2008 Plenary – March 28-29, 2008
F2 Technical Meeting Report

The F2 Technical meeting was held 28 March 2008 was attended by the following:

Dr. Laird Jackson – Chairman	United States
Andras Ree – Delegate	Hungary
Evgeny Fedeev – Delegate	Russia
Igor Trifonov – Delegate	Russia
Peter Germann – Member	Switzerland
Uwe Kehnen – Member	Germany
Ljubomir Radosavgerc – Member	Serbia
Pavol Barbaric - Member	Slovakia
Kevin Dodd – Delegate	Australia
Yolanda Garcia – Member	Spain
Antonio Rojas – Observer	Spain
Hans Visser – Member	Netherlands
Bohumil Votypka – Member	Czech Republic
Guido Michiels – Member	Belgium
Bill Lee – Member	United States
Roland Surugue – Member	France
Bruno Delor – Delegate	France
Karlis Plocins – Delegate	Latvia
Chris KS Wee – Delegate	Singapore
Sovkovic Vojislav – Observer	Serbia
Lazar Lacimic – Observer	Serbia
Bengt-Olof Samulesson – Member	Sweden
Rob Metkemeijer – Observer	Netherlands
Martin Dilly – Delegate	New Zealand
Andy Sweetland – Member	Switzerland
Pater Halman – Member	Great Britain

Items on the Agenda were addressed including item 11.7 and Annexes 4E and 4J.

Agenda Item 11.7 – F2A items a-e:

Items were unanimously adopted as worded in the Agenda with the following clarifications..

A sentence was added to item b. to read

"Fuel shall be mixed by volume."

In item c, the changes suggested for paragraph a) were withdrawn.

The proposal item c, paragraph c. was modified to read

"Solvent may be applied for cleaning only."

The proposal item e. paragraph b.i was modified as follows:

i)The recorded speed in km/h is to be taken from the Electronic Official speed. (Eoff column in the Transitrace system).

Agenda Item 11.7 – F2B item f:

This proposal was withdrawn by the subcommittee, and the subcommittee will continue to work on important aspects of judging, judges' training and the format of the event.

Agenda Item 11.7 - F2C item g:
A complete clarification and standardization of the F2C rules were approved unanimously. Several minor changes were incorporated and appear below. This document was originally Agenda ANNEX 7 F2C Rules, Judges Guide & Organisers Guide

CLASS F2C – Team Racing Model Aircraft and Annexes 4C & 4E

- CLASS F2C – TEAM RACING MODEL AIRCRAFT

4.3.1. Definition of a Team Racing Event

a) A team racing event is a contest during which ~~eliminating~~ **qualifying** races are followed by semi-finals races and a final race, in which three model aircraft participate simultaneously in each race, flying around the same circuit, each of them being entered by one team consisting of one pilot and one mechanic. In exceptional cases, a race may be run with ~~only two teams less~~ **fewer than three teams**.

b) No member of a team may be a member of another team.

c) A race is run over a set number of laps corresponding to the distance to be covered with at least one landing for refuelling. The time taken by each model aircraft to cover that distance after the starting signal is registered. Team classification will follow the process indicated in 4.3.10.

d) **The competition is run in rounds for the qualifying and semi-final races.** The ~~eliminating~~ **qualifying** races and the semi-finals races are run over 100 laps, corresponding to
10 **km** ~~kilometres~~. The final race is run over 200 laps, corresponding to 20 km.

e) During the race the pilots remain in the centre of the ~~circuit~~ **centre circle**. Their only function is to control the model aircraft. The mechanics are placed outside the flight circle, as defined in paragraph 4.3.2. Their function is to start and adjust the motor and to refuel when the model aircraft is on the ground, and generally, to deal with the different operations that enable the model aircraft to race. The motor must be started by flicking the propeller by hand.

f) During a race, the mechanics must wear a safety helmet, with a **fastened** chinstrap, strong enough to withstand the impact of a flying team racing model aircraft.

4.3.2. Team Racing Site

A team racing site must consist of four concentric circles which shall be marked on the ground:

a) Circle to be used by the mechanics: 19,6 m radius. This is called the flight circle, and is divided into six equal 60 degree sectors. At each sector a starting and refuelling area, one meter in length, shall be marked on the outside of the flight circle and be known as the "pitting area".

b) Circle at 19.1 m radius shall be marked with a broken line. It indicates the point beyond

which the pitman is not permitted to reach to retrieve a model **aircraft**. This is called the safety circle.

c) Circle to be used by the pilots: radius 3 metres. This is called the centre circle. The centre of this circle shall be marked with a white spot of 0,3 m diameter.

d) Circle at 2m radius, and known as the inner circle, shall be marked with a broken line in a contrasting colour.

4.3.3 Definition of a Team Racing Model Aircraft

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 the supporting surfaces which must remain fixed in flight except for control surfaces. The model aircraft must be of a semi-scale type and its general lines must be similar to those of a full-size aircraft.

4.3.4. **Characteristics of a Team Racing Model Aircraft**

a) Maximum swept volume of motor(s) : 2,5 cm^3

The maximum exhaust outlet area is 60 mm^2 at the cylinder liner projected exhaust outlet or crankcase exhaust outlet. If a silencer is used the measurement is taken at the exhaust outlet of the silencer. The piston face at the exhaust outlet shall not be visible from the exterior of the model aircraft when side or front exhaust engines are used.

b) Minimum total projected surface area (St) : 12 dm2

c) Total maximum weight : 500g

d) Minimum dimensions of the fuselage ~~at the pilot's location~~ **at the top of the cockpit**: height: 100 mm; width: 50 mm; cross-sectional area: 39 cm^2 - (wing fillets shall not be included in the fuselage cross-sectional area).

e) The model aircraft must ~~carry a scale pilot head with minimum dimensions: height: 20 mm; length: 14 mm; width: 14 mm~~ **have a cockpit or cabin with a clear or painted windshield**.

f) Minimum diameter of the wheel(s): 25 mm. The use of metal wheels is forbidden.

g) Maximum fuel permitted: 7 cm3. Only one tank is allowed, to contain fuel and oil for lubrication.

h) The model aircraft must fly in **an** ~~the~~ anti-clockwise direction.

i) The motor(s) must be entirely enclosed including the cylinder head and the body of the carburettor (except the opening of the induction throat). The fairing or additional extensions to the motor 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 aircraft. The only parts permitted to protrude from the fuselage are those to be manipulated during the operations of starting the motor, regulating the mixture, plugs, advance control, compression control, needle valves, tank fillers, etc. If a silencer is used, it may be fixed outside the fuselage.

j) Openings for the entry and exit of air, exhaust, etc. may be provided for proper functioning of the motor(s).

~~k) A cockpit or cabin with transparent windshield giving direct visibility forward must be provided to house the scale model aircraft pilot head which shall be clearly and fully visible.~~

l) The landing gear must be arranged to permit normal take-of and landing. It may be retractable during flight but must return to its extended position before landing.

m) Fuel tank, tubing and any associated filling valves or shut-off units must be accessible and capable of being measured accurately in order to check the total capacity as a unit. If the organisers do not consider the system to be accessible or accurately measurable, then the team will be disqualified.

n) The model aircraft must be equipped with an effective engine-stopping device ~~for enabling~~ **to enable** the pilot to terminate the engine run before the fuel tank is completely empty.

o) Rule B.3.1. of Section 4B does not apply to class F2C

p) The model aircraft must remain ~~in a correct state according to 4.3.4 (a) - (n)~~ **complete as defined in the whole of this paragraph 4.3.4** throughout the full race, otherwise it will be disqualified.

4.3.5. ~~**Controls –**~~ **Technical Checks** ~~**Verification**~~

a) Line Length: The radius of the flight circle is 15,92 m. It is measured with a line tolerance of -0mm/+25mm from the axis of the control handle to the axis of the propeller for a

single motor model aircraft and to the axis of symmetry for a multi-motor model aircraft. A load sufficient to remove only the slack from the lines shall be applied during the line length check.

b) Control System: Two control lines must be used. If constructed of single steel wire each, these must be of ~~0,30~~ **0,35** mm minimum diameter with a minus tolerance of 0,011 mm allowed. 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 ~~0,34~~ **0,35** mm with no minus tolerance allowed. In all cases the lines shall be measured using a suitable instrument with measuring surface diameters of 5 mm minimum and 8 mm maximum. Before every race a load test **equal to 30 times the gravity force, to a maximum of pull 140 N** shall be applied to the assembled control lines and the model aircraft in flying order. The control handle must be built so that the distance between the axis of the handle and the points of flexibility of the two cables does not exceed 40 mm.

   No intentional twisting and/or linking of the two lines together shall be permitted between the point of exit of the model aircraft and a point 300 mm from the handle. The use of flexible grouper(s) attached to the wing tip and extending a maximum of 2 cm is permitted.

c) Fuel Tanks: The fuel tank capacity is checked **by an accurate system of visual examination** ~~through the use~~ of the volume of the fuel put into the tank and pipes. **The check** ~~Control~~ is to be made before the contest and may be made after each race in addition to a ~~verification~~ **check** after the final race.

d) If the engine has an integral head or extremely tight fitted piston liner assembly, the entrant must provide tooling to allow the piston connecting rod & shaft assembly to be rotated through 360 degrees. A dummy cylinder would be ideal.

