must be refuelled at every pitstop.
- (d) Fuel for glow engines shall have a maximum content of 20% nitro-methane

#### **4.6.4.2.4 Propellers**

- (a) Any commercially available thermoplastic or glass-fibre filled thermoplastic propeller is allowed.
- (b) Manufacturers' maximum RPM limits must not be exceeded
- (c) Propellers specifically designed for electric flight (such as the Graupner black CAM-speed) are expressly forbidden.

#### **4.6.4.2.5 Race Distance**

- (a) Heats and semi-finals shall be 100 laps (10 km), with two mandatory pit stops.
- (b) Finals shall be 200 laps (20 km) , with five mandatory pit stops.
- (c) Maximum race time will be 10 minutes for the heats & 15 minutes for the final.

### **4.6.4.3 CLASS BRITISH GOODYEAR**

#### **4.6.4.3.1 General**

The rules for Open Goodyear shall apply with the following differences.

#### **4.6.4.3.2 Engines**

- (a) Engines shall be
  - (i) any 2.5cm<sup>3</sup> Oliver Tiger or PAW or clones thereof which have enjoyed a significant production run. All engines shall be compression ignition, have radial porting and an iron/steel piston liner assembly
  - (ii) the Parra OT clone with steel/steel piston liner assembly
- (b) Any replacement parts shall, wherever possible, be genuine items from the original manufacturer or elsewhere. Should such parts be unavailable, replacement parts shall be manufactured to the original specification and in the original material.
- (c) The only modification permitted is the removal of metal from any part.

#### **4.6.4.3.3 Propellers**

- (a) The propeller to be used on all engines is an APC 7"x6".
- (b) No modification is permitted except to balance the propeller. When balancing, material may only be removed from one blade.

#### **4.6.4.3.4 The Model**

When flown over grass, the model shall be fitted with a one or two wheel undercarriage carrying wheel(s) each with a minimum diameter of 48 mm. A tolerance of minus 3.0 mm will be permitted to allow for wear.

#### **4.6.4.3.5 Fuel System**

The fuel tank shall be mounted in such a way that the whole of the tank is outboard of the fuselage.

#### **4.6.4.4 CLASS MINI GOODYEAR**

The rules for Open Goodyear shall apply with the following differences.

##### **4.6.4.4.1 Entry Restrictions**

- (a) Junior Teams  
At least one member of the team must be a junior. A competitor is considered to be a junior up to and including the calendar year in which he attains the age of 17.
- (b) Novice Teams  
Both members of the team must be first time entries to any nationally advertised Mini Goodyear competition.
- (c) Senior Teams  
All other Competitors

##### **4.6.4.4.2 Model Specification**

- (a) The model specifications shall be as for the Goodyear class with the following differences:
- (b) The model shall be a minimum of 1/12 scale copy of a Goodyear or similar full-size racing aeroplane.
- (c) All parts of the controls and control connections shall be external to the fabric of the model.
- (d) The model is not required to be fitted with an undercarriage.

##### **4.6.4.4.3 Engine**

- (a) Maximum capacity of 1.5 cm<sup>3</sup> with compression ignition.
- (b) It may be any plain bearing engine which is or has been commercially available, or it may be any commercially available single ball race steel/iron engine.
- (c) It must not be modified in any way other than to alter the choke diameter and/or to replace the spray bar. The original induction system must be retained. If originally fitted with a spray bar, a spray bar must be retained.

##### **4.6.4.4.4 Fuel**

- (a) The fuel tank must be filled using a plastic squash bottle. Pressurised fuelling systems are not permitted.
- (b) Fuel feed from the fuel tank to the engine must be by engine suction. Pressurised fuel feed systems are not permitted.
- (c) Models are to be refuelled at each pit stop.
- (d) Engine cut-outs are permitted but are not mandatory.
- (e) The propeller must be a commercially available thermoplastic item (nylon or glass/nylon) and it must be unmodified except to reduce its diameter if required.

##### **4.6.4.4.5 Lines**

- (a) The distance between the centre of the control handle grip and the centre line of the model shall be 13.5 metres, plus or minus 50 mm.
- (b) Two stranded steel wires of minimum width 0.3mm (0.012") shall be used.
- (c) Each of the wires shall comprise a minimum of three strands.
- (d) The load test shall be 5Kg.
- (e) The radius of the single pilots' circle shall be 3 metres and the radius of the flight circle shall be 17 metres.

#### 4.6.4.4.6 Contest Organisation

The contest shall be run to BMFA Team Race rules with the following exceptions:

- (a) Heats for Juniors shall be flown as two up races
- (b) The circles shall be marked out on grass.
- (c) All models shall be hand launched.
- (d) There is no requirement to move to a defined pitting area but pitmen must move a safe distance from a model which is already in the process of being pitted.
- (e) With permission of the Contest Director, pitmen may enter the flight circle to retrieve a model which has landed, but he must then immediately move outside of the flight circle.
- (f) If a team has not completed its second pit stop in a heat or its fifth pit stop in a final by the end of the penultimate lap, timing of the team will continue until the last pit stop is completed plus one lap flown.
- (g) A complete lap must be flown between each pit stop. In the absence of such a lap the subsequent pit stop will not be counted.
- (h) The Contest Director at all times shall ensure that the conduct of the contest shall be such so as to encourage the participation of junior and novice competitors.

#### 4.6.4.5 CLASS F2CN

F2C rules with BMFA variations shall apply with the following differences.

##### 4.6.4.5.1 Engine & Fuel

- (a) Maximum engine capacity:..... 2.5 cm<sup>3</sup>  
Engines with integral finned liners and/or integral blind bored cylinder heads are not permitted
- (b) Maximum fuel capacity: ..... 15 cm<sup>3</sup>
- (c) Fuel feed from the fuel tank to the engine must be by engine suction. Pressurised fuel feed systems are not permitted.

##### 4.6.4.5.2 Model

- (a) The models must have a profile fuselage with a shape representing a real aeroplane, including a canopy (which may be a drawn one), and must be at least 100 mm deep at the canopy.
- (b) The maximum width of the fuselage shall be no more than 26 mm.
- (c) The engine and tank shall not be enclosed.
- (d) The engine shall be side mounted such that the thrust line is level with, or outboard of, the outboard side of the fuselage with the cylinder head outboard.
- (e) Modified Goodyear models will be permitted but they must comply with the maximum fuel capacity. See paragraph 4.6.4.5.1.(b). Wing area and fuselage depth regulations shall not be enforced for these models.

##### 4.6.4.5.3 Propellers

- (a) Any commercially available thermoplastic or glass fibre-filled thermoplastic propeller may be used.
- (b) Manufacturers' maximum RPM limits must not be exceeded.
- (c) Propellers specifically designed for electric flight (such as the Graupner black CAM-speed) are expressly forbidden.



#### **4.6.4.5.4 Lines**

- (a) The minimum line diameter for single strand wire shall be 0.3mm (0.012") with a minus tolerance of 0.011mm.
- (b) If stranded line construction is used, these shall have a minimum of three strands and all strands shall be of equal diameter and the stranded combination shall have a minimum width of 0.34mm (0.014") with no minus tolerance allowed.
- (c) The load test shall be 20 times the model weight.
- (d) The distance between the centre of the control handle grip and the centre line of the model shall be 15.92 metres.
- (e) The radius of the single pilots' circle shall be 3 metres and the radius of the flight circle shall be 19.6 metres.

#### **4.6.4.5.5 Race Distance**

- (a) Heats and semi-finals shall be 100 laps (10 km) with two mandatory pit stops.
- (b) Finals shall be 200 laps (20 km) with five mandatory pit stops.

## **4.7 VINTAGE TEAM RACE**

### **4.7.1 Vintage Class Rules**

#### **4.7.1.1 Object**

To assist organisers and participants in Vintage Team Racing events by providing a clearly defined code of practice which typically retains the original character of models and events prior to 1958.

#### **4.7.1.2 Eligibility of Models**

- (a) Only those models which are included in the Eligible Models listings in Sections 4.7.2.6, 4.7.3.7 and 4.7.4.6 shall be used.
- (b) Models shall be either, scale or semi-scale in appearance and if semi-scale must have a raised windshield or cabin. The cockpit or cabin must contain the head of a pilot.
- (c) For classes A and B, models must be built to a constructionally detailed and dimensioned plan or three-view published or kitted prior to 1st January 1958. January 1958 magazines are accepted as published in 1957. The model must comply with the accepted team racing rules at the time of publication. Exceptions to this rule may be permitted as follows:
  - (i) Where only photographic evidence of a plan was published before 1st January 1958 a plan drawn from a photograph, signed by the original designer and/or approved by the VTR committee.
- (d) For class 1/2A, models must be built to a constructionally detailed and dimensioned plan or three-view published or kitted prior to 1st January 1961. January 1961 magazines are accepted as published in 1960.

In addition the following types of model will be eligible for class 1/2A:

  - (i) Any approved vintage class A model fitted with a 1.5cc engine and a 10cc fuel tank.
  - (ii) Any approved vintage class B model which is scaled down to 1/2A specifications. The percentage reduction must be specified by the entrant for approval and scrutineering purposes.

### 4.7.1.3 Model Details

The following section gives typical (but not exhaustive) guidelines for what may or may not be allowed.

- (a) Structures may be strengthened for racing to current BMFA rules, using materials and methods consistent with the period. i.e. sheet and block replacing built-up structures and fabric. Where designs have wings of a built-up structure replaced with solid sheet, the wing thickness may be reduced.
- (b) Designs with split fuselage construction (e.g. Footprint) may be made in one piece. No metal pans, otherwise, type of engine installation and access can be to individual choice provided the original thrust line is maintained. Engine position, fore and aft, and cowling may be adjusted to suit different engine dimensions and weights.
- (c) The vertical position of the wing may be altered, e.g. designs with wings that are installed above the engine bearers, may now have the wing positioned below, low wings may be raised. There is no limitation to the amount of movement but in all other respects the profile and plan-view of the design must remain as plan, (except where otherwise stated, i.e. engine and cowling).
- (d) The elevators must be as per plan (no one-sided elevators).
- (e) Circular bellcranks are permitted, grouped lines are not. A minimum of 1" line spacing must be maintained, measured at the exit point at the wing tip. Lead-outs may be installed through, below or above the wing, according to choice. The connection between the lead-outs and lines must be external to the model. This applies to all Vintage Team Racing classes.
- (f) A working engine shut-off MUST be fitted. The shut-off must not be used in the air as race strategy. During the warm-up period the Contest Director may request engines to be stopped using the shut-off to demonstrate that it is a working shut-off. The penalty for use in the air as a race strategy is disqualification (DQ)
- (g) The use of Carbon, Kevlar or other resin bonded fibre is allowed for localised repairs only. Bonded nylon, silk or glass cloth can be used for skinning and flying surfaces may be pressed but no full mouldings are permitted.
- (h) There shall be no use of such modern features as multi-function valves and pressure refuelling.
- (i) The nose contours of models may be reconfigured to a profile of choice, i.e. to add or eliminate a spinner according to personal preference. Where a spinner is not fitted a domed safety nut, compliant with BMFA racing safety rules, must be fitted.
- (j) Glow plug activation systems shall be limited to commercial clips, two pin plugs or jack plugs. Any other system must be shown on the original plan of the model or have acceptable proof of use in the period.
- (k) The undercarriage wheel track shall be a minimum of 4inches. It shall comprise of two horizontally opposed main wheels, laterally placed and centred about the model's 'plan view' longitudinal centre. Ideally the u/c legs will be of equal length, the third component will be a tail skid/wheel.
- (l) Fuel tanks may be made from fibreglass or balsa as an alternative to metal.

cont/...

