Section 4 – Aeromodelling
Volume F2
Control Line Model Aircraft - Annexes

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RULE FREEZE FOR THIS VOLUME

With reference to paragraph A.10.2 of CIAM General Rules:

In all classes, the two-year rule for no changes to model aircraft/space model specifications, manoeuvre schedules and competition rules will be strictly enforced. For Championship classes, changes may be proposed in the year of the World Championship of each category.

For official classes without Championship status, the two-year cycle begins in the year that the Plenary Meeting approved the official status of the class. For official classes, changes may be proposed in the second year of the two-year cycle.

This means that in Volume F2:

a) changes can next be agreed at the Technical Meeting of 2026 for application from 1st January 2027.
b) provisional classes are not subject to this restriction.
c) the F2B manoeuvre diagrams continue to be in a separate document called “Volume F2 Control Line Annex 4J”.

The only exceptions allowed to the two-year rule freeze are genuine and urgent safety matters, indispensable rule clarifications and noise rulings.

Note: It is the aspiration of the 2018 F2 subcommittee to have a ten-year moratorium on changes to the technical specifications of F2C models and equipment. Changes will only be made for safety reasons.

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ANNEX A - CLASS F2 Speed - JUDGES' GUIDE

The speed classes F2A and F2G are, essentially, simple classes to administer with very few rules. However, it is important that there is continuity of interpretation from one Championship to another and it is for this reason that this Judges' Guide has been written.

A.1. Rule F2A.1.1. Definition of Speed Model Aircraft

Requires no clarification.

A.2. Rule F2A.1.2. Characteristics of Speed Model Aircraft

a) When measuring the surface area, allowance should be made for the geometrically projected shape where the wing and tail join the fuselage.
b) Model aircraft must be checked for the fitment of a shutoff.
c) The shutoff must be checked for mechanical function in the line check prior to each attempt.
d) To check shutoff function:
   i) Using a squash bottle, fuel must be shown to flow from the fuel tank to the engine.
   ii) The shutoff must then be activated and resistance to fuel flow from the fuel tank to the engine using a squash bottle must be felt.
e) The fuel bottle should be of approximately 100 cc capacity and must be fitted with a fuel filter.

A.3. Rule F2A.1.3. Fuel

a) It should be noted that the lubricant specified is castor oil only.
b) No additives are allowed so only first pressing castor oil may be used.
c) Proprietary brands such as Castrol M™ which may contain additives may not be used. This is essential to maintain standardisation of fuel supply throughout the world.
d) The fuel mix ratio should be measured by volume and mixed thoroughly.
e) The fuel mix should be tested for methanol/oil ratio by testing its specific gravity using a standard calibrated float.
f) The fuel mix must be verified by the FAI Jury.

A.4. Rule F2A.1.4. Diameter of control lines

a) This rule should cause no problem, but plated wire is not permitted under rule F2A.1.4. which states that "no coating material may be applied to the lines".
b) A micrometer, as detailed in G.8.3.1 of Annex 4F Control Line Organiser's Guide, must be supplied and used by the contest organisers to measure the control line wires.

A.5. Rule F2A.1.5. Length of Course

a) The measured distance covered by the model aircraft must be at least one kilometre.
b) The radius of the flight circle must be 17.69 m (9 laps = 1 km).

A.6. Rule F2A.1.6. Line test

a) The pull test must be applied to the handle grip NOT the horizontal cross bar.
b) The pull test on the wrist strap is to test the strength of the strap and its attachment to the handle. It is not to test the strength of the control system.

A.7. Control Handle and Pylon Fork

a) This rule states that "the horizontal cross bar must be in continuous contact with the pylon fork during the official flight".
b) This statement does not mean that the cross bar must be behind the fork and above the "V" piece as illustrated in the sketch.
c) The important factor is that the cross bar stays in contact with both fork prongs throughout the flight.
d) The cross bar may be above or below the "V" or one end of the cross bar may be in front of the fork.

e) Any position other than that illustrated in the sketch makes it more difficult for the pilot and he will therefore always strive to achieve that position.
f) The "V" is there only to assist the pilot achieve the preferred position. There is no speed advantage to be obtained from any other position. The pilot cannot see the pylon, and it could be disastrous for him to look to check the position.
g) It is recommended that the locking of the pylon height should be by a clamping mechanism which allows for unlimited adjustment and not by pre-set increments.