4.3.6. **Organisation of Races**

a) Three competing teams ~~(in exceptions only two)~~ will fly simultaneously in each race after having been drawn for order. Qualifying races with ~~less~~ **fewer** than **three** ~~3~~ teams will be put at the end of the draw, in order to allow a three-team race~~s~~ with teams which have been granted an attempt. **If it is not possible to get a three-team race in this way, then the race should be filled up with volunteer team(s).**

b) The draw is organised in such a way that, when possible, only one team of any nation may participate in a~~n eliminating~~ **qualifying** race or semi-final race.

~~c)~~ When it is not possible to organise a ~~reflight for a team which has been granted an attempt~~ **qualifying race containing three competing team**s, the F2C panel of judges will ask for volunteers (from different countries in the case of World Championships and Continental Championships) to fill the qualifying race. The F2C panel of judges will organise an appropriate draw for the race among the volunteers and the ~~team with the attempt~~ **competing team(s)**. **The volunteer team(s) will not be eligible to have a flight recorded or to be granted an attempt from this qualifying race. If there are insufficient numbers of volunteers, the competing team(s) will be allowed to fly with fewer than three teams to complete their qualifying race.** ~~If there are no volunteers, the team will be allowed to fly alone to complete their qualifying reflight during the same round.~~

d) The teams may be allowed to run their motors just before entering the circle under the organiser's supervision so **that** the running does not interfere with the starting procedure of

a race. Mechanics are not allowed to walk with a running engine.

e) A pitting area (4.3.2.(a)) is occupied by each of the model aircraft which are to participate in a race. The model aircraft of the team designated first during the draw occupies the place chosen by that team. The other teams choose one of the remaining free pitting areas in order of the draw. The chosen pitting areas are considered occupied until the race is finished. **Teams are not permitted to change their selected pitting segment after the start of the warm up period.**

For the final race, the choice of the pitting areas shall be according to 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 the teams' second fastest times in the semi-finals will decide the order of choice.

f) After entry to the circuit, it is forbidden to start a motor before the first signal has been given by the Circle Marshal, unless allowed by the Circle-Marshal.

g) **In the event of unsuitable weather conditions such as strong winds, atmospheric conditions or when the prevailing conditions might lead to unacceptable sporting results (B.13.1) the F2C Contest Director may postpone races or prematurely end the contest or the Panel of Judges.**

4.3.7. **Race from Start to Finish**

a) Three timekeepers are assigned to each team. They stand outside the flight circle, near the pitting area of the model aircraft that they **are assigned to time** ~~control~~. They are in charge of the timekeeping and lap counting for their particular team.

b) A first signal given by the Circle Marshal authorises the mechanics to proceed with the warming up ~~to~~ **of** the motor(s), during 90 seconds. A second signal (visual and **audio** ~~acoustic~~) announces the end of the warming up period and orders the mechanics to stop motors.

c) A period of 30 seconds is allowed for final preparations (filling up the tanks) and the Circle Marshal announces the last five seconds by ~~reverse~~ counting **down**.

d) The starting signal is given by the Circle Marshal through a visual signal (flag) and a**n audio** ~~sound~~ signal **(eg air horn, starting pistol ~~hooter~~)**. For the last 3 seconds of the countdown and at the starting signal the mechanics must be standing erect close to their model aircraft and the pilots must be crouching on the border of the centre circle, with one hand touching the ground and with their control handles as close to the ground as defined by the F2C panel of judges. The starting signal must be "sharp" to enable accurate timing.

e) Model aircraft must fly at a normal height of between two and three metres, except **when** ~~for~~ overtaking, taking off or landing.

f) Proper pilot activity is to attempt to walk a circle at the centre of the 3m centre circle.

g) That circle should be as small as possible, so that the controlling handle moves forward in the same direction as the model aircraft.

i. The pilots handle should be positioned in the centre line of the pilot's body. The handle is allowed to move vertically on this line as long as it does not move more than 30 cm out from the chest or be pulled back over the pilots head in an attempt to shorten the radius of the model aircraft's path. An exception of 3 laps is allowed when taking off and landing.

ii. **The lines should remain at an angle of 90 degrees to a line joining the pilot's shoulders and passing through the centre line of his body. When the pilot is positioned correctly the lines will form a tangent to the circle formed by the centre line of the pilot when in rotation (Fig 4.3.7.f).**

iii. **The pilot should stand in an upright position. There should be no leaning backwards in an attempt to shorten the radius of the model aircraft's path. The pilot should walk forward and around in a small circle, the centre pivot of this circle should remain at the extremity of the pilots left shoulder except when allowing space for an overtaking pilot (Fig 4.3.7.f).**

The pilots left arm should remain by his side or slightly forward. It should not be placed around the pilot behind them or behind their back.

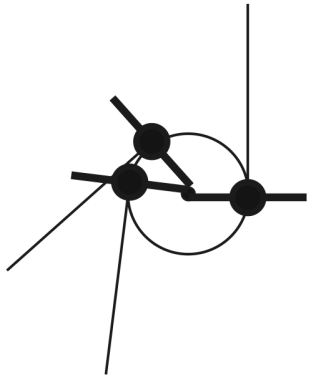


Fig4.3.7.f

~~h) Pilots must keep their controlling hand and the model aircraft on a plane perpendicular to a line joining their shoulders and passing through the centre line of their body, pilots must also keep their controlling hand on the vertical line between the middle of the chest and the top of the forehead, except when overtaking, taking off and landing when an exception of three laps is allowed.~~

i) Overtaking must be done by over flying. The model aircraft is not in any case allowed to fly over six metres height when overtaking. The pilot being overtaken must on no account carry out any manoeuvre to impede the overtaking competitor and must leave space for the overtaking pilot when the overtaking is finished.

j) The model aircraft is **only** allowed to fly a maximum of two **consecutive** laps without the motor running.

k) Landings **must** take place inside the flight circle.

l) The model aircraft must touch the ground with its motor stopped before the mechanic is allowed to catch it.

m) After the mechanic has caught the model aircraft, he must go to the nearest free pitting area from the point at which the model aircraft was stopped. A pitting area is occupied if a mechanic is standing at such an area, even if his team's model aircraft is still in the air.

n) After the mechanic has caught the model aircraft, but only then, the pilot is allowed to put one foot outside the centre circle.

o) During the ~~re~~fuelling and the ~~re~~start**ing** of the motor, and until the time when he releases the model aircraft, the mechanic must keep the model aircraft in contact with the ground by at least one point and with the centre line outside the flight circle. During that time the pilot must be crouching or sitting inside the centre circle. He keeps one hand on the ground and his handle and his lines as close to the ground as defined by the F2C panel of judges until the model aircraft starts again.

p) The official time limit for each race is fixed at 10 minutes for a qualifying race or a semi-final race and at 15 minutes for the final race. The race will be declared finished when all of the competing team's model aircraft have either completed the required distance, are unable to continue racing, have been disqualified or the official time limit has been reached.

~~The race ends when the number of laps completing the required distance has been covered by all the competing model aircraft or, when the official time limit has been reached, which is fixed at 10 minutes for a qualifying race or a semi-final race and at 15 minutes for the final race.~~

q) When **a** ~~the~~ model aircraft has finished the race**;** or when it cannot continue after a stop, its pilot must sit down or crouch outside the centre circle as long as the other competitors are still engaged in the race, unless the Circle Marshal allows him to leave the circle earlier.

r) In the case where a team cannot finish the race and their model aircraft is in a position where it may be an obstacle for the other competing teams, the pilot must immediately clear the model aircraft to a position where it will ~~not remain as~~ no longer be an obstacle.

s) The team manager may never become physically involved during the race.

t) During the landing process, the landing model aircraft has the priority.

4.3.8. **Definition of an Official Flight**

An official flight is recorded for every participant in any race not granted an attempt. Attempts are granted as follows:

a) Any team in an ~~eliminating~~ **qualifying** race or a semi-final race which has been interrupted through an obstruction or collision for which **that team** ~~it~~ was not responsible shall be granted an attempt.

b) Suggest this para transposed to here; was c) If, before 50 laps of an ~~eliminating~~ **qualifying** race or a semi-final race have been completed by any of the teams who started the race, only one team remains in the running and flying alone, **then** the race will be declared void and **will be** considered an attempt for the remaining team. A team which has been granted an attempt is allowed to participate in another race.

c) Suggest this para transposed to here; was b) In a final race which has been interrupted through an obstruction or collision before any of the **teams** ~~participants~~ has completed 100 laps the final shall be stopped and all **the** competitors, except any who**, at the point of stoppage of the race, have** been disqualified, shall be granted an attempt.

4.3.9. **Warnings - Disqualifications ~~Eliminations~~**

At each warning the chief judge shall notify the ~~team manager~~ **team** concerned so that~~, in turn, he may convey~~ **the team will know that a warning has been given** ~~the warning to the~~

~~mechanic~~. In the event of any serious breach of the rules, the F2C panel of judges may **disqualify** ~~eliminate~~ the team from the race.

A TEAM SHALL BE WARNED:

a) If a pilot interferes with or obstructs another pilot either by his conduct in the circle (for example by raising the handle above his head during take-off), or by a manoeuvre of his model aircraft preventing another model aircraft from flying or landing normally.

b) If a pilot, instead of walking around the centre, stands in the same place or walks backwards or continuously keeps the centre spot of the circle between him and the model aircraft.

c) If the pilot's flying style does not conform to 4.3.7.f).

d) If a pilot applies physical effort to increase the speed of his model aircraft during the official flight.

e) If the height level of the flight prescribed by the rules is exceeded.

f) If, during the start of the race or during the pit stops, **the pilot does not have** one hand ~~is not~~ on the ground, the control handle **and** the lines ~~and the model aircraft~~ are not as close to the ground as defined by the F2C panel of judges and/or the centre line of the model aircraft is inside the flight circle.

g) If a mechanic:

- services the model aircraft outside the designated pitting area or **with the centre line inside the flight circle**
- ~~or not keeps~~ **does not keep the model aircraft in contact with the ground by at least one point.**

h) If the pilot does not leave space **in the centre circle** for an overtaking pilot when the overtaking is finished.