#### 4.7.1.4 Eligibility of Engines

- (a) A vintage engine is one where the design and MK number was advertised for sale prior to 1st January 1958, although the engine need not necessarily have been manufactured by that date.
- (b) The engine used in a model in the Vintage Team Racing classes shall either conform to the above or, if of a later design and manufacture, be a plain bearing, non-schnuerle ported engine, commercially advertised at some time.  
**Note:** Schnuerle porting is defined as two or more directionally shaped ports, symmetrical about, and adjacent to, the exhaust port, normally in conjunction with, but not limited to, a flat topped piston.
- (c) The use of ETA 6C engines and Mk4 Oliver engines will be permitted as they are direct lineal descendants of earlier, scarce engines and offer no marked increase in performance.
- (d) Any engine modifications, replacement parts or hybrid engines must use materials and technology clearly in use for model aircraft engines used in team racing prior to 1st January 1958.  
Class B glow engines must be cross scavenged or cross flow with a baffle piston.  
In the case of 1/2A and A classes, an engine's piston shape is not restricted. The tuner may then remove as much metal as he sees fit.
- (e) Bearings may be bushed with non-ferrous materials and liners may be chromed.
- (f) Peripheral jet carburettors are allowed.
- (g) A hybrid or replica engine must have an original crankcase or one using the same method of manufacture as the original crankcase (to qualify as original, it will be the manufacturer's original crankcase or a crankcase of an accepted replica). All other components may be a mix of different engines or custom made, in accordance with the technology of the time period.

#### 4.7.1.5 Race Conduct

The conduct of the race shall be in accordance with the current rule 4.6.2 'General Team Racing' with the following exceptions:

- (a) Models already on the ground must avoid causing an obstruction to any landing models, either in the air or running in to their pit station. Unlike modern T/R there is no minimum over-fly height. Lines must be on the ground and a pitted model should not be released to undertake or foul a landing model. To do so is a DQ.
- (b) If required the team may employ an assistant to assist in the starting of the engine/s.
- (c) The pilot must be crouching with one hand close to the ground at the start and during pit stops. (Ref: Team Racing General Rule 4.6.2.9 (d))
- (d) In the interests of safety the Contest Director may at his discretion group model/teams according to their performance/competence.
- (e) For Vintage Team Race there is no requirement for a mandatory pit-stop (ref: general team race rule 4.6.2.1(b))

#### 4.7.1.6 Proof of Authenticity

Scrutineering will be carried out at the discretion of the Contest Director and may include model/engine, tank capacity and lines. The onus of proof lies with the entrant for any model/engine/feature not listed and he must have acceptable provenance on the day of the contest.

#### 4.7.1.7 The Circle

- (a) The radius of the pilot's circle shall be 9 feet 10 inches for all classes.
- (b) The flight circle shall be divided into six equal segments for the locations of the starting positions. The choice of starting segment shall be by means of a draw.

**Note:** The diameter of the flight circle appears in the class rules.

#### 4.7.1.8 Lines

- (a) The control lines shall be measured from the centre of the handle to the centre of the model.
- (b) The control lines shall conform to current BMFA safety regulations for Team Racing. Each ready to-fly-system of handle/lines/model shall be subject to a pull test of 20 times the model weight.
- (c) Control lines will be attached immediately adjacent to and externally of the model, Connections at the handle end do not qualify in this context.

### 4.7.2 Vintage Team Racing Class 1/2A

#### 4.7.2.1 Model Specification

Maximum engine capacity .....	1.5 cm <sup>3</sup>
Minimum projected wing area .....	55 ins <sup>2</sup>
Maximum fuel tank capacity including pipes .....	10 cm <sup>3</sup>
Minimum fuselage width (at cockpit) .....	1.25 ins
Minimum fuselage depth (at cockpit) .....	2.5 ins
Minimum wheel diameter .....	1.5 ins

#### 4.7.2.2 Propeller

Only APC or Graupner propellers may be used. No reworking of propellers is allowed other than reducing the diameter and treating one blade for balance.

#### 4.7.2.3 Lines

The line length from the centre line of the handle to the centre line of the model shall be 46 feet 8 inches.

The minimum line diameter shall be 0.012inches.

#### 4.7.2.4 Race Distance

Heats will be run over 90 laps (5 miles)

Finals will be run over 180 laps (10 miles)

#### 4.7.2.5 Flight Circle

The radius of the flight circle shall be 58 feet 2 inches.

#### 4.7.2.6 Eligible Models

Model	Designer	Source	Date
6.5 (reduced Class B)		Accepted by VTRSIG	
½ Midget	W Musciano	Model Aviation	MA2/1950
Boeing P26A (scale)	P M H Lewis	Model Aircraft	MA123
Burley 1/2A		Accepted by VTRSIG	
Cream Puff		Accepted by VTRSIG	
Cupid		Accepted by VTRSIG	
Diddy Dice (reduced Class B)		C Taylor	
Estrellita Jr	F Ptazkiewicz	Model Aviation	MA7/1950

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Frog Hornet		Frog Kit	
Gnat Foursome		APS	
Half Pint		Aeromodeller Annual	
Hawker Tempest (scale)	CM Milford	Model Aviation	MA4/1955
Hyperion		Accepted by VTRSIG	
K31	Ken Long	Accepted by VTRSIG	1956
Keil Kraft Ranger		Keil Kraft Kit	
Little Warrior	M Bassett	Aeromodeller	
ME 109 (scale)	P M H Lewis	Model Aircraft	MA278
Mercury 1/2A Team Racer		Mercury Kit	
P40 Warhawk (scale)		Accepted by VTRSIG	
Panko Baby		Accepted by VTRSIG	
Skeeter	R Taccini	Model Aircraft	MA257
The Nurk	M Bassett		
The Weaver		Accepted by VTRSIG	
Shoestring (scale)	P Lewis	Model Aircraft	MA297
Veron Pinto		Veron Kit	
Wee Bipe	W Winter &	Model Aviation	MA7/194
W Schroder		Accepted by VTRSIG	
Wharfdale 1/2A	J Horton	Original Drawing	

#### 4.7.2.7 Eligible Engines

AE 15	Albon Javelin/Sabre	AM 10/15
Byford Sabre 1.5	BWM 150	Byra 1.5
Cipolla 1.5	CS Tiger Cub	DC Sabre/Spitfire
ED Fury/Super Fury/Hawk/Cadet	Elfin 149 BB and BR	Frog 150/150R/Viper
JB Atom	Le Simmone HR 15	Margaret Meteore
ME Snipe	MVVS 1.5	OK Cub Diesel
Oliver Tiger Cub (360) (non Schnuerle)	PAW 1.49	Russian MK17
Taifun Record/Hurrikan	Webra Record	

### 4.7.3 Vintage Team Racing Class A

#### 4.7.3.1 Model Specification

Maximum engine capacity .....	2.5 cm <sup>3</sup>
Minimum projected wing area .....	70 ins <sup>2</sup>
Maximum fuel tank capacity including pipes .....	15 cm <sup>3</sup>
Minimum fuselage width (at cockpit) .....	1.5 ins
Minimum fuselage depth (at cockpit) .....	3.0 ins
Minimum wheel diameter .....	1.5 ins

#### 4.7.3.2 Deviation to the above specification

Class A models built to early FAI rules (eg Phfft) which therefore cannot comply with the above cockpit dimension definitions will be measured at an appropriate section.

#### 4.7.3.3 Propellers

Propellers shall not be of the glass, carbon, Kevlar or other resin bonded types.

#### 4.7.3.4 Lines

The line length from the centre line of the handle to the centre line of the model shall be 52 ft 3 inches. The minimum line diameter shall be 0.012 inches.

#### 4.7.3.5 Race Distance

Heats will be run over 80 laps (5 miles)

Finals will be run over 160 laps (10 miles)

#### 4.7.3.6 Flight Circle

The radius of the flight circle shall be 64 feet 0 inches.

#### 4.7.3.7 Eligible Models

<b>Model</b>	<b>Designer</b>	<b>Source</b>	<b>Date</b>
Alien	W Woodrow	MA244	8/56
A-bus	J Johnson		
Arau	Portuguese	J Isidro	1957
Bambi	K Brenk		1957
Battler	R Moulton	Model Aviation	1950
Black Chiffon	C Milford	CL/486X	10/52
Burley	J Horton	J Horton	1954
Cannonball	J MacArthur		1955
Chingford Racer	L Haywood	Aeromodeller	1956
Competitor		Hearns Hobbies Australia	1951
Dimpled Dumpling	Mac Grimmett	D Finch	1956
Elfcats	T Millar		1952
Elliptical	J Horton	J Horton	1957
Fingerprint	Forresters Club		1956
Footprint	P Smith	CL/589X	6/55
Fury	R Mayers	Aeroflyte Kit (Australia)	1956
Gengangaren	M Hagberg	MA 264	11/57
Honeybug	F Ehling	Air Trials	
Hornet		Skyleada Kit	1951
Humpty Go-Kart	D Edmunds	Aeromodeller	1955
Hyperion	L Hayward	Aeromodeller	4/52
Jabberwocky	W Hume	CL/514X	6/53
Jambon	N Butcher	MA 99	4/51
K31	Ken Long	Accepted by VTRSIG	1956
Mac	S McGoun	Mercury Kit	1955
Mercury MkII		Mercury Kit	1951
Mew Gull	H A Thomas	CL/600	7/55
Midget Mustang	P Smith	Veron Kit	1950
Minibuster	P Smith	Veron Kit	
Nervansage	W Kroger	MA 200	1/55
Nike	D Edmunds	Aeromodeller	1954
Olympian	T Smith	South Bristol	1953
Pacemaker	S Rymill	CL/509X	4/53
PHHT IV	H Stouffs	AM 3-view	1957
Pluto	M Smith	MA 211	5/55
Ranger	W Dean	Keil Kraft Kit	1950
RO56	J Rohr		1957
Scout	W Dean	Keil Kraft Kit	1949
Shorty	B Deason	Australian Nats Winner	1957
Skyhawk	L Ellis	CL/687X	12/57
Starshell		Australian Kit Plan	
Sorcerer's Apprentice	N Butcher	CL/515X	6/53

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Swift		Hearns Hobbies (Australia)	
Tarantula	J Horton	Wharfdale Club	1956
Texan	R Young	Mercury Kit	
Tiger Terror	J Muir	MA	1956
Time Traveller	D Edmunds	CL/642X	12/56
TK 4	R Moulton	CL/411X	1/51
Tomahawk	S Alexander		
Tornado	G Bergamaschi	Olimpic Kit (Italy)	1956
Voodoo Mk1	G Yeldham	G Yeldham	1953
Voodoo Mk5	P Stephens	Contest Kits	1957
William Henry	J Horton	J Horton	1955
Wolverine	Meadmore Bros	Australian Model Hobbies	12/51
Zenith Mk4	Stan Robinson	Accepted by VTRSIG	
Zenith Mk7	Stan Robinson	Accepted by VTRSIG	

#### 4.7.3.8 Eligible Engines

Alag X3	AM 25	Barbini B40
Cox 15 (PB)	CS Oliver Mk3 Replica	CS Elfin 2.49 Replica
DC Rapier	Eiffaender Special	ED 246
Elfin 2.49	Enya 15D/15G (PB)	Frog 250/249BB
Fox 15 (PB)	Fuji 15 (PB)	Indian 'K' 2.5
K&B 15 (PB)	Oliver Tiger (Mks 2,3,4)	OS 15 (PB)
Parra T3 2.5	PAW 249 (PB Mks 2,3)	PAW Eiffaender Special Replica
PAW 2.49 VTR	R250 Rothwell	Russian Oliver Mk 3 Replica
Super Tigre G30	Silver Swallow	Webra 2.5 (Mach 1 & Winner)

#### 4.7.3.9 Special Provisions

In view of the probable dominance of Class A events by one type of Vintage engine, provision shall be made for an award to be given to the team using a Vintage engine, as defined in 4.7.3.8, other than the Oliver Tiger or one of its clones/replicas.