A.8. Rule F2A.1.8. Definition of attempt

a) The competitor has 3 (three) minutes from the starting signal to take-off and place his handle in the pylon.
b) The timing sequence will then take place. Thus, the timing of the official flight may start and finish more than the 3 (three) minutes after the time of the starting signal.

A.9. Number of attempts

Competitors may not take their second attempt without first returning to the line check area in order to comply with rules F2A.1.3. and F2A.1.6.

Draw of flying order

a) It is recommended that the draw should be arranged so that competitors fly at five-minute intervals.
b) The draw should be arranged so that competitors from one nation are not required to fly within fifteen minutes of each other.
c) After the draw has taken place, it should be split into three equal groups, A, B and C.
d) For round one, group A flies first, followed by group B and then group C.
e) For round two, group B flies first, followed by group C and then group A.
f) For round three, group C flies first, followed by group A and then group B.
g) For round four competitors will fly in the reverse order of position after round three, up to position four. The competitors in first, second and third places after round three then fly in sequential order, first, second, third.
h) There should be a ten-minute break at the end of each hour of flying.
i) Re-flights (second attempts) should take place at the end of each round.
j) Replacement attempts may take place at the end of the group in which the attempt was scheduled, or in the scheduled ten-minute break at the end of each hour of flying
k) Replacement attempts and second attempts shall be taken in the original draw order.

A.10. Rule F2A.1.10 Definition of an official flight

An audible signal should be made to the pilot at the end of the timed flight by one of the timekeepers.

A.11. Rule F2A.1.11.

Requires no clarification.

A.12. Rule F2A.1.12. Number of helpers

- Care must be taken to ensure that this rule is complied with.
- In addition to the two helpers, the team manager may enter the contest circle. When this is the case, he may not assist the pilot or helpers, but he is permitted to carry and hold any equipment which the pilot and helpers require to use.
- In the case of an incomplete team, only speed team members of other incomplete teams or supporters or competitors from other control line classes may be registered to act as helpers.
- They can help only one team.
- Except for incomplete teams, competitors may not act as helpers for competitors from other nations

A.13. Rule F2A.1.13. Start of Timing

a) The chief timekeeper should determine when the pilot has placed his handle in the pylon - NOT the judge who is observing the conduct of the pilot.
b) The chief timekeeper must call when the pilot has placed his handle in the pylon.
c) For manual timekeeping, he will call "two" when, after the pilot has placed his handle in the pylon, the model aircraft first passes the height marker. He will then call "one" as the model aircraft again passes the height marker.
d) The timekeepers start timing the next time the model aircraft passes the height marker.
e) The timekeepers should preferably be positioned one behind the other, not side by side.
f) When an electronic timing system is used, the chief timekeeper will initiate the primary timing device when he observes that the pilot has placed his handle in the pylon. As he does so he will call "in" and the backup timekeeper will immediately initiate the backup system.
g) The judge who is observing the pilot must call if the pilot removes the handle from the pylon.
h) The timekeepers and circle judges must use the official practice session to train in their individual and collective duties.

A.14. Rule F2A.1.14 Height of Flight

a) Two judges must be used for this task: one for each of the height markers.
b) They must be positioned at eye level to the respective height marks.
c) The height restriction applies only during the timed run.

A.15. Rule F2A.1.15 Cancellation of Flight

Requires no clarification.

A.16. Rule F2A.1.16. Number of Timekeepers and Judges

Requires no clarification.

A.17. Rule F2A.1.18. Classification

Requires no clarification.

A.18. Training/Practice

a) The official training/practice session should continue on the draw basis as currently used where each competitor is allocated a ten-minute slot.
b) The circle should not be available for practice during the round (allowing practice at, say, lunchtime can give unfair advantage to competitors drawn to fly after lunch).
c) Practice on free days and after the rounds should not be on a draw basis.
d) Speed competitors have learned to self-regulate circle use by each taking one flight in rotation. This system allows many more practice flights per hour than any draw-based practice session. All competitors then have a chance to make a test flight, go away and make adjustments, think about what is required and return for another test.