A TEAM SHALL BE **DISQUALIFIED** ~~ELIMINATED~~ FROM A RACE

i) If the pilot steps outside the centre circle before the mechanic has taken hold of the landing model aircraft, **and/or the pilot does not act in accordance with rule 4.3.7.i**) ~~and m)~~.

~~j) If the model aircraft flies more than two laps without the motor running.~~

k) **If the model aircraft lands outside of the flight circle.**

l) If the mechanic steps into the flight circle (with either foot) or reaches further than the safety circle (line) painted 0.5m into the flight circle.

m) If the mechanic retrieves his model aircraft by any device.

n) If overtaking is done by passing under the slower model aircraft.

o) If the pilot whose model aircraft is to be overtaken carries out any manoeuvres to impede the overtaking competitor.

p) **If the pilot performs an extreme manoeuvre to overtake another model aircraft.**

q) If a member of the team or the model aircraft causes a collision.

r) If jettisoning occurs or if the model aircraft is not in the condition as stated in 4.3.4.a). to l).

s) If the model aircraft flies more than two laps with the motor stopped.

t) If the model aircraft is recovered with the motor running or prior to touch down with the

motor stopped.

u) If, after its model aircraft have been processed, the competing team has used parts or elements not checked during the **processing** ~~control~~. **I**f the team has modified its model aircraft~~(s)~~ by changing the characteristics or specifications imposed by the rules this may lead to the application of penalties as stated in the General Section of the Sporting Code.

v) If the mechanic does not act according to 4.3.7.k) and l). 4.3.7.l)

w) If the team has accumulated three warnable offences during the ~~eliminating~~ **qualifying** or semi-final race (100 laps).

x) If in the final (200 laps) the team has accumulated four warnable offences.

y) **For any other flagrant breach of the rules.** This should be a warning as not all offences result in a DQ

4.3.10. **Team Qualification and Classification**

a) Each competing team must take part in at least one ~~eliminating~~ **qualifying** race to qualify for the semi-finals. The contests will be organised on three ~~eliminating~~ **qualifying** races and if there are no semi-finalists then all teams are allowed four ~~eliminating~~ **qualifying** races.

b) The number of teams qualifying for the semi-finals will depend upon 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
12 up to and including 39	9
40 or greater	12

The 6, 9 or 12 teams which register the 6, 9 or 12 best times respectively during the ~~eliminating~~ **qualifying** races qualify for the semi-finals.

A draw will take place to decide the pitting segments.

c) ~~This~~ **The following** system for the ~~elimination~~ **resolution** of ties will only be enforced if more **than** the number of semi-finalists **qualify for the semi-finals** (6, 9 or 12, depending on the total number of teams entered in the competition).

There will be a tie between teams if their best times in any single qualifying race are equal. In this case the teams' next best times will be used as a tie break. If the tie still exists after this, then the next best times for the teams will be taken into account and so on until the tie is broken ~~and so forth for each next best flight until the teams are separated~~. If **after this,** there **is** still ~~exists~~ a tie between some teams, new ~~eliminating~~ **qualifying** race(s) will be organised between these teams until an adequate number of teams is qualified. In that case, ~~**departure**~~ **pitting segments** will be made by an individual draw.

d) The three teams having registered the three best times during the semi-finals qualify for the final race. In the case that no semi-final flights have taken place, the three teams having registered the three best times during the ~~eliminating~~ **qualifying** races qualify for the final race.

All semi-final races will take place between three teams. Where this cannot be achieved

either by withdrawal or ~~in~~ **by** re-flights, then the number will be made up by bringing forward the tenth placed team (seventh or thirteenth in case of 6 or 12 semi-finalists) and so on as necessary. Those teams ~~will~~ **may** not be granted a~~n~~ **further** attempt but any recorded flight~~(s)~~ **times** shall be eligible to qualify for the final race.

e) In case of a tie amongst the semi-finalists during the semi-finals, the regulations (b), (c) and (d) will be applied, based on the semi-final results, the number 6, 9 or 12 being reduced to three.

The competing teams which have participated in the final race will be placed at the head of the classification, only taking into account **only** the times of flights during the final race, **and only** after checking **that the** tank capacity and the general characteristics of the model aircraft **are still within the rules**.

The teams which have participated in the semi-finals will be placed next in order of classification, **taking into account only** the times **of flights** during the semi-finals. All teams not participating in the semi-finals will be classified according to their best time in any single ~~eliminating~~ **qualifying** race. Classification of any team that has not completed any race within the official time limit but was not disqualified shall be ranked according to the number of laps completed in the best race.

If more than one team is disqualified in the final race, they are placed in the order of the number of laps completed. A disqualified team is always placed after any team that has retired without a disqualification.

Note: The F2C panel of judges' decision **to disqualify** must be communicated to the lap counters to ~~ascertain~~ ~~**decide**~~ **record** the number of "legal" laps.

4.3.11. **International Team Classification**

International team classification is established by adding the numerical position achieved by each individual team. The ~~lowest~~ team **with the lowest total** is ranked first, etc. with complete three-team teams ahead of two-team teams which in turn are ranked ahead of single team entries. In case of a team tie, the best individual placing decides.

4.3.12. Judges and Timekeepers

a) The organisers must appoint a panel of **judges composed of three members, each of whom should have had recent experience in international competition or judging at that standard, and preferably be selected from the list of persons proposed by the National Air sport Controls for their proficiency and experience and approved by the CIAM. The judges must have a good understanding of a common language. At World and Continental Championships and other limited entry international competitions, the judges must be of different nationalities. In open international competitions, the judges must be of at least two nationalities and two of them must be approved by CIAM.**

a) Three timekeepers, equipped with electronic stopwatches registering at least 1/100th second, with a timing limit of 15 minutes minimum ~~of~~ will be ~~allotted~~ **allocated** to each team. The stopwatches may be replaced or complemented by a computerised timing system of equal or better accuracy.

b) The time retained is the average of the registered time, made up to the next upper 1/10th second. A maximum tolerance of 0,18 seconds is allowed between watches. Any single watch exceeding this tolerance shall not be counted in the average.

4.3.13. **Duties of the F2C panel of judges**

~~a)~~ The F2C panel of judges is responsible for observing the conduct of each team during the race. Teams will be informed of any offence by a combination of visual and ~~loudspeaker~~ verbal warnings. ~~After a maximum of three offences a team will be eliminated from an eliminating a qualifying or semi-final race. In the final a team will be eliminated after a maximum of four offences.~~

b) Warning**s** and ~~cancellation~~ **disqualification** are notified to each team by ~~means of~~ **a loudspeaker announcements and** three coloured lights:

Green light	- First warning (first offence)
Amber light	- Second warning (renewal of the first offence or a new one)
Red light	– Third warning (renewal of previous offences or a new one)

For the final only (200 laps), ~~renewal of previous offences for the fourth time or a new offence~~ a team shall be disqualified **for any fourth offence, either a new one or repetition of a previous one,** by the judges verbally announcing “Colour - fourth offence. Disqualified. Land your model immediately”.

In addition, a second set of lights, one coloured for each team colour, will be provided. Upon the ~~issuance~~ **announcement** of the fourth warning in a final race, the appropriate light for the disqualified team will be displayed.

c) Suggest this para transposed to here; was d)In the final, a time penalty of 5 seconds shall be **added to the race time** ~~given to~~ of a team ~~with the~~ **which has been given a** third warnable offence.

d) Suggest this para transposed to here;was c) A time penalty of 5 seconds shall be given to a

team starting the engine(s) during the countdown before the starting signal.
Note: The Team Race Judges' Guide is at Annex 4C.

- ANNEX 4C –
- CLASS F2C –
TEAM RACE ~~JURY~~ PANEL OF JUDGES GUIDE
VERSION 6 AMENDED 2009

It is the intent of this ~~Judges~~ ~~Jury~~ **Panel of Judges** Guide to aid both the **T**eam **R**ace panel of judges and the competitors in realising a fair and enjoyable competition. The guide is an indication of the current consensus of the F2C rules as written in the Sporting Code. Problems with the rules or the Guide together with suggestions for improvements are welcomed by the Control Line subcommittee and will **be** considered at the CIAM Plenary meeting in March.

4.C.1. **TEAM RACE PANEL OF JUDGES.**

The judges must have a good understanding of a common language. It is recommended that the common language should be the same as the language used to issue warnings, as this will reduce delays and possible errors.

4.C.1.1 It is the duty of the Team **R**ace panel of judges to assure a fair competition between the teams and to ~~disallow~~ **penalise** unfair actions, which would result in placing one team at an advantage or another team at a disadvantage.

4.C.1.2 The judges responsibilities regarding **the** issue of warnings, ~~eliminations~~ **disqualifications and** re-flights **begin** only ~~start~~ with the ~~GO~~ **start** signal; however to help in the smooth running of the contest they should assist the Circle Marshall by checking **that** all other aspects of the contest are in accordance with the rulebook. Examples of this are:

a)All mechanics wearing helmets

b)The correct 90 seconds' warm-up and 30-second countdown are allowed.

c)Competitors using the circle for unauthorised practice.