### 4.7.4 Vintage Team Racing Class B

#### 4.7.4.1 Model Specification

Maximum engine Capacity.....	5.0 cm <sup>3</sup>
Minimum engine capacity .....	2.51 cm <sup>3</sup>
Minimum projected wing area .....	125 ins <sup>2</sup>
Maximum fuel tank capacity including pipes .....	30 cm <sup>3</sup>
Minimum fuselage width (at cockpit) .....	2.0 ins
Minimum fuselage depth (at cockpit) .....	4.0 ins
Minimum wheel diameter .....	2.0 ins

#### 4.7.4.2 Propellers

Propellers shall not be of the glass, carbon, Kevlar or other resin bonded types.

#### 4.7.4.3 Lines

The line length from the centre line of the handle to the centre line of the model shall be 56 feet 0 inches.

The minimum line diameter shall be 0.0136 inches for single strand lines and 0.015 inches for multi-strand lines for models powered by engines with a capacity greater than 3.5 cm<sup>3</sup>.

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For models powered by engines with a capacity of 3.5 cm<sup>3</sup> or less, the diameter for single strand lines may be reduced to 0.012inches.

#### 4.7.4.4 Race Distance

Heats will be run over 75 laps (5 miles)

Finals will be run over 150 laps (10 miles)

#### 4.7.4.5 Flight Circle

The radius of the flight circle shall be 67 feet 6 inches.

#### 4.7.4.6 Eligible Models

Model	Designer	Source	Date
Able Mabel	D Clark	MA News	1/50
Accelerator		Super Kits(Australia)	1/57
Auggie	D Shipton	D Shipton	1951
Bartlett Bullet	W Bartlett	Air Trails	?
Battler	R Moulton	Model Aviation	1950
Bluebottle	C S West	CL/526X	9/53
Blue Star	P Vittori	Modellismo	5/54
Cardinal Puff	C Taylor	MA 95	3/51
Challenger	L Schulman	MA News	?
Chatterbox	K Conrad	MA News	4/49
Chow Hound	B Thompson	Air Trails	3/52
Cirrus	R Bagot	Modele Reduit D'Avion	11/56
Delta	P Bataillou	A/M Annual	1954
Double Dice	C Taylor	C Taylor	9/55-6
Dude	T Carvalho	Flying Models	6/57
Estrella	T Millar	T Millar	5/50
Firecracker (Aus)		Australian Model Hobbies	8/50
Firecracker (USA)	D Ealy	MA News	12/51
Firecracker MkII (Aus)		Australian Model Hobbies	12/51
Gee-Mac	B Evans	MA 84	1951
Good News		Monarch Kit	12/54
Greenfly	C S West	MA 133	7/52
Hells Bells	G Rae	G Rae	1950
Hokey Pokey	T Millar	T Millar	
Hoofmark	M Ware	Model News (Australia)	9/57
Jack of Diamonds	K Muscutt	K Muscutt	1953
Jezebel		AM Annual	1953
Kestrel	P Godfrey	MA 238	5/56
Lap Master		Australia	
Lazy Daisy	P Wheeler	CL/428X	5/51
Leighnor Special	P Plecan	American Modeller	7/57
Man O'War	R Moulton	CL/383X	7/50
Mercury Mk 1	J Nunn	Mercury Kit	1950
Mew Gull	C Smith	Flying Models	1950
Midget Mustang	P Smith	Veron Kit	1949/50
Migrator	B Lutker	Aeromodeller	12/56
Nemesis		A/M Annual	1953
Nimbus	H Wilde	MA 230	2/56
Nucleus	W Woodrow	MA 223	2/57

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Number 13		Accepted by VTRSIG	
Number 20	H Whitney	Aeromodeller	7/50
Ole Slippery	C Smith	Air Trails	1952
Pacer	W Dean	Keil Kraft Kit	1951
Philibuster	P Smith	Veron Kit	1950
Presto	H Hall	CL/481X	8/52
Queen Bee	O Stutter	Accepted by VTRSIG	1949
Quest	K Storey	Berkeley Kit	1951
Racer	D Shipton	D Shipton	1951
Racer	R Panko	D Shipton	1950
Rambler	G Moir	MA News	3/55
Rambler 55	G Moir	MA News	1/55
Red Lightning	D Rowe	MA 88	1951
Redskin	C Lee	Veco Kit	1953
Rivetter	G Rae	AM 1722	1950-1
Saint	K Marsh	K Marsh	1950
Scramble	J Jones	CL/454X	11/51
Scramble (Inverted engine)		C/L Technical Committee	
Scrambler		AM Annual	1955-6
Scout	W Dean	Keil Kraft Kit	1949
Sheik	K Johnson	MA News	1/54
Shorty		Australia	1956
Skidoo	C Smith	Air Trails	
Sloe Boat	A Greenwood	A Greenwood	1951
Sorcerer	P Cameron	CL/544X	3/54
Starbomb		Australian Model Hobbies	1952
Super Saint	K Marsh	CL/465X	2/52
Tantivvy	C Taylor	CL/534X	1953
Teamster	H Stevenson	Flying Models	6/54
The Key	K Storey	Berkeley Kit	1949
The Key	K Storey	AM Annual	1950
Thunderbird	S McGoun	Mercury Kit	1955
Thunderbird Prototype	S McGoun	J Jones	1955
TK 4	R Moulton	CL/411X	1/51
Vantage	J Vanderbeek	Frog Kit	1953
White XI	D Walker	J Ridley	1956
White XIII	D Walker	J Ridley	1957
Wrangler	P Wright	MA News	7/53

#### 4.7.4.7 Eligible Engines

The team may choose to employ an assistant to help start the engine.

Amco 3.5 PB/BB	AM35	DC 350/Manxman
Dooling 29	ED346	ETA19/29(all Mks)
Enya 19/29 (PB)	Fox19/25/29 (PB, X&R, '57)	Frog 500
Fuji 19/29 (PB)	K&B 19/29 (PB)	Kometa 29 (ringed piston with baffle only)
Merco 29	Miles Special	McCoy 19/29
Oliver Tiger JO19	Oliver Tiger Major	OS 19/20/25/29/S30
Parra T4	PAW 19/29 (PB)	Rothwell 19

cont/...

.../cont...

Super Tigre G12/29 '51ser    TechnoHobby K19                      Veco 19/29 (PB)

Yulon 29/30

Engines eligible for class A may also be used in class B providing they are of a minimum capacity of 2.51cc.

## **4.8 COMBAT**

### **4.8.1 BMFA Variations on F2D**

**FAI 4.4.5** Note that it is normal practice for fuel to be supplied by the organisers only at International and Open International events.

Centralised Competitions - The following is the minimum organisational requirement:

- (a) Centre Circle Marshal, who shall be the Contest Director.
- (b) Scorer / Timekeeper, one per competitor.
- (c) Control Line Processor, to ensure correct line length and to perform the pull test before each flight (this is essential for safety reasons)

### **4.8.2 1/2A COMBAT**

#### **4.8.2.1 Object**

The object of this class is to promote combat by encouraging flyers to enter a class which is cheaper to compete in than full FAI Combat.

#### **4.8.2.2 Definition of a Combat Event**

A combat event is a competition during which eliminating heats are followed by a final in which two competitors with their model aircraft fly in the same circle at the same moment for a predetermined time, the object being to cut a streamer attached on the longitudinal centre line of the opponent's model aircraft, points being awarded for each cut taken.

#### **4.8.2.3 Definition of a Combat Model Aircraft**

- (a) Model aircraft in which the propulsion energy is provided by a piston motor(s) and in which lift is obtained by aerodynamic forces acting on surfaces which remain fixed in flight, except for control surfaces.
- (b) The longitudinal centre line shall be defined as the axis of the propeller in case of a single engined model aircraft and the axis of symmetry in the case of multi-engine model aircraft.

#### **4.8.2.4 The 1/2A Combat Site**

A combat site must consist of two concentric circles which shall be marked on the ground.

- (a) The flight circle radius 17.5 metres.
- (b) The centre (piloting) circle: radius 2 metres.

The flight circle must be laid out on grass. The centre piloting circle may be laid out on grass or any other material having a maximum radius of 4 metres.

#### **4.8.2.5 Competitor**

The pilot, who shall be the entrant and known as the competitor, may employ a maximum of two mechanics in any one heat. (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).

*cont/...*

During active combat periods, the pilot and his mechanic(s) must wear protective headgear fitted with an effective retaining strap.

To avoid the catching of the opponent's lines the protruding parts of the helmet must be covered. No communication using electronic devices is allowed between the pilot and mechanics/persons outside the flying circle.

#### **4.8.2.6 Characteristics of a 1/2A Combat Model**

- (a) Any 1.5 cm<sup>3</sup> capacity engine may be used and the use of a safety spinner nut is compulsory.
- (b) The engine must run on suction feed only, with the fuel tank mounted entirely outboard of the axis of the propeller.
- (c) Propellers MUST be commercially available thermoplastic items.
- (d) Fuel for compression ignition and glow engines is not restricted.
- (e) The model shall not carry any artificial aid to assist the cutting of the streamers.

#### **4.8.2.7 Controls**

- (a) The control line length must be 12.88 metres plus or minus 75 mm. It is measured from the inboard face of the grip of the control handle to the longitudinal centre line of the model.
- (b) The control line wire used shall be of multistrand construction with a minimum diameter of 0.34 mm. No free ends capable of entangling an opponents lines and no line splices shall be permitted. A safety strap connecting the competitor's wrist to the control handle must be provided by the competitor.
- (c) Before each heat any sets of lines which may be used must be checked for correct length. A pull test shall be applied to the assembled handle, control lines and model used in that heat. The pull test shall be equal to 10 kgf (22.5 lbs)
- (d) Line changes during the combat period shall be permitted.

#### **4.8.2.8 Number of Models**

Only one model will be allowed per bout.

#### **4.8.2.9 Streamer**

- (a) The streamer shall be crepe paper 2 metres long by 25 mm wide and shall be attached to the model by 2 metres of sisal string.
- (b) The streamer shall be attached to the model within the longitudinal centre line and a 3 inches maximum distance outboard on the model and must not become detached under normal flying conditions.