ANNEX B1 - CLASS F2B - JUDGES' GUIDE

Purpose

This Judges' Guide is an aid to judging and marking FAI class F2B contests. It should be used both for the training of potential F2B judges and for maintaining the proficiency of judges who are already judging at F2B contests. This Judges' Guide forms an integral part of the FAI Sporting Code Section IV Volume F2 applicable to class F2B.

B.1.1. Judges' Qualifications and Selection of Judges for Contests

The National Aero Club (NAC) of each country having F2B judges who join (or who wish to join) judging panels at international F2B contests should ensure that a defined standard of judging proficiency is reached and maintained by each of the judges for which it has responsibility. Each such NAC should therefore:

a) Provide translations into their own language of both the current FAI Sporting Code Volume F2 applicable to F2B (that is the whole sub- volume F2B) and of this complete Judges' Guide.
b) Arrange suitable means and procedures to ensure that each judge is fully trained. This means arranging training courses which include regular and repeated group training in both theoretical (classroom) and practical (flight) venues where every aspect of both the current Sporting Code and of this Judges' Guide may be examined and practised in detail.
c) Provide suitable means for officially recording each such training session attended by every judge within its national responsibility. Such official record should include dates, duration, and number of flights observed at such training sessions, and should also separately list details of all the national and international F2B contests at which each judge has been a member of the judging panel.
d) Establish selection criteria that clearly define the minimum periods of such training and of actually judging high-quality F2B flights at national level, before prospective judges are eligible to be nominated or invited to join judging panels at international F2B contests.

Providing all the above will ensure that the judging of all international F2B contests is carried out to the same basic standard. These measures will also enable the organisers of international contests to be sure that all judges invited or nominated to a judging panel do indeed meet the required standards of qualification and experience. The organisers of all World and Continental Championships should therefore submit a list of proposed judges' names, together with their NAC qualification details as at paragraph c) above, to their own NAC and to the F2 Subcommittee of the CIAM.

To ensure a continuous pool of suitably qualified international F2B judges it is also recommended that, with suitable modifications, each NAC apply the criteria and procedures at the above paragraphs a) through d) inclusive to the selection and training of F2B judges for contests at national level.

B.1.2. Sporting Code and F2B Manoeuvres Knowledge

The primary requirements for fair, accurate, and consistent judging are:

a) A clear understanding of all the applicable regulations and definitions within the complete Section IV of the FAI Sporting Code.
b) An in-depth and fully detailed knowledge of all the current F2B rules and manoeuvres descriptions.
c) A fully detailed knowledge of this complete Judges' Guide.

Self-study of all the above points is a must, as is regular detailed group training at both classroom and flight venues. Such training should cover the practical application of all the above points to the judging of high quality F2B contest flights. It is stressed here that individual "interpretation" of the intent and/or meaning of the F2B manoeuvre descriptions and rules is strongly discouraged - the purpose of this Judges' Guide and of the new rules is to eliminate any need for such "interpretation" by individuals.

B.1.3. Judging Focus

In order to get a complete picture of each manoeuvre, judges should focus their attention on four major aspects:

a) Shape
This is the form or outline of the entire manoeuvre, but shape also relates to the position of each of the figures making up a complete manoeuvre. In manoeuvres consisting of repeated multiple figures (for example, the three consecutive inside loops), an important criterion is that the shape of each individual loop figure is consistently the same for each repetition, and that consecutive manoeuvres should be performed with the second and subsequent manoeuvres all positioned in exactly the same place as the first (superimposed). All manoeuvres should be of the shape defined in the various manoeuvre rules - that is round loops should be round with no flat spots; square manoeuvres should have clearly defined corners connected by "straight line" flight paths (refer to paragraph F2B.2.15.1 of the F2B rules).