~~Transgressions~~ **Infringements** should be brought to the attention of the Circle Marshall for him to rectify.

4.C.1.3. Judges should allocate the specific tasks of warnings operation, microphone use **and** note taking prior to commencement of the contest. They should also practice working together ~~either~~ by observing the official practice flights ~~or preferably~~ **and** by viewing videos from recent ~~previous~~ championships. It is recommended that a video **camera system** is situated in the judges' tower; this should not be used by the judges before decisions are made nor will it be made available to teams before the end of the round but will be useful for:

- **Viewing by the panel of judges in cases where a review of their decision is necessary.**
- ~~Enabling the panel of judges to review a decision after the end of a particular race where they feel that complaints regarding that decision warrant it.~~
- Later discussions between the panel of judges to aid better co ordination**.**
- Viewing by the FAI Jury in the event of a protest**.**
- Viewing by teams with **the** panel of judges for a better all-round understanding**.**
- And finally to be available for the panel of judges to **use for training purposes** ~~train on prior to~~ **in preparation for** the next championships.

4.C.1.4. **It is recommended that the** ~~The~~ panel of judges ~~is recommended to~~ adopt the following

procedure during races:

a) Before the start each judge selects one team **that** he will watch at pit stops (preferably from a different nationality to **himself** ~~that judge~~). His specific responsibilities are to check for:- **s**tarting ~~GO~~ **before the start signal** , landing model **aircraft** outside circle, pilot foot out, handle significantly off ground, etc. His decision on ~~violations~~ **infringements** must be accepted by the other judges without discussion and the appropriate penalties given.

b) For the remainder of the race all three judges should observe all three ~~competitors~~ **pilots**. It is recommended that the judges adopt a running commentary of the race, as this will allow them to focus in on any infringements quickly.

c) Warnings/~~elimination~~ **disqualification** should be given when verbal agreement of two judges is obtained ~~and no verbal disagreement is heard from the third judge~~. **There is no time for discussion or translation as the judging has to be quick.**

d) The panel of judges should give clear decisions immediately regarding teams **that do not behave according to the rules or those teams** that have been obstructed**. I**t should not **delegate** ~~put~~ the responsibility for fair play on the FAI **J**ury who probably will not have observed the incident.

4.C.1.5. It is a central part of the rules that teams who feel they have not received a fair result **may** ~~can~~ make protests. The panel of judges should encourage teams to use this facility **when necessary**.

4.C.1.6. It is equally important for the judges to observe model **aircraft** positions in flight in case collisions occur.

4.C.1.7. ~~Warnings should be communicated to the teams quickly. However all warnings are effective at the lap or race time when the infringement occurs, not when verbally communicated to the team.~~ **Warnings should be communicated to the teams quickly as they are effective at the lap or race time when the infringement occurs.** Pilots need to recognise that as soon as a warning is given the judges will expect the pilot to respond. Failure to correct his flying style will risk another penalty being given as a repeat of that same offence. A good example of this is where a pilot receives a warning for failing to overtake within ~~3~~ **three** laps, but continues to attempt to complete the overtaking manoeuvre; this can result in a ~~2nd~~ **second** warning being given.

4.C.1.8. Warnings should be given using short standard phrases wherever possible, the more common ones are shown below thus “ “ under **S**ection **4.C.**2. Verbal communication from the judges should be kept to a minimum to prevent pilot distraction. Teams should be called by their flying colour and not by name.

4.C.2. **PHRASES USED BY THE JUDGES.**

4.C.2.1. **“WHIPPING”** is the application of physical force to increase the speed of the model **aircraft**. This occurs when the model **aircraft** is behind the line perpendicular to the pilot’s body (4.3.7.f). See also figs.1 and 2 at the end of the **G**uide. This is a function of the position of the pilot’s handle (H) relative to the centre of the circle (or centre of rotation CR.) and the model **aircraft** (M). The CR. can be determined, as illustrated in fig.2, by observing the rotation of the pilot’s handle and taking the midpoint of the maximum left and right movement of the handle.

4.C.2.2. **“BLOCKING”** is defined as obstructing another pilot either by body position or arm

position preventing the other pilot from taking his correct piloting location, thus slowing down his model **aircraft**. See fig 1d ~~and~~ ~~fig.~~4. Blocking is caused by the position and attitude of the body of the blocking pilot. With the body between lines 3 and 4 blocking can be caused. Rotation of the shoulders can cause more (a) or less (c) blocking action. Warnings should be given as soon as the overtaking pilot is impeded. Delays can lead to more serious and potentially dangerous situations occurring. Pilots being blocked by a slower opponent will frequently attempt to clear the situation by crossing lines. Where the blocking pilot has received a warning for this, but remains in the same position, then the overtaking pilot should not be penalised for line crossing for a short ~~duration~~ **period** whilst he clears the obstruction. Excessive blocking to directly prevent being overtaken is a~~n elimination~~ **disqualification** offence (4.3.9.n). Should and fig 4 be deleted?

4.C.2.3. **"PIVOTING"** is defined as keeping the handle in the centre of the circle with the pilot's body behind the centre.

4.C.2.4. **"TAKING THE CENTRE**" is defined as the pilot physically keeping his body in the centre and forcing the other pilots to walk around him. This can also occur when the pilot does not return to walking forward after the completion of his overtaking manoeuvre.

4.C.2.5. **"LINE SHORTENING"** occurs when either. Jo corrected the sub-para numbering.

a) The centre of rotation is in front of the pilot's handle or

b) The handle is pulled back from its correct position in front of the body.

4.C.2.6. **"ILLEGAL HANDLE POSITION"** occurs when the pilot does not fly in accordance with rule 4.3.7.f. this is frequently a precursor to a blocking situation.

4.C.2.7. **“PILOT INTERFERENCE”** is defined as:

- Holding
- Or pulling another pilot such that ~~his~~ **the pilot’s** normal activities are impeded,
- Or preventing another pilot from moving around correctly by ~~occupying the “free space” by the raising of his arm/elbow~~ **raising his arm/elbow to occupy the “free space”**.

Warnings should not be given when a pilot only touches another pilot to help his orientation.

4.C.2.8. **“PILOTS GO TO THE CENTRE” is necessary because** ~~due to the risk of~~ the ~~pilot’s~~ pilots’ rotational centre **can move ~~him~~ them** ~~moving~~ towards the edge of the 3.0m circle potentially causing problems of lack of space for landing/taking off pilots**.** ~~this advice may be given.~~ Warnings will not be given directly to pilots failing to respond to this advice. However, penalties will be given for other infringements that may result from pilots failing to respond to the advice.

4.C.2.9. **“STOP RACING – SAFETY”** when this command is given by the judges **all the teams** ~~it~~ must ~~be~~ immediately respond~~ed~~ to **it** ~~by all the teams~~ and the race ~~is~~ **will be** declared null and void (after the application of any appropriate penalties). This command will only be given when**, in the** ~~it is~~ the view of the **panel of** ~~F2C~~ judges that there is an immediate**,** significant safety risk. ~~The F2C judges will be fully supported in this course of action by the FAI Jury.~~ **It is expected that the FAI Jury would support this course of action.**

4.C.2.10. **“SERIOUS BREACH – DISQUALIFIED”** will be used by the judges where a team is guilty of multiple simultaneous rule infringements that need immediate action to prevent a more serious flying situation developing. See section **4.C.**3.3 below for further clarification.

4.C.3. PILOT FLYING STYLE

4.C.3.1.The judges should be looking for correct positioning of each pilot in the circle. This can be determined by:

The position of a pilot’s left shoulder. When walking forward and around the pilot’s left shoulder should be close to the centre pivot point.

Spacing between the pilots. When a pilot is attempting to overtake there should be no space between him and the pilot being overtaken. If there is space then the overtaking pilot is behind centre and trying to shorten the radius of the model aircraft’s path.

The position of a pilot’s right foot. When walking forward and around the pilot’s right foot should be placed in line with the position of the model aircraft. If the pilot’s right foot is placed to the outside of the circle being walked and behind the position of the model aircraft then the pilot is behind centre.

4.C.3.2. The judges should be trying to identify the cause of bad pilot positioning. This can be determined by:

Spacing between the pilots. When a faster pilot approaches an overtake and there is no space between this pilot and the pilot in front and the overtaking pilot’s handle cannot be positioned

any further forward (Fig 4.3.2.1) and the handle then falls behind the position of their model aircraft, then the pilot in front is blocking. This could be because the front pilot:

- **Has his left arm positioned between ~~themselves~~ himself and the overtaking pilot.**
- **Has his left shoulder positioned between ~~themselves~~ himself and the overtaking pilot.**
- **Is positioned behind centre because of the incorrect position of his right foot ~~position~~.**

When a blocking situation occurs and the third pilot is also a faster pilot then another layer is introduced into the problem (Fig 4.3.2.2). If there are no spaces between the pilots behind then it is the front pilot who is causing the disruption and should be warned for behind centre or blocking.

A warning should be given to the front pilot as soon as the overtaking pilot's handle falls behind the position of the model aircraft and there is no space between the pilots. If the situation does not change then subsequent warnings should be given until the front pilot responds or is disqualified. To allow an overtaking manoeuvre to take place in this situation will result in a dangerous situation.