#### **4.8.2.10 Method of Starting**

- (a) All signals shall be both acoustic and visual.
- (b) During the starting period the launching positions must be separated by at least a quarter of a lap. The first named competitor in the draw shall have the choice of streamer colour and the other the choice of starting position
- (c) The motor(s) must be started by flicking the propeller by hand.
- (d) A first signal, given by the Circle Marshal, shall signify the beginning of the 60 seconds period when the mechanic(s) or the pilot have the opportunity to start, run and adjust their motors.

*cont/...*

- (e) A second signal, given by the Official Timer, shall signify the beginning of the combat period on or after which the model aircraft may be launched.
- (f) From the moment the Official Timer has given the signal to launch the combat heat lasts for four minutes.
- (g) When the Circle Marshal is satisfied that each model aircraft has completed two level laps, anticlockwise, separated by approximately half a lap, he will give a signal that combat may commence.
- (h) Combat may begin after a restart signal from the Circle Marshal following an interruption when one or both model aircraft have been grounded. This signal shall be given as soon as the Circle Marshal is satisfied that there is approximately half a lap separation between the two model aircraft.

#### **4.8.2.11 Termination of the Contest**

- (a) The Circle Marshal shall give an acoustic signal to terminate the combat heat four minutes after the signal to launch, i.e. five minutes after the first signal to run and adjust motors.
- (b) The same acoustic signal shall be given if the heat has to be terminated due to disqualification of one or both competitors or for any other reason.
- (c) The Circle Marshal shall signal both pilots to fly level and anti-clockwise and to cease combat when both streamer strings have been cut. If one pilot has only the string remaining he may request the circle marshal instruct both pilots to fly level and anti-clockwise and to cease combat. This decision may not be reversed, once made.

#### **4.8.2.12 Method of Scoring**

- (a) Scoring shall commence from the signal to launch and continue for the four minute period.
- (b) 100 points shall be awarded for each distinct cut off the opponent's streamer. There is a cut each time the model aircraft, propeller or lines fly through the opponent's streamer resulting in particle(s) becoming detached from the streamer.
- (c) A cut must contain at least one part of the streamer. A cut that contains string alone will not count.
- (d) Should the string become detached from the model aircraft while airborne the competitor shall 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. If after a mid-air 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.
- (e) One point shall be awarded for each whole second that a model aircraft is airborne during the four minute period.
- (f) Each whole second of stay on the ground of the model aircraft shall be penalised by 1 point. In the case of a model aircraft fly-away, with or without lines, this ground time shall commence from the moment of such fly-away.
- (g) Each warnable offence shall be penalised by the deduction of 40 points from the competitor's score.

*cont/...*

- (h) Should the mechanic(s) damage the streamer, or the model aircraft cut its own streamer, whilst the model aircraft is on the ground the mechanic(s) must replace it with a new streamer. If they launch the model aircraft without so replacing it, the competitor shall be penalised by 100 points. Ground time will be counted while the model aircraft is airborne with the damaged streamer.
- (i) In the case of a line tangle where the circle marshal estimates the tangle cannot be cleared, he can require both pilots to land immediately. Ground time for both pilots will start from the circle marshal's signal. After the models have landed the heat will continue as normal.

#### **4.8.2.13 Attempts**

Only one attempt will normally be allowed to complete a combat heat except for when:

- (a) A streamer breaks
- (b) In the event of a model aircraft fly-away, as a result of the lines having been severed by his opponent's model aircraft, lines or engine, in which the model aircraft and streamer may not be retrievable due to the distance flown, the circle marshal asks the affected pilot whether he wants a new attempt or not. The affected pilot must respond immediately, without consulting others about the status of the heat. If the pilot wants to continue the flight he must use a new full-length streamer.  
The pilots should be informed before the beginning of the competition where the fly-away area is defined. This area should be clearly defined by the organisers.
- (c) In the event of a line tangle resulting in the control line(s) breaking and only one model aircraft being grounded, making it impossible to clear the line tangle.
- (d) If, as a result of a line tangle, an opponent's model aircraft cuts its own streamer in flight or the streamer, unless only string remains, becomes wrapped around the model aircraft and/or the lines, the heat shall be re-flown.

#### **4.8.2.14 Conduct**

- (a) A pilot must remain inside the centre circle while his model is flying except at the moment of release of his model by the pitman.
- (b) After a mid-air collision the heat shall continue as if both models had landed.

#### **4.8.2.15 Offences**

The following are warnable offences and each and every occurrence will attract the appropriate penalties (subject to 4.8.2.12.(g))

- (a) If a pilot unintentionally leaves the centre circle while his model is airborne.
- (b) During the bout 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.
- (c) If the mechanic(s)/pilot do not immediately, or after a line disentanglement, withdraw a grounded model to outside the 17.5 metre circle prior to servicing it.
- (d) If the model is launched prior to the starting signal.

#### **4.8.2.16 Cancellation of the Flight (Disqualification)**

An entrant will be eliminated from the heat and his opponent declared the winner if:

- (a) He deliberately attacks the streamer of his opponent's model prior to the Circle Marshal's signal to commence.
- (b) His model fails to become airborne within two minutes of the signal to launch.

*cont/...*

- (c) He attempts to fly a model which at the time of launch does not have a strong effective control mechanism, or does not have a secure engine attachment, or does not have a running engine.
- (d) He interferes with his opponent, or forces his opponent to leave the centre circle.
- (e) He deliberately flies in a dangerous manner.
- (f) He attacks his opponents streamer without his own, or the remaining parts, attached to his model.
- (g) He is not present at his allotted flight time, unless he has the express permission of the Circle Marshal.
- (h) He leaves the centre circle, intentionally whilst his model is flying, or without informing his opponent of his intention to do so when his model is grounded for a purpose other than to allow his model to be serviced.
- (i) He deliberately leaves the centre circle, for a purpose other than to allow his model to be serviced, without wearing protective headgear.
- (j) He flies in such a manner as to inhibit his opponent, or his opponent's pit crew, from clearing any line entanglement.
- (k) He flies other than level in an anti-clockwise direction when only his model is in the air and there is no line entanglement.
- (l) Attacking the opponents streamer before the start signal is given by the Circle Marshal (see 4.8.2.10).
- (m) For any other flagrant breach of the rules
- (n) He releases the handle, or removes the safety strap, for any reason, while the model is flying.
- (o) He deliberately attacks or interferes with his opponents continuously level flying model, which clearly has no paper streamer left.
- (p) He fails to clear any line tangle prior to relaunching his model.

#### **4.8.2.17**

#### **Classification**

- (a) The contest shall be run as a knock-tournament.
- (b) The Competitor who obtains the highest score in points shall be the winner of each bout.
- (c) A competitor shall be eliminated from the competition when he has lost two bouts.
- (d) Each round shall be randomly drawn from the competitors remaining in the competition
- (e) In the event of an unattached competitor remaining in any round, that competitor shall be matched with the first competitor drawn in the next round and (if he/she is not eliminated) in each successive round, unless such time as there is again an unmatched competitor remaining in a round. At that time these two competitors shall be matched to complete that round.
- (f) In the event of a tie for second and third place (both cannot happen) fly them off using the above procedures except allowing only one loss during the fly-off.
- (g) In the event of a two way tie for third remaining after a fly-off for second, match them with the winner to take third.
- (h) In the event of a tie score in any bout, that bout shall be re-flown. A bout is considered a tie if the score difference is 5 points or less.

#### **4.8.2.18 Contest Procedure**

Under normal circumstances the contest will be run as 4.8.2.17 (a) to (h) except where the number of entries does not permit this. Should this situation arise the following system will be used:

- (a) Competitors will normally compete with each other in a knockout competition chosen by random draw. The losers of each of the first round flights will be allowed to compete in a further losers re-fly round.
- (b) The winners from this round will be drawn with winners from the first round to provide a second round of contests.
- (c) The rounds will continue until eight Competitors are left so that quarter, semi and final round provide an overall winner.

#### **4.8.2.19 Judges and Timekeepers**

The following is the minimum organisational requirement:

- (a) A Centre Circle Marshal, who shall be the Contest Director.
- (b) Two Scorer / Timekeepers (one per competitor).
- (c) One Control Line Processor, to ensure correct line length and to perform the pull test before each flight (this is essential for safety reasons).

### **4.8.3 1/2A DIESEL COMBAT**

#### **4.8.3.1 Object**

To provide an event based on 1/2A Combat but with easily and cheaply available plain bearing 1.5 cm<sup>3</sup> diesel engines.

#### **4.8.3.2 Engine**

The engine will be a PAW 1.5 cc plain bearing diesel and the use of a safety spinner nut is compulsory.

#### **4.8.3.3 Fuel**

Fuel is not restricted.

#### **4.8.3.4 Lines**

The control line length from the inboard face of the grip of the control handle to the longitudinal centre line of the model shall be 42 ft 3 in (12.875 metres) plus or minus 1.5 in (0.04 metre).

#### **4.8.3.5 Scoring**

Scoring will be as per Vintage Combat four minute bout rules (4 points per cut, less one point per 15 seconds ground time).

#### **4.8.3.6 General**

All other rules shall be as Class 4.8.2 1/2A combat.



## 4.8.4 VINTAGE COMBAT

### 4.8.4.1 The Model

- (a) This is a limited performance class and performance levels are restricted by strict control of model design, engine design and engine modification.
- (b) A vintage combat model must be built in accordance with a design which was in common use prior to and up to 31st December, 1974 or was kitted prior to that date. Only models which are on the approved list may be used.

The rules (including approved models and engines) shall be frozen at the start of every year. Updates/changes and additions shall be approved at the CFA AGM for the following year. The only exception to this will be if changes are required on safety grounds. The complete lists of approved models and engines appear in two Annexes at the end of these class rules.

- (c) Models **MUST** be an accurate plan view of the original. The following alterations are permitted:
  - (1) Addition to or omission of sheeted areas, i.e. centre sheeting.
  - (2) Changes to wing section or internal structure or degree of asymmetry of wing (i.e. whilst retaining the original wing outline, the engine pod and elevator may be moved inboard or outboard to give a different degree of asymmetry to the wing.)
  - (3) Additional booms or replacement of wire booms with wooden ones and vice versa and spacing of booms (noting that the original elevator size and hinge moment must be maintained..)
  - (4) Recessing the engine into the leading edge.
  - (5) A balanced elevator may be changed to a conventional elevator and vice-versa. The elevator must retain the original outline.
  - (6) Such changes must be carried out using constructional techniques that were commonly used at the time that the model was in use. The use of carbon, Kevlar or boron fibre reinforcement is not permitted. Modern adhesives are permitted. Neither Styrofoam nor any expanded foam may be used.
  - (7) Models must not exceed original overall dimensions or be more than 6 mm smaller on any dimension. Elevators must be dimensionally accurate. The elevator hinge line may be moved forward or rearward, to increase or decrease the area of the elevator, as long as the original plan outline of the model is unaltered. If moving rearward the hinge line must not exceed 11.5" (292.1mm)
  - (8) Fins and fences may be omitted or altered.
  - (9) Where the original model had an upright engine this may be converted to 'sidewinder'.
  - (10) Any model that exceeds 36" wing span or 11.5" elevator hinge moment (leading edge to elevator hinge line) will not be allowed to compete.
  - (11) The curvature of the wing tips (defined as the last 50 mm of each wing) may be changed but such changes must not add any area to the wing.
  - (12) It is permissible to strengthen the engine pod in excess of plan
  - (13) External gussets may be used around tail booms, the dimension of the hypotenuse of such gussets may not exceed 20 mm.

*cont/...*

(14) Metal bearers are not allowed.

- (d) The following alterations are NOT permitted:
- (1) Filling in between booms unless specifically permitted, as in the case of the Yeti 1.
  - (2) Where any dispute arises, the designers opinion will be given priority.

**Note**

By allowing a model to compete in the first round the Contest Director (CD) signals his acceptance that the model is 'legal' and it will be considered to have been processed. That model may not subsequently be disqualified unless 'illegal' parts are added. Combat damage that occurs during a competition will not be grounds for disqualification unless safety is compromised. The CD will point out any illegalities observed prior to a bout and will give the competitor(s) the opportunity to make the infringement good.

- (e) There are no restrictions on what material may be used to cover Vintage Combat models however, if the model covering is white or clear, there must be an element of colour somewhere on the model, for example the elevator, wingtips etc.
- (f) The name (and mark number) plus the year of the model must be clearly visible on the upper flying surfaces.
- (g) No design will be added to this list until it has been proposed, considered and accepted at the CFA AGM. No modifications to the plan will be permitted other than those agreed at the above meeting.
- (h) The Vintage Combat Approved Models List can be found at Annex A at the end of these class rules.

**4.8.4.2 Engine**

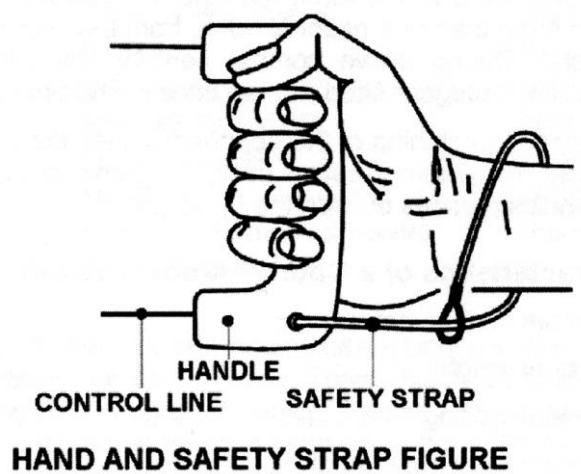
- (a) The engine shall be a diesel of 3.2 cm<sup>3</sup> maximum displacement if constructed with ball/roller races or 3.5 cm<sup>3</sup> maximum displacement if constructed with plain bearing crankshaft. Engines permitted under this definition (any mark or model unless otherwise stated) appear in Annex B at the end of these class rules.
- (b) The engine must be fitted with a domed safety spinner nut.
- (c) Only suction fuel feed systems are permitted.
- (d) The propeller for engines above 2.5cc must be a commercially available 8in by 6in thermoplastic item. The propeller for the Fora Junior must be a commercially available 8in by 4in thermoplastic item. The propeller may not be reworked except that one blade may be modified for balancing purposes. All other 2.5cc engines may use any commercially available thermoplastic item.

*cont/...*

- (e) The engine must contain the manufacturers original crankcase, liner and crankshaft, in the original materials. These components may be modified by removal of metal and/or chroming. Such modifications may not reduce the weight of the motor (minus spinner and spraybar) by more than 5 grams. Ceramic products may not be used.
- (f) All Vintage Combat models are subject to a speed limit of 26 seconds for 10 laps. This to be measured without the streamer and with the handle on the pilot's chest. Any flier found to be exceeding the speed limit must demonstrate to the Contest Director that he is within the speed limit before being allowed to re-fly the bout otherwise he will be eliminated from the competition.

#### 4.8.4.3 Lines

- (a) Control line length must be 15.92 metres plus or minus 75 mm. It is measured from the inboard face of the grip of the control handle to the longitudinal centre line of the model.
- (b) The longitudinal centre line shall be defined as the axis of the propeller.
- (c) Only two line control is permitted and each of these lines shall be multi-strand and of a minimum diameter of 0.385 mm. No free ends capable of entangling an opponents lines and no line splices shall be permitted. Line connectors at the handle end may have a maximum diameter of 13mm and must be sleeved as must the thread on any adjusting screw. A safety strap connecting the competitor's wrist to the control handle must be provided by the competitor. This strap will be subject to the full pull test separately to the line pull test and must be worn at all times while his model is flying. See drawing.



- (d) The lines between the handle and the model must be identical eg the same type, size and diameter.
- (e) Lines must not be joined or repaired at any point between the handle and model.
- (f) Line changes during the combat period shall be permitted.
- (g) A line pull test shall be applied to the assembled handle, control lines and model. Replacement lines must be pull tested by the Circle Marshal before the model is relaunched. Failure to do so will result in disqualification. The pull test shall be equal to 125 Newtons (12.5kgf) held for 5 seconds.

cont/...

#### 4.8.4.4 Combat Site

A combat site must consist of two concentric circles which shall be marked on the ground.

- (a) The flight circle: radius 20 metres
- (b) The centre (piloting) circle: radius 2 metres.

The flight circle must be laid out on grass. The centre piloting circle may be laid out on grass or any other material having a maximum radius of 4 metres.

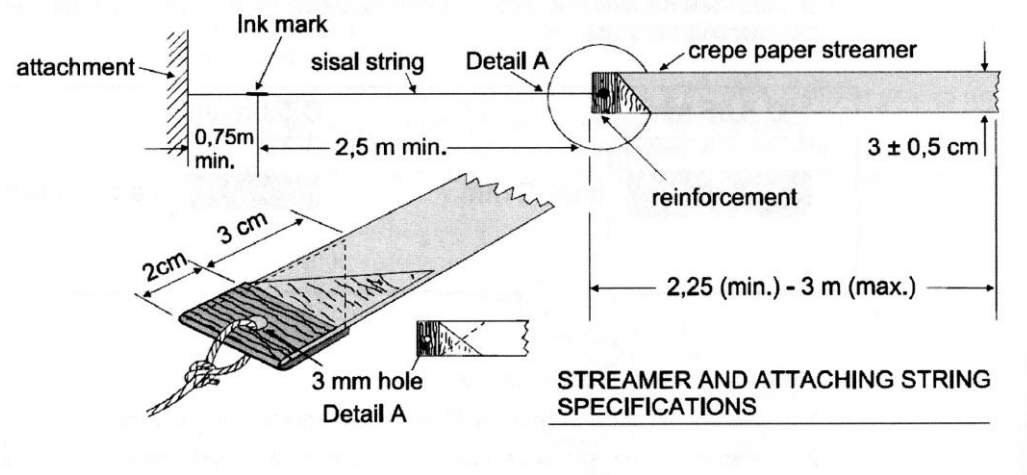
#### 4.8.4.5 Streamers

The streamer must consist of double weight crepe paper (80 g/m<sup>2</sup>) or any replacement of equivalent strength, including forestry flagging tape, not less than 2.25 m or more than 3.0 m long and 3.0 cm +/- 0.5 cm wide, fixed to a sisal string of 2.5 m minimum length.

The attachment end of the streamer must be reinforced on either side by tape approximately 2.0 cm wide affixed diagonally to the length of the streamer with one at right angles to the other and extending for a maximum of 5.0 cm. An additional fibre/fabric-reinforced tape 2.0 cm wide must be affixed across the streamer (see detail below).

The streamer must be attached through the longitudinal centre line of the model via a suitable streamer attachment.

The colour of the streamer must be different for the two competitors in the heat. Each mechanic crew shall be issued with a streamer at the start of the heat by the Centre Marshal. A second streamer will be available from the Centre Marshal when needed.



#### 4.8.4.6 Number of Models

A competitor will be allowed to use one model per bout.

#### 4.8.4.7 Mechanics

Two mechanics are allowed per competitor. During the combat period the pilot and the mechanic(s) must wear protective headgear fitted with an effective retaining strap. In exceptional circumstances of wet or windy weather an additional helper may be used as a streamer holder and must perform no other task during the bout. The helper must wear protective headgear. Whilst it is permissible for pilots to wear the baseball style 'Bump' caps, mechanics must wear more substantial protective headgear

#### **4.8.4.8 Officials**

- (a) A contest shall normally be run by a Circle Marshal, who shall be the overall timekeeper, and one scorer per competitor.
- (b) The Centre Marshal must wear protective headgear.
- (c) The scorers should hold their stopwatches so that observers can read them.
- (d) The total time of each pit stop should be written down and the penalty points calculated after the bout. Should a timekeeping error be made a scorer should advise the centre Marshal immediately so that the bout may be stopped and re-flown.
- (e) The will be considered to be part of the course and any model or line contact with him will be treated as if it had contacted the ground. It is the flier's responsibility to avoid the Marshal, not the Marshal's to avoid the models or lines.
- (f) Times and scores are public information and should be freely available.

#### **4.8.4.9 The Bout**

- (a) A competitor's flight commences after a 30 second period for engine starting. The last 10 seconds to the launch signal shall be counted down by the Centre Marshal.
- (b) The flight shall last four minutes from the launch signal and its completion shall be signalled by the Centre Marshal.
- (c) The engine must be started by flicking the propeller by hand.
- (d) A combat bout may be ceased when both streamers have gone at which point the Centre Marshal will signal a 10-second count down to bring the bout to an end. In order for the count down to begin, both models have to be airborne and be seen to have no available streamer to cut
- (e) A pilot who has no streamer left on his model may ask the Centre Marshal to cease the bout if he is confident that he has won the bout and no longer intends to attempt cuts of his opponent's streamer. In order for this request to be made, both models must be airborne. If his calculation is wrong, and he has actually lost the bout, the result from the scorers will still stand.

#### **4.8.4.6 Scoring**

- (a) Scoring will commence at the launch signal and finish at the completion signal.
- (b) One point will be deducted from a competitors score for every full period of 15 seconds that their model is not airborne during the flight period. Ground time is not accumulative and the stopwatch must be zeroed each time the model becomes airborne.
- (c) Four points will be added to a competitor's score for each single cut of their opponent's streamer or string with knot.
- (d) In the event of a mid-air collision, if the streamer falls to earth attached to any part of the model or engine it will not be counted as a cut. If, however, the streamer falls separate to any part of the model a cut will be recorded.
- (e) In the event of a mid-air collision if the streamer becomes detached from the streamer attachment because it was not securely connected then this will be deemed to be a DQ for failure to attach the streamer securely. (See 4.8.4.14) However if there is any element or proof of string still attached to the streamer attachment and/or model, then it will be deemed to have been a cut and the opponent will be awarded 4 points for that cut.

#### 4.8.4.11 Attempts

Only one attempt will normally be allowed to complete a combat heat except for the following conditions:

- (a) When a streamer breaks in the air due to being faulty. It must be clear that the break was not caused by an attack from the other model.
- (b) If either the Centre Marshal or any of the scorers' stopwatches fail to operate once the bout has started.
- (c) If, as a result of a line tangle, a model aircraft cuts its own streamer in flight or the streamer, unless only string remains, becomes wrapped around the model aircraft and/or the lines, the heat shall be re-flown.