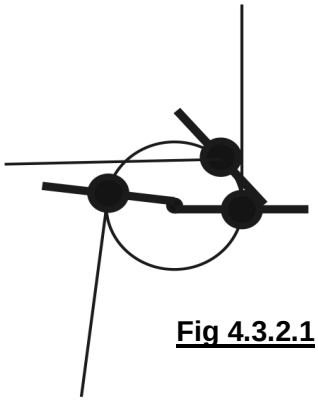


Fig 4.3.2.1

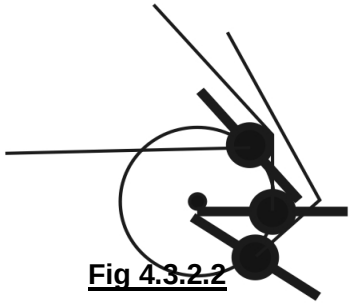


Fig 4.3.2.2

4.C.3. **COMPETITORS ACTIVITIES DURING A RACE.**

4.C.3.1. ~~Proper pilot activity is to attempt to walk a circle at the centre of the 3m centre circle so as to keep the controlling handle moving forward in the same direction as the model, that circle should be as small as possible.~~

4.C.3.2. The pilot should keep his controlling hand on the centreline of his body with his hand in close proximity to his chest (approx. 10cms). The handle position is restricted to any place between the middle of his chest and top of forehead (rule 4.3.7.f). He is allowed to move his handle away from the body (forward), but still on the centreline in order to better control the model **aircraft** during overtaking for a maximum of ~~3~~ **three** laps. During overtaking the pilot~~'s~~ **may move his** head ~~may be removed~~ from the centreline for better vision of his model **aircraft**. During takeoff and landing rule 4.3.7.f does not apply (**for** up to 2 laps) however this relaxation does not permit a pilot to whip.

~~4.C.3.3. Rule 4.3.9.i states that teams shall be warned for any flagrant breach of the rules. Actions by either team member leading to a dangerous situation during a race shall be considered a~~

flagrant breach. The following specific examples are given: **Many actions by a team may cause immediate danger to another competitor or his model aircraft and can result in disqualification under the rules of 4.3.9. There are other actions which, while not explicitly stated, can be considered "A flagrant breach of the rules." as defined in 4.3.9. Examples include:**

a)Pilot flies too high immediately on takeoff.

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

c)Pilot does not immediately join other pilots in the centre.

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

e)Pilot does not promptly bring his model **aircraft** below 2m after engine has cut.

f)Pilot, when **during landing, runs** running model **aircraft** on ground for more than 1 segment during landing, does not attempt to avoid (hop over) the lines of other model **aircraft** that are refuelling and restarting.

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

h)Mechanic releases his model **aircraft** with physical effort. (see **take-off Sporting Code Section 4 ABR paragraph 1.4.12**) Don't quote this referance as it will eliminate most CL events!!!

~~ABR 1.4.12 Take-off~~

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

~~i)Mechanic has the model **aircraft** or its lines significantly off the ground during repair, adjustment, change of segment, catch**ing**, refuelling or restarting.~~ ~~How can the pitman change segment without lifting the model and lines off of the ground?~~

~~j)Mechanic releases the model **aircraft** without properly checking that no other model **aircraft** is overflying his pit position (especially landing) causing it **the other model aircraft** to bypass its mechanic in order to avoid a collision **(**re-flight for other team**)**. Note**:** if a collision occurs **then** the team releasing its model **aircraft** is eliminated **disqualified**.~~

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

~~* Rule 4.3.9 states "In the event of any serious breach of the rules, the **F2C panel of** judges may eliminate **disqualify** the team from the race"**. T**his should be restricted to:~~

- ~~Unsafe **actions.**~~
- ~~Or **U**nsporting actions**.**~~
- ~~Or **The situation** where multiple infringements are taking place simultaneously and the judges do not have sufficient time to award **give** each warning separately. In these cases it is important that the individual offences **committed** are communicated to the team at the end of the race.~~
- ~~In addition **there are** to those **the offences** specifically listed under the elimination's part of rule 4.3.9.**i) to y)**.~~ ~~This all looks a bit contradictory, as 4.3.9 now states "A flagrant breach of the rules." is now a DQ. So any breach of a) to j) above is a DQ, yet this is further qualified at *~~

4.C.3.3 **Rule 4.3.9 Warnings-Disqualifications.**

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

Rule 4.3.9 also states “In the event of any serious breach of the rules, the F2C panel of judges may disqualify the team from the race”. This should be restricted to:

- Unsafe actions.
- Unsporting actions.

There are actions which, while not explicitly stated, may be considered unsafe or unsporting actions. Examples include:

k)Pilot flies too high immediately after takeoff.

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

m)Pilot does not immediately join other pilots in the centre.

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

o)Pilot does not promptly bring his model aircraft below 2m after engine has cut.

p)During landing, the pilot runs model aircraft on the ground for more than 1 segment, or does not attempt to avoid (hop over) the lines of other model aircraft that are fuelling and starting.

q)Pilot flies the model aircraft at an effectively dangerous radius when passing over another mechanic,(his handle should remain inside the 3m. centre circle until the last segment).

r)Mechanic releases his model aircraft with physical effort.

s)Mechanic has the model aircraft or its lines significantly off the ground during repair, adjustment, change of segment, catching, refuelling or restarting. How can the pitman change segment without lifting the model and lines off of the ground?

t)Mechanic releases the model aircraft without properly checking that no other model aircraft is overflying his pit position (especially landing) causing the other model aircraft to bypass its mechanic in order to avoid a collision (re-flight for other team). Note: if a collision occurs then the team releasing its model aircraft is disqualified.

u)In the situation where multiple infringements take place simultaneously, and the judges do not have sufficient time to give each warning separately, the team will be disqualified.

v)In addition there are the offences specifically listed under 4.3.9.i) to y.

In the enent of k) then it is important for the individual offences committed are communicated to the team at the end of the race.

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

4.C.3.4. When a ~~competitor~~ **pilot** has been ~~eliminated~~ **disqualified** he should land his model **aircraft** immediately (within 10 laps). If he does not attempt to land and continues to prevent **the** other ~~competitors~~ **pilots from racing** ~~continuing~~ without interference, the ~~F2C~~ panel of judges will inform the ~~FAI jury~~ **Event Director** with a **recommendation that the team should be disqualified** ~~view to his disqualification~~ from the whole contest. Teams that are

~~eliminated~~ **disqualified** in a race have the right of protest to the FAI jury. If the protest is upheld they will be granted a re-flight. Their original race time will not be counted; therefore, there is no advantage to be gained by flying on after ~~elimination~~ **disqalification**.

4.C.3.5. Rule 4.3.7.*n* states that during the start and refuelling pitstops the pilot must keep his handle and lines as close to the ground as defined by the F2C judges. Judges should normally interpret this as meaning below knee height with the pilot in a fully crouched position with either hand in contact with the ground as this will ensure that:-

a) The lines are sufficiently above the surface to prevent them catching on any obstructions at ground level.

~~b)~~ The lines are sufficiently low enough to prevent them catching another model **aircraft that is** making a normal landing **and to permit safe overflying.** ~~to safely overfly them.~~

~~However~~ **T**eams must remember their responsibility not to prevent other competitors from flying, landing and pitting normally.

A normal landing is generally defined as having sufficient airspeed to clear the preceding pit segments by 0.5metres in height and with no part of the model **aircraft** passing ~~vertically~~ above the pitting area as this would prevent the mechanic from continuing with his normal pitting activity. See fig.5. There are legitimate occasions when the landing/taking off model **aircraft** may not be able to maintain this 0.5metre separation, therefore, it would be a prudent course of action for the static pilot to place his handle and lines in direct contact with the ground on these occasions to prevent ~~an~~ **the offence of** obstruction taking place.

4.C.3.6. Rule 4.3.7.o states that the race is not complete until either 10 minutes **(15 minutes for a final race)** have elapsed or all competitors have completed their race. Therefore it is possible for teams to be penalised after they have completed their individual race provided that other competitors have not also finished **the race**. The judges must apply the appropriate penalty, either warnings or disqualification, as defined in section 4.3.9. If this forms ~~a 3~~rd **the final** warnable offence for a team then they will be automatically disqualified.

Note: - where the judges consider that the failure to control a model **aircraft**, after finishing a race, allowing it to damage another **team's** equipment was a deliberate act then the judges could recommend to the ~~FAI Jury~~ **Contest Director** that the competitor be disqualified from the entire contest for gross unsporting behaviour.

4.C.4. **STANDARDS OF JUDGING.**

4.C.4.1. A contest consists of 3 distinct sections: **qualifying** heats, semi-finals, final.

Each section poses its own unique problems for the judges and competitors.

The panel of judges shall observe the official practice and carry out a briefing for all competitors before the first race starts and also before the final.

The first couple of heats will have a significant effect upon the standard of the rest of the contest. It is important that both the competitors and judges are aware of this. The judges have to maintain an even standard throughout all the rounds of heats. It will be **helpful** ~~aided in this~~ if the competitors in the early heats recognise this fact**.** ~~!~~ Judges**'** decisions are made in response to actions taking place in the flying circle. It is very important that the panel of judges has a unified understanding between themselves before the first heat.

Semi-finals are between the top placed contestants with very little difference in airspeed and ability between them. The judges should aim to keep a similar standard ~~to~~ **as in** the heats**.**

However, this may not always be possible ~~(nor is it essential)~~ as the emphasis is likely to be different with teams having less speed differential, **where** overtaking is more difficult, tension is higher **and** blocking situations are more frequent. Again the prime responsibility of the panel of judges is to maintain an even standard across all the semi-final flights.