#### 4.8.4.12 Conduct

- (a) A pilot must remain inside the centre circle while his model is flying except at the moment of release of his model by the mechanic.
- (b) After a mid-air collision the heat shall continue as if both models had been grounded at which point a pilot may leave the centre circle to assist in pitting his model provided he informs the Centre Marshal prior to leaving the circle.
- (c) Mechanics may only enter the flight circle to retrieve a downed model when there is no line tangle and the second model is in level flight or to help clear a line tangle when both models are grounded.
- (d) Line tangles when just one model is airborne must be cleared by the pilots and Centre Marshal prior to a mechanic entering the flying circle. The Centre Marshal must indicate to the mechanics when the line tangle is cleared and that they may then enter the flight circle.
- (e) If, during the servicing of a grounded model, the mechanics break or cut the streamer it must be replaced with a new full-length streamer prior to launch.
- (f) If, following the servicing of a model, the streamer should become entangled and subsequently fails to unfurl, the pilot must immediately land to have the streamer untangled or replaced. No penalties other than ground time will be incurred.
- (g) Ground time will be calculated from the point that the unfurled/tangled steamer was identified until the point that the model has been relaunched.

#### 4.8.4.13 Offences

The following are offences and each and every occurrence will incur one or more penalty points.

- (a) If a pilot accidentally steps out of the centre circle with one foot during a combat bout the Centre Marshal will instruct the pilot to re-enter the circle and issue a warning. If this happens a second or subsequent time then a penalty of two points will be awarded against the competitor. Any cuts taken during the period will not be counted and attacking during the pause may lead to disqualification.
- (b) During the bout 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.
- (c) If the model is launched prior to the launch signal.
- (d) If a pilot leaves the centre circle to assist in the maintenance of his model without informing his opponent and the Centre Marshal whilst his opponent's model is in flight, one penalty point will be incurred.

*cont/...*

- (e) Where in the opinion of the Centre Marshal a competitor deliberately lands to avoid combat he will incur four penalty points for a first offence. Subsequent offences will be taken care of under rule 4.8.4.14(q).

#### **4.8.4.14 Cancellation of the Flight (Disqualification)**

A competitor will be eliminated from the heat and his opponent declared the winner if:

- (a) He performs any manoeuvre after launch and before the Centre Marshal indicates the start of Combat
- (b) He deliberately attacks the streamer of his opponent's model prior to the Centre Marshal's signal to commence.
- (c) His model fails to become airborne within two minutes of the signal to launch.
- (d) He attempts to fly a model which at the time of launch does not have a strong effective control mechanism, or does not have a secure engine attachment, or does not have a running engine.
- (e) He interferes with his opponent, or forces his opponent to leave the centre circle.
- (f) He deliberately flies in a dangerous manner which could cause injury to any third party.
- (g) He either unintentionally or intentionally puts both feet out of the centre circle while his model is airborne.
- (h) He is not present at his allotted flight time, unless he has the express permission of the Circle Marshal.
- (i) He flies in such a manner as to inhibit his opponent, or his opponent's pit crew, from clearing any line entanglement.
- (j) He flies other than level in an anti-clockwise direction when only his model is in the air and there is no line entanglement.
- (k) He removes the safety strap, from his wrist/hand, for any reason, while the model is flying. (Losing his grip on the handle is permissible provided that the handle is still connected to the pilot via the safety strap).
- (l) He deliberately attacks or interferes with his opponents continuously level flying model which clearly has no paper streamer left. He may, however, follow closely.
- (m) He fails to clear any line tangle prior to relaunching his model.
- (n) He flies level (upright or inverted) at a height of less than six feet for more than two consecutive laps whilst the bout is under way unless instructed to do so by the Centre Marshal. The Centre Marshal shall warn a flier that he is approaching this limit.
- (o) A flier who does not present himself, or an adequately competent replacement, in adequate time to judge the second bout after his, may be removed from the subsequent draw. The organiser is at liberty to adjust this order but, in any case, a flier will be expected to judge as many bouts as he flies or to provide a suitable replacement to do so.
- (p) His streamer becomes detached from the model during combat but not as the result of a mid-air collision.
- (q) At the end of the bout, there is no remnant of string attached to the model via the streamer attachment then it would be deemed that the string had become detached.

- (r) It is found that a competitor has tied extra string to his streamer attachment or model other than the streamer which he used to compete in that bout.
- (s) The mechanic(s) or pilot does not immediately, or after a line disentanglement, withdraw a grounded model to outside the 20 metre circle prior to servicing it and thus continues to service the model within the flying circle.
- (t) If A mechanic enters the flying circle for whatever reason whilst combat is taking place or to retrieve a downed model whilst there is a line tangle.

Additional Disqualifications:

- (u) At the start of each bout and after a restart when one or both models have been grounded, both models **MUST** fly level ~~and~~ in an anticlockwise direction, separated by at least a third of a lap. No manoeuvres above vertical are to be allowed on take-off until the Centre Marshal declares combat and combat **must not** commence until a signal is given by the Centre Marshal (either audible or a physical indication). Attacking the opponents streamer before this signal will result in disqualification.
- (v) For any other flagrant breach of the rules.
- (w) Where, in the opinion of the Centre Marshal, fliers collude to arrange a result they will both be disqualified from the event by the Centre Marshal and will not be allocated points toward any league positions or the Knokke Trophy.
- (x) Following a collision with either the ground or another model resulting in a grounded model, and where the model is subsequently launched and flies outside the contest circle without coming into contact with another model it will be deemed to be a flyaway.

NB: For the avoidance of doubt any instructions given by the Centre Marshal shall be either audible or physical and it is the competitor's responsibility to be aware of these instructions.

#### 4.8.4.15 Contest Procedure

- (a) Competitors will normally compete with each other in a knockout competition. The losers of each of the first round flights will be allowed to compete in a further losers re-fly round.
- (b) Pilots from the same team and/or club will be kept separate for as long as possible.
- (c) Draws will be completely random and held in public and if any member of the organising club or team is involved in the competition then the draw will be made by an unbiased outsider.
- (d) The winners from the first round will be drawn randomly with winners from the losers round to provide a second round of competition. After losing twice a competitor should not be reinserted. Eliminator rounds should be run to arrive at the correct numbers for quarter and semi-finals to proceed.
- (e) The rounds will continue until eight competitors are left so that quarter, semi and final round provide an overall winner



*Annex A – Vintage Combat Approved Models List appears overleaf.*

## ANNEX A

### 2020 Vintage Combat Approved Models List

This list is also valid for the Oliver Tiger Combat class.

The Plans Archivist runs the mail order Vintage Combat Model Plans service. This scheme is highly recommended. For more information in the first instance contact the Combat Flyers Association (CFA) at [admin@combatflyers.co.uk](mailto:admin@combatflyers.co.uk)

MODEL	DESIGNER	SOURCE	DATE
Anduril 1969 & 70	Mick Tiernan (UK)	Frank Smart	1970
Anduril '74	Mick Tiernan (UK)	Mick Tiernan	1974
Apache		AMAnnual	1970/71 p72
APS Ironmonger FAI XL			
Assagai	Alan Thompson	Frank Smart	1968
Assagai XL	Alan Thompson	Frank Smart	1968
Banshee	Mike Davis (UK)	Frank Smart	1968
Barbarian	John Dixon (UK)	Frank Smart	1969
Barbarian XL	John Dixon (UK)	Frank Smart	1969
Billy Bones	Dave Packwood (UK)	Frank Smart	1963
Boogaloo	Dave Williams	Stuart Vickers	1974
Boogy-man	Terry Lee (UK)	AM	Jun 1964
Boogy-man XL	Terry Lee (UK)	AM	Jun 1964
Bumblebug	Vernon Hunt (UK)	Frank Smart	1969
Bumblebug XL	Vernon Hunt (UK)	Frank Smart	1969
Buzzard	Neil Blackburn (UK)	Frank Smart	1970
Chaos	Peter Freebrey (UK)	AM	Jun 1963 p294
Chip Chop	Jose Vicente Segrelles	Jose Vicente Segrelles	
	El Aeromodelo (Spain)	March 1973	
Cleaver	George Copeman (UK)	AM799	Sept 1961 p466
Cobra II	Don Halls (Australia)	AM	May 1968
Cobra II XL	Don Halls (Australia)	AM	May 1968
Combat King		Contest Kits	
Delta	Martin Kizsel	Martin Kizsel	1974
Device	Steve Malone	Steve Malone	1973
Diamond	Alec Herring	Alec Herring	1972
Dominator	Mike Davis (UK)	AM893	Dec 1965 p581
Dongus	Johnson/Pinckert (USA)	AM 789	Feb 61 p74-75
Duellist	A Tristany (Spain)	AM 648	Mar 1957 p150
Early Bird	Richard Wilkins(UK)	M.A.1022	Sep 1965 p232
Falco		AM Annual	1963/64 p106
Finale	Martin Kizsel	Martin Kizsel	1974
Flingel Bunt	Stu Holland (UK)	AM	Jan 1965 p20
Freecloud	Bob Morgan	Frank Smart	1970
Gladiator	G.F. (UK)	Frog Kit	
Gunslinger Mks 1,2 & 3	E Varley & Fred Pateman	Frank Smart	1963
Hornet 3	Frank Smart	AM	April1974 1974
Hornet XL	Frank Smart	Frank Smart	1974
Ironmonger	Richard Evans (UK)	AM Oct 71 p550	1970

*cont/...*

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Jaguar Mk 1	Mick Chesterton (UK)	Frank Smart	1969
Junior Satan	Carl Goldberg (USA)	Goldberg Kit (AM )	Nov 1964
(new)Junior Monitor(II)	Henry J Nichols (UK)	Mercury Kit	
Jupiter	Phil Jackson	Stuart Vickers	1962
Kanible	John Dixon (UK)	AM Annual1	968/69 p92
Kanible GT	John Dixon (UK)	Frank Smart	1968
Kanible GTO	John Dixon	Frank Smart	1969
Karnivore	Dave Gibbard	Frank Smart	1961
King Twister	Mick Chesterton (UK)	Frank Smart	1967
Kombat Kapers	R Gibbard (UK)	AM	Jan 1954
Komm-Batt		AM 288	Aug 1958 p278
Liquidator	Frank Dowling (UK)	AM 998	May 1969 p230
Liquidator XL	Frank Dowling (UK)	AM 998	May 1969 p230
Mini - Voodoo	Riley Wooton (USA)	AM	May 1963
Mister Pogle	Terry Mortimer (UK)	Frank Smart	1965-1967
Nemesis	Howard Rush	Frank Smart	1970 (USA)
Njuurd	Roger Silcock	Simon Miller	1974
Njuurd XL	Roger Silcock	Simon Miller	1974
Oliver Twist Mk 6	Martyn Cowley (UK)	Frank Smart	1969
Oliver Twist Mk 7	Martyn Cowley (UK)	Frank Smart	1970
Olympic Rocket	C.Bergamaschi (Italy)	Kit (AM )	Apr 62
Pallisandra		AM Annual	1960/61 p77
Pallisandra		CL Manual	1961 p131
Panic	Peter Freebrey (UK)	American Modeller	Jan-Feb 1965
Piraja		AM Annual	1965/66 p46
Piranha Mk 1	Frank Smart (UK)	Frank Smart	1968
Piranha Mk 2	Frank Smart (UK)	Frank Smart	1969
Piranha XL	Frank Smart (UK)	Frank Smart	1969
Proton	O.F.W.Fisher (UK)	Performance Kits	Apr 1959
Pygar	Mick Lewis	Mick Lewis	1974
Razor Blade	Pete Tribe (UK)	AM 729	Mar 1959 p222
Razor Blade `64	Pete Tribe (UK)	AM 729	Jul 1964 p332
Rhino Mk 5	John Dixon (UK)	Frank Smart	Apr 1967
Riot-Act 1& 2	Andrew Longhurst	Frank Smart	968
Rogue	AM Staff (UK)	AM 716	Dec 1958 p643
Satana		AM Annual	1969/70 p32
Schuco-Hegi 160	(Germany)	AM Annual	1959/60 p83
Scorcher	(UK)	Frog Kit	1969
Sennapod		MA 389	Mar 1964 p90
September Warrior	Bazz Bumstead (UK)	MA 385	Nov 1963 p334
Shim-Shek 1 & 2	Turner (UK)	Frank Smart	1963
Shogun	Dave Wiseman	Dave Wiseman	1973
Shrike	(UK)	AM 634	Sep 1956 p484
Shuffler MK 2	Frank Smart		
Splinter	Bill Netzeband (USA)	American Modeller	Apr 1967 p30
Squig	J Benoy (UK)	AM	Jul 1961
Streamer Eater	A. Ytreoy (Norway)	AM 883	Jun 1965 p280
Stockport Warlord	Graham Howard	Frank Smart	1968
Styrobat	Peter Short (UK)	AM	Jan 1967
Supermonger	Richard Evans	Richard Evans	1974