The final is a unique race between the three best teams at the contest. It is double the distance but teams are ~~still~~ only allowed **three** warnings before ~~elimination~~ **disqualification**~~!~~ It cannot be judged in exactly the same manner as the heats. The judges must issue warnings where safety is at risk, teams are gaining an unfair advantage or are obstructing other teams. But it should be more lenient on purely technical infringements that will have no direct affect on the result of the final. Where teams have already received ~~two~~ **three** warnings and are ~~equally~~ guilty of a ~~third~~ **fourth** warnable offence then the judges are recommended to allow the race to continue and be decided by the stopwatch. It is preferable that the results are determined by the competitors and not by a dictatorial panel of judges.

4.C.4.2. All competitors should recognise that variations on warnings will occur during the course of the contest and that the judges will miss/not observe some incidents. The panel of judges operates from a fixed location and must take this in to account**. I**t should not give warnings for technical infringements where by virtue of position it cannot treat all teams equally ~~except where~~ **unless** there is a significant safety risk or gross misconduct.

4.C.4.3. The rules state that models **aircraft must not** ~~cannot~~ fly for more than 2 **consecutive** laps without the engine running. When this occurs close to the end of a race it is important that the panel of judges is given a clear signal from the timekeepers at the 98-lap **or 198-lap** stage in all races where the judges cannot directly observe the lap counting device**s**.

4.C.5. **GENERAL POINTS.**

4.C.5.1. The draws for flying order should be made by the F2C ~~event~~ **contest** director in the presence of the **panel of** judges as early as possible so that competitors are given the maximum time to prepare. ~~The 2nd and 3rd round of heats should be drawn immediately after completion of the preceding round. The draw for the three qualifying rounds can be made at the same time.~~ For the semi-finals both rounds are drawn at the same time using the following matrix.

4.C.5.2. Semi-final draws. If 3 competitors of one nation have qualified they are placed diagonally across the matrix (A); other multiple nations are placed in the matrix randomly across the % axis (B)

A B F ..... The 1st round is selected horizontally

B A D ..... The 2nd round is selected vertically.

C E A ..... In each case a random draw is made to determine segment choice.

4.C.5.3. All eliminating races with only 2 teams (for example if a team withdraws) will be put at the end of **the** round in order to allow a 3rd team which is granted a re-flight to enter the race. ~~If there are no teams, with granted re-flights, then the race shall be filled with volunteer team(s).~~ If necessary, a new draw for pitting segments will be made under the responsibility of the ~~F2C~~ **panel of** judges.

4.C.5.4. In the case of re-~~runs~~**flights** there will be a new draw for pitting segments (unless it is a complete re-flight of the same 3 teams).

4.C.5.5. ~~Teams are not permitted to change their selected pitting segment after the start of the warm~~

~~up period.~~

4.C.5.6. Rule 4.3.6.c states that the judges will call for volunteer teams to fill up (to make it a 3 up race) ~~an eliminating~~ **a qualifying** race whenever there is a single contestant remaining for a re-flight. Competitors having an obvious interest in the semi-final stage or team classification should not be accepted as volunteers wherever possible. At a World or Continental Championships the volunteering teams must be of different nationalities **from each other and** also from the single contestant.

4.C.5.7. ~~Rule 4.3.10.c relating to the position of standby teams not being allowed to claim an attempt is clarified as follows:~~

In rule 4.3.10.b) it is stated that volunteer teams have no right to an attempt. This means that:

- The volunteer team has no right to claim an attempt under rules 4.3.8.a and 4.3.8.c.

- Where the volunteer team is not responsible for the termination of a race it will remain eligible for any official re-flight of that race.

~~The standby team has no right to claim an attempt under rule 4.3.8.a and 4.3.8.c.~~

~~Where the standby team is not responsible for the termination of a race they will remain eligible for any official re-flight of that race.~~

4.C.5.8. The ~~F2C~~ **panel of** judges should take an interest in the processing of the competitors model **aircraft** as part of ~~their~~ **its** overall responsibility to ensure a fair and even standard for all competitors.

4.C.5.9. Rule 4.3.4.m states that "the tank …. must be accessible and capable of being measured accurately". As these units become ever more complex and unique the **panel of j**udges **supports the following statements:** ~~will support the organisers in carrying out this activity in the following manner:~~

- It is the competitor's responsibility to supply any specialist equipment other than **the** normal flexible fuel tubing that is required **to** link~~ing~~ the measuring **equipment** with the competitor**'**s **model aircraft fuel** system.
- Organisers are only ~~responsible~~ **equired to make two** ~~for making 2~~ correctly executed attempts to measure the capacity of the system at the officially designated processing time.
- If the system cannot be verified **by two** ~~within 2~~ attempts then the competitor will be allowed to return after the end of the official processing time to complete the verification of ~~his~~ **the** system, with ~~an allowance of 2 an~~ **a further two** attempts.

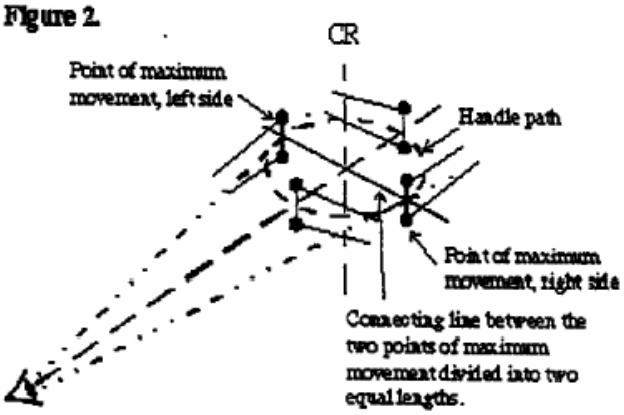
4.C.5.10. **R**ule 4.3.9.**l)**~~The alteration to A rule in 4.3.9 4.3.9.l approved at the 2001 CIAM plenary meeting~~ states that "A team shall be ~~eliminated~~ **disqualified** from a race if the mechanic … or steps into the flight circle with either foot or reaches further than 0.5 metres into the flight circle". This ~~change~~ rule was introduced to ensure that mechanics remain in a safe location when retrieving their model **aircraft**. Retrieving a model **aircraft** in this context should generally be taken as recovering the model **aircraft** from an area outside a pitting segment. The penalty of ~~elimination~~ **disqualification** should not be applied to mechanics who may

have one foot slightly inside the flight circle or reach in to catch the model **aircraft** slightly over the 0.5metre stated limit. The reasoning behind this interpretation is that during a normal pitting activity mechanics are balanced on both feet and facing in the direction of other approaching model **aircraft. T**hey will, therefore, be easily able to move clear of any other approaching model **aircraft**. (See also **4.C.3.3.g** ~~above~~, which makes it the landing/taking off pilot's responsibility not to fly his model **aircraft** at an effectively dangerous radius.).

When a mechanic is retrieving his model **aircraft** from any area outside a normal pitstop, he is likely to be under pressure to do it quickly and may well have his back towards other model **aircraft. I**t is in these circumstances that he is at risk and the ~~elimination~~ **disqualification** penalty should be applied.

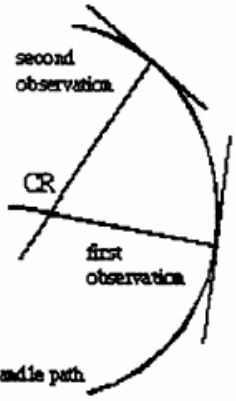
Note also that the penalty should be applied where a mechanic carries out a non-normal pitstop such that he either excessively steps inside the flight circle or reaches so far inside that the **panel of** judges determine that he has caused a significant risk to safety.

Figure 2.



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

Figure 3.



These are very poor drawings and the ones in the 2008 edition are of much better quality and will be used for future editions.

- ANNEX 4E -
CONTROL LINE ORGANISERS' GUIDE

FIRST PART: PRE-CONTEST ARRANGEMENTS

3. Time Schedule – Section 3.1 will be replaced in total with a table showing the typical schedule for a Continental or World Championships.
3.1. A common time schedule for control line W/Ch/**ECh** is as follows:
1st day: ..... Arrival
2nd day: ..... Processing, **Official training**
3rd day: ..... Inauguration, 1st round speed, aerobatics, team racing This should be changed to suit the extra day needed for F2B & Chris says that there are three rounds of TR plus the day of semis/finals - Jo
4th day: ..... 2nd round aerobatics, team racing; **Training day for speed**
5th day: ..... 2nd round speed, 3rd and 4th rounds aerobatics, semi-finals and final team racing, prize giving banquet
6th day: ..... Departure
F2C official training will take place prior to each round.

6.2. Layout
6.2.1. The area should preferably contain three hard circles and, if combat is included: one grass circle. The circles shall be horizontal. The distances between the circles must permit safe ~~passing~~ **passage of pedestrians** while the model **aircraft** are flying.

See the lay-out sketch in Appendix 1.

The circles should not be too widely spread as this will cause communication problems for the teams and the officials.

6.3. Depots
6.3.1. Sufficient area for depots must be provided. The depots should be placed within the contest area and they can be of open air, tent or indoor type. They should preferably be equipped with a sun - or rain –**shade**.

6.3.2. Avoid putting the depots so close to the tracks that motor testing interferes with the starting procedures.

6.3.3. The depots should be organised in such a way that spectators cannot obtain access to them. They should be easily entered by the competitors.