Super Twister	John Chamberlain (UK)	John Chamberlain	1967
<i>cont/...</i>			
<i>.../cont</i>			
Super Twister XL	John Chamberlain (UK)	John Chamberlain	1967
Sword	J Templeman (UK)	AM 674	Oct1957p518
Talon	Dave Platt (UK)	Keil Kraft Kit	
Taper- Wing	Arthur Garnett (UK)	Frank Smart	
Terminator	Stu Holland (Eire)		1970
Terminator XL	Stu Holland (Eire)	Stu Holland	1970
Terminator	Mick Davies	Frank Smart	1970
The Proposition		AM Annual	1955/56 p88
Titan Mk 1	John Shaw (UK)	Frank Smart	1966
Titan Mk 4	John Shaw (UK)	Frank Smart	
Titan Mk 5	John Shaw (UK)	Frank Smart	1969
Toreador	Henry J Nichols (UK)	Mercury Kit	
Turncoat	Moggs Morris (UK)	AM 926	Feb 1967 p74
Turncoat XL	Moggs Morris (UK)	AM 926	Feb 1967 p74
Twister Mk 1	John Chamberlain (UK)	Frank Smart	1965
Twister Mk 4	John Chamberlain (UK)	Frank Smart	1966
Twister Mk 9	John Chamberlain (UK)	Frank Smart	1969
Twister Mk 10	John Chamberlain (UK)	Frank Smart	1970
UFO	Dave Budd (UK)	Frank Smart	1968
Unlimited	R. Smith (UK)	AM 369	Dec 1980 p656
Vendetta	Jean Claude Marconcini	Modellistica	April 1974
Vendetta XL	Jean Claude Marconcini	Modellistica	April 1974
Warlock	Richard Evans	Frank Smart	1967
Warlock	Steve French	Frank Smart	1969/70
Warlord	Mick Chilton (UK)	Frank Smart	1968 - 1972
Warlord	Heanor MAC (UK)	AM Annual	1968/69 p77
Warlord	Vernon Hunt (UK)	Pegasus Kit	(AM) Jul 1972
Warlord	John Dunker	Frank Smart	1968
Warlord XL	Vernon Hunt	Vernon Hunt	1972
Warmonger Mk 1	John Dixon (UK)	Frank Smart	1965
Warmonger Mk 2	John Dixon (UK)	Model Avia (France)	Feb 1968
Warmonger Mk 2XL	John Dixon (UK)	John Dixon	1968
Warmonger Mk 3	John Dixon (UK)	Frank Smart	1969
Warmonger Mk3 XL			
Warrior	Frank Smart (UK)	Frank Smart	1970
Wildcat	(USA)	Bradshaw M P Kit	(AM) Mar 1963
The Yeti 1 & 2	John Dixon (UK)	Frank Smart	1965
Zack-Zack	Klaus Seegers (Germany)	CL Manual	1961 p131
Zig-Zag	Brian Mills (UK)		1965
Zot-Box 'N'	Cpl Red Phin (Australia)	Frank Smart	1966
Zot-Box 'M'	Cpl Red Phin (Australia)	Frank Smart	1967-1968

The following models, due to their undoubted status as 'Classics', will be allowed to compete despite the fact that they may exceed the dimensional limits :-

Mr Pogle	Terry Mortimer (UK)	Frank Smart	1965
Orcrist	Steve Jones (UK)	AM Oct 71 p550	1969
Razor Blade 1964	Peter Tribe (UK)	AM 729	July 1964 p 332
Ruteress	Steffan Larson (Swe)	AM 969	Dec 1968 p657

## ANNEX B

### 2020 Vintage Combat Approved Engines List

AK 19	AM 25CS	AM 35
CTMVVS 2.5/1958 TRS & D7	DC Rapie	ED Racer
Elfin 249	Enya 15D	ETA 15
For a Junior	Frog 249	Oliver Mk 3 Replica
Oliver Tiger Mks. 2,3 ,4	OS 15D	Parra T3 (2.5cc)
PAW 249, 249 TBR CT 1 & 2	PAW 19D and 19 D	Rivers Silver Streak
Rothwell 250	Russian Oliver Mk 3	Replica Super Tigre G20/15D
Sharma (15 & 19)	Super Tigre G30	Taifun Orkan T4 (3.2cc)
Techno K12 (2.5cc and 3.2cc)	Webra Mach 1 and 2	

The Rothwell 320 TBR, PAW 19 TBR, PAW 19 BR and the Oliver Tiger Mk4 19 TBR are allowed subject to not being increased in capacity.

The retro fitting of a single ball race in PAW 19 sized plain bearing motors is allowed.

MVVS 15D 2.5cc (Current model, and subject to the following restrictions):

- (1) Standard engines only to be used, no tuning allowed.
- (2) Standard sized venturi, 3.5mm.
- (3) Bearings may be replaced by steel bearings of the same size.
- (4) No bushings to bearings, phenolic or ceramic bearings permitted.
- (5) The only modifications permitted to the engine is the removal of the exhaust stub, and the positioning of the exhaust port to either side or rear exit.
- (6) Prop size is up to the operator, but only nylon props to be used.
- (7) These rules apply only to the front induction MVVS 15.
- (8) The rear induction disc valve engine will not be permitted, nor will the use of the MVVS ABC Lined engine converted from glow.

Oliver Tiger Class Rules begin overleaf

## 4.8.5 OLIVER TIGER COMBAT

The object of this class is to provide a class of combat that is comparatively cheap to compete in and where the performance levels can be kept down to a level by strict control of model design and engine modification. The rules are based upon those of Vintage Combat.

The rules for Class 4.8.4 Vintage Combat will apply with the following exceptions:-

### 4.8.5.1 The Model

The Vintage Combat Eligibility List will still apply with additional models as agreed at the CFA AGM. These shall be frozen at the start of every year. Updates/changes and additions shall be approved at the CFA AGM for the following year. The only exception to this will be if changes are required on safety grounds

- (a) Models may be covered in any material including modern film.
- (b) The motor may be attached to the model with metal engine bearers if desired in replacement of the standard wooden bearers as used in the Vintage class.
- (c) The Vintage Combat eligible model list (see Annex A at the end of the Vintage Combat rules) will apply with the following Oliver Tiger additions:

MODEL	DESIGNER	SOURCE	DATE
Black Ghost	M.Grimmett (UK)	M.A.295	Nov 1958 p360
Early Bird	Richard Wilkins (UK)	M.A.1022	Sep 1965 p232
Firebird	Dave Platt (UK)	Keil Kraft Kit	
Peacemaker	George Aldridge (USA)	AM 687	Feb 1959 p68

### 4.8.5.2 Engine

- (a) Engines in this class should be either genuine Oliver Tiger Mk3 or Mk4 (John Oliver or Tom Ridley) or their clones (Russian, Chinese, Parra T3 or Techno K12 (2.5 cc)). The only other exception to the above is the inclusion of the PAW 2.5 cc either the plain bearing or ball race version. The only permitted modifications will be chroming and the removal of metal from the original manufacturers' standard parts. The replacement of the compression screw and carburettor assembly with non-original parts is permissible.
- (b) All Oliver Tiger Combat models are subject to a speed limit of 29 seconds for 10 laps.  
This is to be measured without the streamer and with the handle on the pilot's chest. Any flyer found to be exceeding the speed limit must demonstrate to the Contest Director that he is within the speed limit before being allowed to re-fly the bout. Otherwise he will be eliminated from the competition.
- (c) The engine must be fitted with a domed safety nut.
- (d) Only suction feed fuel systems are permitted.
- (e) Any engine may be stripped for inspection at any time that the Contest Director may decide.

**NOTE:** It is intended that engine modifications will be strictly policed and any modification that gives an obvious advantage will be banned as soon as it becomes

apparent, hence 4.4.8.2.(e) above.

### **4.8.5.3**

#### **Officials**

- (b) The Centre Marshal may at his own discretion remain outside the circle for safety purpose.

## **4.8.6 BMFA VARIATIONS ON F2E DIESEL COMBAT**

### **4.8.6.1 Characteristics (FAI 4.G.5)**

- (a) As the majority of models used in this class in the U.K. are purchased already built and these are supplied without the wire from the bellcrank to the motor, FAI rule 4.4.5.(f) will not be enforced for F2E until further notice.
- (b) Any engine/model combination eligible for Vintage Combat may be used.
- (c) In F2E, only when the Fora Junior is used any commercially available thermoplastic propeller may be used with no reworking of the prop, except for the removal of material from one side to balance.

### **4.8.6.2 Classification (FAI 4.G.14)**

- (a) Competitors will normally compete with each other in a knockout competition chosen by random draw. The losers of each of the first round flights will be allowed to compete in a further losers re-fly round.
- (b) The winners from this round will be drawn with winners from the first round to provide a second round of contests.
- (c) The rounds will continue until eight competitors are left so that quarter, semi and final round provide an overall winner.

### **4.8.6.3 Number of Model Aircraft Etc (FAI 4.G.7)**

One model per match shall be allowed. Engine changes are not allowed. Line changes are allowed during the combat period. The changed lines will be pull tested by the Centre Marshal.

#### **Notes: Pilot**

The pilot must wear protective headgear with the strap fastened throughout the bout.

#### **'Fly Away'**

A "fly away" shall be defined as going outside a pre-determined area set by the organisers. At the Nationals this will be the "roped off area". Clarifies rule 4.4.5.12(b)



## **4.9 CARRIER DECK**

### **4.9.1 CLASS 1 CARRIER DECK**

#### **4.9.1.1 The Flight Deck**

The specifications of the flight deck should be as close to those of the deck constructed by the Royal Navy as possible except that when no deck is available for the event, weighted drags and arrester wires on any flat surface may be used.