6.3.4. The depots should preferably be equipped with an area (4 m x 24 m per nation) where model **aircraft** with lines and handles assembled can be put. This area can be marked by cloth bands on short poles.

6.3.5. Tables and chairs in each depot are always appreciated.

6.4. Site
6.4.1. The contest site should be fenced off so spectators can be outside it. Places for spectators should thus be placed outside the limits of the area although as close to it as possible.

6.4.2. The different hard circles should be made of tarmac, asphalt or similar material. The surface shall be smooth without rough joints and free from grit and dust. It is recommended to have the tracks leaning slightly outwards so water is not collected on them.

6.4.3. The best track is the one where the complete circle area is made of the same material. If there is grass or gravel between the centre circle and starting and landing circles there is a risk that lines are caught thus causing accidents.

6.4.4. If the flying surface is shaped like a ring, then enough space must be left both inside and outside the 15,92 m circle to permit normal foot work to the pilot for safe take-off and landing without the model **aircraft** falling outside the smooth area.

6.4.5. The central part of the flying circle must be smooth, but not slippery, especially in case of rainy weather (rough tarmac, rough concrete or coating with special anti-slip paints is recommended). Its radius must be sufficient **to permit** ~~**during**~~ take-offs and landings.

6.5. Tracks

6.5.3. Team Racing

6.5.3.1.1. The centre circle, safety circle and flight circles shall be marked (painted) on the ground in a colour having a high contrast to the ground, according to Sporting Code Volume F2 para. 4.3.2. The circle lines shall be 10 cm wide. The safety circle shall be a broken line consisting of dashes 25cm long with 25cm gaps, and a width of 2.5cm. The radii are:

Inner circle, 2.0-2.1 m
Centre circle , 3,0 - 3,1 m
Flight circle, 19,5 - 19,6 m
Safety circle, 19.075-19.1 m

The centre of the centre circle shall be marked with a spot of 0,3 m diameter in the same colour as the circles. See Appendix II.

6.5.3.2. The **T**eam **R**ace circle must be surrounded by a fence 2,5 m high according to Sporting Code Volume ABR **B.9.1.** It should be placed as close to the track as possible but the radius to the circle centre shall not be shorter than 22 m.

6.5.3.3. In case of a permanent installation, checks must be made for any rust or corrosion (especially near the sea) reducing its strength.

6.5.3.4. At three evenly spread places there shall be T-marks showing the flight heights of 2 m, 3 m and 6 m.

6.5.3.5. The fence shall have **separate entrance and exit areas** ~~one entrance and one exit preferably diametrically opposite to each other~~ **to** allow a smooth flow of entrants at the end and beginning of each race.

6.5.3.6. Just outside the entrance there shall be a line control square at least 4 m x 18 m, fenced off with a low fence or rope. In this square, the line length 15,92 m shall be marked by two marks firmly fixed to the ground. The marks should preferably be of the edge type, and the edges not wider than 2 mm.

6.5.3.7. In the square there should be signs showing where to keep the handles and where to keep the

models **aircraft**.
As motor running is allowed in the square while a race is running, the model **aircraft** should be kept away from the **Panel of Judges**'s place.

6.5.3.8. The **Panel of Judges** is preferably placed on a raised floor about 2 m above the ground just outside the safety fence. There shall be a 6 m high tower for one official checking high flying model **aircraft**. The **Panel of Judges** must be placed close together having the sun behind their backs.

6.5.3.9. At the track there shall also be three lap-counting displays, ~~a~~ big enough to be **clearly** seen ~~(clearly)~~ from the track, and three sets of warning indicators. **A fourth set of lights in the colours of the three teams to display the fourth warning (disqualification) shall also be on this display.**

8. Equipment
8.1 Measuring Equipment Specification:
The contest organisers should procure the following minimum equipment for use at the Championships:
8.1.1 Line Measuring
1. A good quality electronic digital reading micrometer, constructed to DIN 863 or equivalent standard, fitted with a friction thimble, with measuring graduations of 0.001 mm and with an accuracy of +- 0.001 mm. The instrument should have a recent calibration certificate. (This will resolve any anticipated problems with the thimble torque.)

2. Three lever operated thickness gauges with measuring graduations of 0.01 mm for Speed, Team Race and Combat.

3. Pin gauges of 0.3 mm for Team Race and 0.4 mm diameter for Speed and Combat to DIN 2269 standard to calibrate the micrometer and thickness gauge.

8.2 Measuring Equipment Method of Use
8.2.1 Methodology for Line Measuring Equipment
The pin gauges should be used to set a zero on the thickness gauge, which is light, easy to use and requires minimum skill to operate. The calibrated digital micrometer would only be used in the case of a dispute where lines are at or near bottom limit. An electronic digital micrometer is specified because it is much easier to use and clearer to read. It must be fitted with a friction thimble and *not a ratchet thimble*.

8.2.2.2 Team Race Engines
Team Race engines present very different problems for measurement because of the tight fit of the piston in the liner. The relatively high interference fit between the piston and the liner does not however mean that it is invalid to use the liner diameter at TDC as the measuring point for bore diameter.

On Team Race engines, which have integral heads, the bore diameter must be measured from the bottom of the liner. The diameter should be measured at the point at which the piston interferes with the bore. If this cannot be established, then the bore should be measured 2,5 mm below the height of the piston crown at TDC. This point should be below any carbon band which would reduce the apparent bore of the cylinder. Alternatively, as is current practice, the piston diameter can be measured. The piston should **be** measured at its maximum diameter point.

Wherever possible the stroke on Team Race engines should be measured in the same way as for Speed

and Combat. Where this is not possible because of the use of integral heads or extremely tight fitted piston liner assemblies, the entrant must provide tooling to allow the piston connecting rod & shaft assembly to be rotated through 360 degrees. A dummy cylinder would be ideal.

8.5. Team Racing
6 stopwatches registering at least 1/100 sec.
6 manually operated lap counters
1 spring balance for at least 15 kgf pull
1 micrometer 1/100 mm resolution
1 depth micrometer 1/100 mm resolution
1 internal diameter micrometer with its calibrating tool (0-15 mm)
Graduated glass burette, capacity 10 cm3, accuracy 1/20 cm3
1 metal graduated rule 1 m long - 1 mm resolution
1 metal graduated rule 300 mm long - 1 mm resolution
1 balance 1 kg capacity □.5 g accuracy
1 measuring tape 20 m
Jigs for checking fuselage dimensions, 100 mm and 50 mm
25 mm jig for wheel dimension
1 starting pistol, whistle, etc.
1 flag
3 remote lap indicators, showing each lap from 0 to 100. They should be painted in different colours so they can easily be identified by the teams and the spectators.
3 sets of warning indicators showing green, amber and red light. They should be controlled by the **Panel of Judges**
and it must be possible to light the different indicators independently of the others (Sporting Code Volume F2 Section 4C para. 4.3.13.b.)
2 sets of coloured pieces of cloth for each teams. There should be two pieces for each team, and they should be of different colour for the three teams participating in a heat. The pieces of cloth should be equipped with bands so they easily could be fastened on the entrants.
17 chairs for the timekeepers, lap counters and **Panel of Judges** ~~members~~.
Sun- or rainshades if needed
1 table for the **Panel of Judges**
Cleaning equipment so the oil and fuel could quickly be removed from the starting positions.

9.5. Team Racing
3 Judges (Sporting Code Volume F2 Section 4C para. 4.3.12.a)
6 timekeepers (Sporting Code Volume F2 Section 4C para. 4.3.12.b)
6 lap counters (Sporting Code Volume F2 Section 4C para. 4.3.12.c)
1 circle marshal (Sporting Code Volume F2 Section 4C para. 4.3.7.b)
2 officials for line tests
1 official in charge of line control square, and motor running prior to heats
1 official looking for high flying model **aircraft**
1 official looking at the video

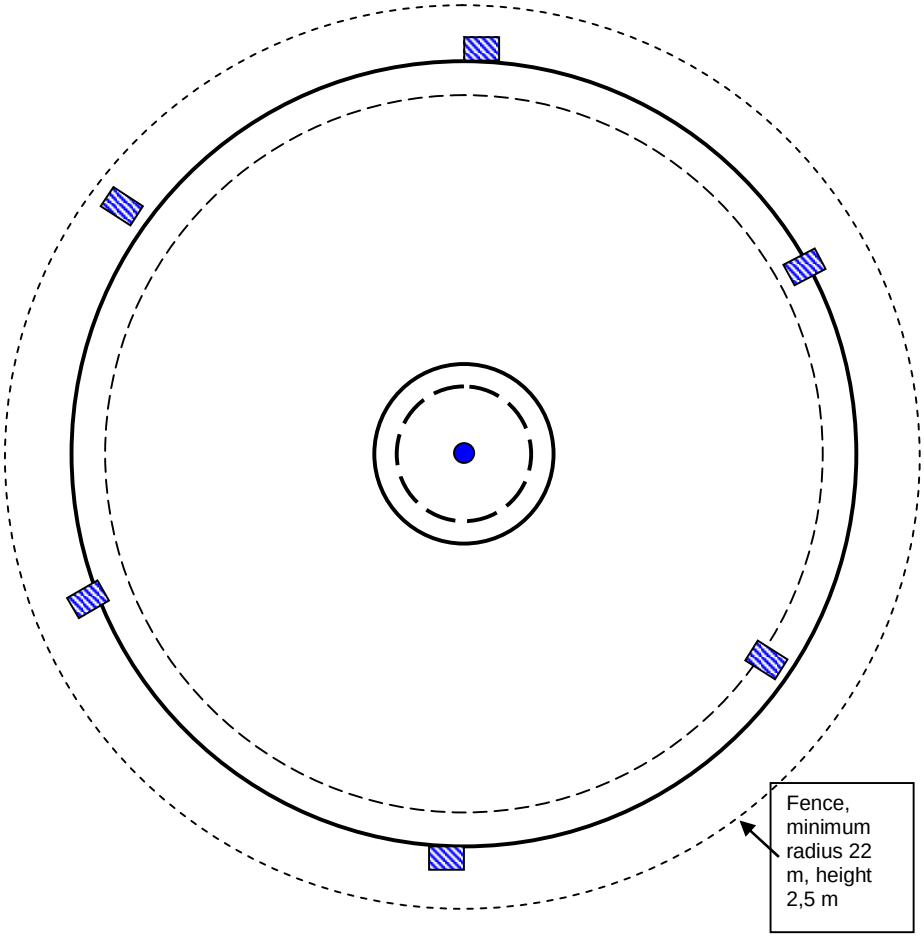
14. **Fuel - World Championships**: The organisers shall provide, ~~**for**~~ **at** cost, up to 20 litres of fuel per competitor for practice flying and, when a FAI standard fuel is not specified, for use in competitions. The fuel must be requested in advance (at the time of entry). Unless a standard fuel is specified for use in an event, the competitor shall specify the constituents to be purchased on his behalf. Fuel supplied

by the organisers shall be mixed from top quality material. Methanol shall be at least commercial grade without additives. Castor oil, when used, shall be at least equivalent in quality to Castrol M.

~~**15.** F2C - The team manager may never become physically involved during the race.~~

~~**16.** F2C - During the landing process, the landing model aircraft has the priority.~~

APPENDIX II
Team-racing circle dimensions



The inner circle, centre circle, safety circle and flight circles shall be marked (painted) on the ground in a colour having a high contrast to the ground, according to Sporting Code Volume F2 para. 4.3.2. The circle lines shall be 10 cm wide. The safety circle shall be a broken line consisting of dashes 25cm long with 25cm gaps, and a width of 2.5cm. The radii are:

Inner circle, 2.0-2.1 m
Centre circle , 3,0 - 3,1 m
Safety circle, 19.075-19.1 m
Flight circle, 19,5 - 19,6 m

The middle of the centre circle shall be marked with a spot of 0,3 m diameter in the same colour as the circles.

Each pitting area, 1 metre long, shall be marked on the ground at 60^{O} interval just outside of the flight circle in a different colour to the flight circle.

SECOND PART: CONTEST ARRANGEMENTS

9. Processing: The times for processing all nations' teams should be given to team managers (and all team members, if possible) on arrival at reception. Attention of organisers is drawn to Sporting Code

Section 4b, para. B.7.2. and B.7.3. The organisers must provide themselves with the necessary measuring apparatus, adequate to check the characteristics of the model ~~aeroplane~~ **aircraft** in question, and give the competitors opportunity to determine the characteristics of their model **aircraft** on the official measuring equipment before the contest.

Processing may take place during the practice day providing the published times for practice and processing allow no possibility for overlap.

The processing team must be familiar with the equipment they are using and should have a reasonable understanding of the model **aircraft** they are processing.

For F2C, if after two attempts to measure the fuel system, it still cannot be done accurately, the competitor must return at the end of processing for another attempt. The team must provide an adapter for filling their fuel system that shall have a 3 mm diameter nipple to attach to the organiser's measuring equipment.

The processing area should be restricted to processing officials, **Panel of Judges** ~~members~~, judges, and the team and team manager **of the team** whose model **aircraft** are undergoing processing.

10. Practice: In the interest of giving the competitor the opportunity of performing at his best, provision of practice circles is required ~~(Sporting Code Volume ABR Section 4C, para. 2.2.2.b).~~ One day prior to the start of the contest is usually set aside for practice (Sporting Code Volume ABR Section 4B, para. B.7.4.). National teams are allowed on all circles for a limited time in strict rotation.
If a practice circle or circles are not available at the site of the contest, every effort should be made to allow competitors the use of existing circles outside the times when they are required for competition flights.

FOURTH PART: SAFETY RULES FOR CONTROL LINE

2. Model Aircraft - At the processing and at the pull test, it should be checked that the model aircraft is not equipped with any of the following details:
- metal bladed propellers
- metal rimmed wheels
- any loose parts which can be jettisoned during flight or in any other way cause accidents

Safety Precautions - Immediately before each attempt to **make** an official flight the model aircraft, the lines and the control handle shall be pull-tested with a load ~~equal to :~~ **as specified in the individual sections of sporting code volume F2.**

~~- 30 times the weight of the model aircraft with a maximum of 140 N for F2C ;~~
Crash-proof safety helmets with a **fastened** chin strap should be worn by mechanics in F2C and by mechanics and pilots in F2D.

4. Conduct - During flights, the following is forbidden:
- to deliberately release the control handle while the model aircraft is moving (penalty: disqualification from the contest). It is allowed to hand over the handle to another pilot, or to change hands, in case of emergency ;
- jettisoning.

All safety rules in the Sporting Code, Section 4, volume F2 must be obeyed.

5. Flying Sites
Avoid power cables.

Avoid flying too close to inhabited area (noise reasons)

Avoid flying too close to public roads (traffic reasons)

The tracks for F2A and F2C should be equipped with a 2,5 m high fence according to Sporting Code Volume ABR Section **B.9.1.**

This fence should be placed as close to the track as possible but the radius to the track centre should not be less than 22 m. The fence should be strong enough to stop a flying model aircraft.

The F2B and F2D tracks should be equipped with a safety circle which is the limit of the dangerous area.

The safety circle should have a radius not shorter than 25 m in F2B and 22 m in F2D. The safety circle can preferably be marked with a rope fence.

The F2B track should also have its centre well marked on the ground.

Only the competitor and his helpers, and the officials concerned are allowed to stay inside the fences or safety circles.

Personnel who have fulfilled their mission must immediately leave the dangerous area.

End

Agenda Item 11.7 – F2D items h-s:

Items h) and i) were accepted as written in the Agenda.

Item j) was rejected.

Item k) was accepted as written below:

The models must be equipped with an engine shut-off device that activates if a fly-away occurs. The device must remain functional for the entire flight period and must be repaired or replaced before take off if it becomes non-functional during the match.

Item l) was accepted as written below:

Add at the end of paragraph b):

The strap should be as shown in the sketch i.e. it should be attached to the wrist with a loop and sliding knot so that if the handle is released it tighten itself securely around the wrist. The point of attachment at the handle is left to the discretion of the pilot.

Add at the end of paragraph c):

However the processing officials or judges can ask the competitor to change the lines if there is any doubt about the line quality, such as kinks, curls, stress or rubbing marks.

Add a new paragraph f):

Demonstration of the engine shut-off device may be required by the judges before each heat. The engine shut-off device must stop the engine within 3 seconds of activation. Additional demonstrations may be required by the judges after the heat.

Items m) and n) were rejected.

Item o) was accepted as written in teh agenda with changes to proposal for paragraph b as described here:

Add in paragraph b):

A cut must contain at least one part of the streamer. A cut that contains string alone will not count.

Items p) and q) were accepted as written in the Agenda.

Item r) was accepted with the following modifications:

Add in paragraph e):

While a competitor's model is not airborne and his opponent is flying or ready to fly, he leaves any parts of his model or lines in the center circle without an immediate attempt to clear them;

Add in paragraph n):

he releases the handle **and the safety strap separates from handle or wrist**, or **he**

removes the safety strap, for any reason, while the model aircraft is flying;

The proposal associated with paragraph r) from Russia was rejected.

The proposal pertaining to paragraph s) was modified as follows:

Add in paragraph s):

1)if the mechanic or pilot leaves the model (inboard wing tip) more than 0,5 metre outside the flying circle;

2) if the mechanics jump over the opponents model aircraft(s) and lines kept within the pitting area;

The proposal associated with paragraph y) was changed to read:

Add a new paragraph y):

In the event of a flyaway where the engine shut-off device does not activate.

Agenda Item 11.7 item t): Control Line World Cup Rules

The technical meeting requests that this item be referred back to the F2 subcommittee.

Agenda Item u) – Annex 4E Organisers Guide

Agenda Annex 7B was accepted as presented except for the time schedule which will be merged with the time schedule as presented in Agenda Item 11.7, item g). (Annex 7)

Agenda Item v) Electric Speed model aircraft

Annex 4J was accepted as presented with three modifications as shown below:

4.J.2 Characteristics of a Speed Model Aircraft

Maximum voltage of power supply 42 volts off load.
Minimum total projected area... 5.0dm$^{2.}$
Maximum loading..... 100g/dm2.
Maximum weight..... 600g.
The model aircraft must take off from the ground.
The model aircraft must be fitted with a wheeled undercarage for landing. Minimum wheel diamater 25mm.
The maximum flight time must not exceed 3 minutes from take-off.

4.J.3. Diameter of Control Lines

Only two-line control is allowed, minimum control line diameter is 0,40 mm with a tolerance of minus 0,011 mm. ~~Control wires shall be unplated carbon steel Piano / Music Wire.~~

The lines must be round in cross-section and may not have any liquid or coating material applied. Solvent may be used for cleaning purposes **only**.

In section 4.J.16:

(i) The recorded speed in km/h is to be taken from the **Electronic Official Speed (Eoff column for the Transitrace system)**.