#### **4.9.1.2 Model Specific**

Maximum single engine displacement will be up to and including 0.4028 cu. in. A twin-engined model may use individual engines each of maximum displacement 0.21 cu. in. The model must take off and land on an undercarriage of fixed or retractable type; in the latter case, the wheels must be extended for landing. Models must be equipped with an arrester hook which will have a maximum extended length of less than 1/3 of the model's overall length. Models must fly in an anti-clockwise direction. No method may be used to assist take-off other than the thrust developed by the in-flight power unit.

#### **4.9.1.3 Lines**

Stranded cable of minimum diameter 0.020 inch will be used for two line systems. Stranded cable of minimum diameter 0.015 inch (e.g. light Laystrate) will be used for three line systems. The lines shall be 60 ft (plus 6", minus 0") from the inboard face of the grip of the control handle to the longitudinal centre line of the model fuselage. Model, lines and handle shall withstand a pull test of 20 kg sustained for ten seconds. All handles must be fitted with a safety wrist strap which must be used by the pilot during all contest and practice flying.

#### **4.9.1.4 Official Flights**

Three minutes will be allowed from the competitor beginning to start his engine, for the model to become airborne. Exceeding this time allowance will cause an attempt to be recorded. A further two minutes is allowed for each additional engine of a multi-engined model. An attempt will also be recorded where the model has been released for a take-off. Three attempts will be allowed for the two official flights, the highest scoring flight to count for the purposes of determining the competitor's placing (subject to a CD's decision to extend the contest on the day). A flight is considered official when the competitor signals for a timed, low-speed run. In the case of an uncompleted flight programme, points will be scored for the parts carried out, and also for the scale. All ground other than the deck shall be considered water, and touching the ground will terminate the flight.

In the final classification those competitors who have scored landing points under rule 4.9.1.7 will be placed ahead of any competitor who has failed to score landing points regardless of total scores.

#### **4.9.1.5 Flight Procedure**

The model shall not exceed an altitude of 20 ft. for more than half a lap during the timed run. No whipping is allowed at any time. High speed flight will be the first seven laps of the flight timed from a standing start. Low speed flight will be the next seven laps after the competitor signals the start of his low speed run by a pre-arranged signal, and this will be timed from the standing start position. The flyer will not walk a circle of larger than 3 ft. radius during this phase of the flight, nor must the model exceeds a 60 degree nose-high attitude except for momentary inadvertent deviations. When the 60 degree limit is exceeded, the flyer will be notified immediately and must correct model attitude

immediately. Failure to do so will result in loss of low speed score. A maximum of three notifications will be given. The fourth notification shall result in loss of the low speed points.

#### **4.9.1.6 Flight Scores**

- (a) All speeds shall be recorded to the nearest 0.1mph.
- (b) Recorded high speed in mph shall be the high speed score in points.
- (c) 10 times the ratio of recorded high speed to recorded low speed, calculated to the nearest 0.1 of a point, shall be the low speed score (note that high speed divided by low speed is the same as low speed flight time divided by high speed flight time).

#### **4.9.1.7 Landing**

The competitor shall signal to the judges when he is ready to land. The landing takes place at the end of the next complete lap after signalling, any subsequent laps being penalised by the deduction of 5 landing points for each extra lap.

Points will be scored as follows:

- (a) 100 points for an arrested landing ending with the model at rest at the normal ground angle for the type of undercarriage used.
- (b) 50 points for an arrested landing ending with the model at rest at any other angle, while still having both main wheels in contact with the deck.
- (c) 25 points for a landing on the deck, ending with the model at rest in any position not fulfilling the requirements of (a) and (b) above.

#### **4.9.1.8 Scale Bonus**

A carrier aircraft of any nation shall score 100 scale bonus points. A carrier aircraft is defined as any full-size aircraft which has at any time been fitted with arrester equipment designed for deck landing.

#### **4.9.1.9 Scale Scoring**

For the purpose of this contest, scale bonus points shall only be awarded to a model with fuselage, air brakes and the outlines of wings, tailplane, elevators, flaps, fin and rudder to the same scale within a tolerance of plus or minus 5% in line or dimension. Undercarriages shall emerge from the model in the same place as the prototype but need not be to scale. It is not necessary for flaps to operate in the same manner as the prototype. Engine and accessories may protrude from the contours of the model providing the clearance around the protruding part does not exceed 1/4 inch. Wing and tailplane dihedral and/or anhedral shall be plus or minus 3%. If a clear canopy is not used, the cockpit or canopy area shall be defined with a contrasting colour or colour outline. Colour schemes and markings shall approximate to a scheme used on the prototype. Scale three view drawings must be submitted to qualify for bonus points. The drawings shall be from a source acceptable to the contest director. Any deviation from these definitions and tolerances will result in NO scale points being awarded.

## 4.9.2 BASIC CARRIER DECK

With thanks to the Three Kings Club

### 4.9.2.1 The Model

- (a) Any fixed wing model of 450 sq.in. (29 dm<sup>2</sup>) wing area or less which must have a stable wheeled undercarriage.
- (b) A model powered by any size of internal combustion engine shall compete only in the class of Basic Carrier Deck (i.c.). A model powered by an electric motor of any power shall compete only in the class of Basic Carrier Deck (electric). These two classes shall operate concurrently whenever a Basic Carrier Deck competition is run. A contestant may compete in both classes.
- (c) No tuned pipes, only effective standard silencers. The engine of a Basic Carrier Deck (i.c.) model shall not be fitted with a tuned pipe, only an effective standard silencer.
- (d) Any fixed line length of 60ft (18.3m) or less. Line length is measured from the inboard face of the grip of the control handle to the longitudinal centre line of the model fuselage.
- (e) No moveable surfaces except normal elevators for pitch control, no yaw variation methods such as line rakes and no fixed boundary layer control devices such as slots or slats.
- (f) The arrester hook to be no longer than one third of overall model length and to have no other function other than to arrest the model on landing.
- (g) A spinner or safety spinner nut is compulsory.
- (h) All handles must be fitted with a safety wrist strap which must be used by the pilot during all contest and practice flying.
- (i) All models, ready to fly, shall be subject to a pull test of 15 kg sustained for ten seconds.
- (j) All models must be fitted with a visible heavyweight Laystrate (or equivalent) safety cable between the bellcrank pivot and the engine.
- (k) Any fixed wing model of 264 sq.in. (17dm<sup>2</sup>) wing area or less with a profile fuselage, simple flat-plate sheet wing, 0.15 cu.in. maximum i.c. engine capacity and fixed line length of 42ft 0in is eligible for the sub-class of Junior Carrier Deck i.c. [JCD (i.c.)]. A model of the same specification except with an electric motor of 300W maximum power is eligible for the sub-class of Junior Carrier Deck (electric) [JCD (electric)]. Such models shall compete directly with both Basic Carrier Deck (i.c.) and Basic Carrier Deck (electric) models and are subject to all Basic Carrier Deck rules except the High Speed and Low Speed lap distances.

### 4.9.2.2 The Contest

- (a) A competitor is allowed a maximum of three attempts to make a maximum of two official flights. An official flight is recorded when the pilot signals the start of the slow flight; until that time the flight is considered an attempt. Once two official flights have been recorded by a competitor they will be allowed no more attempts (subject to a CD's decision to extend the contest on the day)
- (b) An attempt begins as soon as you have begun to start your engine(s). You are allowed three minutes to start the engine (four minutes for multi engine models).
- (c) The model is timed from a standing start on the deck (or ground if the deck is not used) for seven full laps (JCD: 10 laps) and the high speed time is recorded in seconds. The CD will signal when these laps have been completed.
- (d) For the low speed time, on the pilot's signal the model is timed from the standing

start position for a full seven laps (JCD: 10 laps) and the low speed time is recorded in seconds. The CD will signal when these laps have been completed.

- (e) Flying height is not to exceed 6 m (20 ft) throughout the whole attempt and you must not leave the 3 m diameter pilot's circle during the flight. Whipping or shortening of flight radius is not permitted during the fast run. Flight progress must always be forward and anticlockwise. Ground contact, except after landing, is considered to be ditching and is not allowed. Deck contact, except after the landing signal has been given, is also considered to be ditching. Any infringement of these requirements means disqualification from the attempt flight. After the landing signal, ground contact after deck contact shall result in termination of the flight with a landing score of zero.
- (f) Attitude should not exceed 30° to the horizontal. Except after the landing signal each exceeding of 30° for one second or less will incur a warning and three warnings will disqualify the flight. After the landing signal has been given, a single exceeding of 30°, however momentary, will disqualify the flight without warning.
- (g) To assist in assessing the 30° model angle a clearly visible line shall be painted (or adhesive tape may be used) on both sides of the fin such that the line is horizontal when the model is held at 30° nose up.
- (h) On the pilot's signal of readiness, the model is to land on the deck or the marked-out deck outline after the next approach. Each lap completed after this first approach will result in a five point deduction.
- (i) The quality of the landing will be assessed and points will be awarded as follows:
  - i) Arrested, when stationary the model has correct deck attitude for wheel arrangement ..... 100
  - ii) Arrested, when stationary the model does not conform to i) but has all main wheels on deck ..... 80
  - iii) Arrested, when stationary the model does not conform to i) or ii) but is still on deck ..... 60
  - iv) Not arrested, when stationary the model has correct deck attitude for wheel arrangement ..... 40
  - v) Not arrested, when stationary the model does not conform to iv) but is still on deck ..... 20
  - vi) Any part of model makes ground contact, whether arrested or not ..... 0
- (j) Models judged to be of scale like appearance of a specific full size aircraft which has at any time been fitted with arrester equipment designed for deck landing will be awarded 10 bonus points. Models painted in a navy-like colour scheme will be awarded 10 bonus points. If the model has both it will be awarded 20 points.
- (k) Competitors who cannot safely undertake high speed flight due to temporary or permanent physical impairment but can safely undertake all other aspects of a flight are permitted to compete in the Slow Only Basic (SLOB) sub-class. SLOB shall compete directly with all other sub-classes in the competition and, except as described below, shall be subject to all Basic Carrier Deck rules, including the JCD sub-class and the division between i.c. and electric power.

SLOB requires only a take-off, low speed flight and landing. The high-speed flight shall be carried out as required by the rules except that it shall be separately executed by one or more unimpaired proxy pilots in advance of the SLOB flights. At least two such high speed flights shall be made, and the average time recorded, together with the full model, engine and line specifications. Each such flight does not need to undertake slow speed or landing and may therefore be terminated as required. The average time shall then be the permanent high-speed time used for all subsequent SLOB flights of the model until any specifications are changed, after which a new average high-speed time shall be required. The SLOB flight

take-off is not a standing start and the power setting used may be chosen by the competitor. After take-off, the pilot's slow speed signal made be made when the competitor chooses. After this signal, the remainder of the flight and subsequent calculation of results shall be subject to normal Basic Carrier Deck rules.

- (l) The Contest Director's decision on all matters is final.

#### **4.9.2.3 The Results**

- (a) The competitor's highest individual flight score counts.
- (b) An individual flight score is: Low Speed time minus High Speed time plus landing Points plus Appearance Points, minus Deductions.
- (c) All times will be recorded to the nearest one tenth of a second.

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