b) Size
Manoeuvre sizes are often defined in the manoeuvre descriptions by specifying line elevation angle (in degrees of arc above the normal 1.5 metres upright level flight height). Judges should watch for manoeuvres being flown with their tops above or below the specified 45-degrees, 42 degrees, and 90 degrees line elevation angles - and as a result of such errors, judges should therefore watch for complete figures which are either larger or smaller than specified in the respective rule. All such errors should be downgraded in the marks awarded by judges. The use of visible fixed terrain reference points at each site to help the judges "fix into memory" both the 1.5 metres normal upright and inverted level flight height, and 45-degrees lateral angle (1/8th lap) is recommended. Contest organisers are also encouraged to erect suitable markers at contest sites to assist judges, particularly at sites where suitable natural fixed features are missing. Judges should practice using the available terrain features and any erected markers at each contest site during the judges' calibration flight sessions held before the start of each particular contest (see also 4.B.15 below).

c) Intersections
The judging (and therefore the marking) of the intersections between the various elements of complex manoeuvres is also made easier if judges use fixed terrain reference marks and/or erected markers to "fix into memory" the visual position of the model when it passes an intersection point for the first time in a manoeuvre. Then, by comparing that "locked-in" point with the position of the model when it comes to the same intersection point at later stages of the same manoeuvre, judges will be more easily able to gauge the degree to which the pilot has met the intersection. As already noted, the erection of suitable markers is encouraged to assist in this practice at sites which lack suitable fixed terrain reference points (see also B.1.14).

d) Bottoms
Normal upright level flight and inverted level flight is specified in the manoeuvre descriptions as being required to be flown at a height 1.5 metres with an allowed tolerance of plus/minus 30 cm. These are all clearly described for each manoeuvre and judges should mark accordingly, as per B.1.6 and B.1.9 below, plus also paying close attention to the notes about values and tolerances which appear at F2B.15 of the F2B rules.

B.1.4. General Comments on the Marking of Manoeuvres

Although control line model aircraft actually fly on the surface of a hemisphere, when seen from the pilot's position, all manoeuvres are flown in two-dimensional plane geometry. In other words, because all points on the surface of the hemisphere are at an equal distance from the pilot (that distance is the length of the lines), the pilot sees all manoeuvres as if they were drawn on a flat sheet of paper. But from their position outside the circle, the judges are not in the ideal position to view manoeuvres. Therefore, the judges' marking tasks include a large element of personal analysis and situational awareness that must take their own (less than ideal) viewing position into consideration when awarding marks. There are however a number of precise definitions and values within the manoeuvre descriptions which judges must assess accurately if they are to award fair and consistent marks. These are:

a) Recognition of level flight altitude of 1.5 metres, plus/minus 30 cm.
b) Recognition of height by judging 45-degrees line elevation angle.
c) Recognition of height by judging 42 degrees line elevation angle.
d) Recognition of a position directly overhead the centre of the flight circle (that is above the centre of the pilot's body and head if he is standing erect).
e) Recognition of "vertical" climbing and diving flight paths (perpendicular to the ground).
f) Recognition of "horizontal" flight paths (parallel to the ground).

g) Recognition of a turn in corner as an abrupt change of direction with the requirement for the model to fly the tightest (sharpest) possible corner (see also B.1.5.).
h) Recognition of the correct "Start" and "Stop" points specified in the F2B rules for each manoeuvre (as highlighted within each manoeuvre description by the paragraphs a)"Start of manoeuvre:" and x) "End of manoeuvre").
i) Recognition of the fact that all the above values are specified as seen and measured from the pilot's viewing point, so judges must make due allowance for models of different sizes, flown on different length lines, and for the difference between the pilot's position and the judges' viewing position/s.
j) Judges should also note the requirements of rule F2B.2.11a) which not only limits the amount by which judges shall move their original position (to account for changes in wind direction) during a single official flight (+/- 1/8 lap), but which also limits the times at which such moves may be made.

B.1.5. Judging Objective Errors

The systematic deduction of points will provide the most uniformity in of standards in judging F2B contests. This system can be applied to all manoeuvres in the following way:

a) Taking normal level flight as an example, judges are expected to award maximum points provided that the model remains inside the values and tolerances defined in the rules throughout all of the judged laps, and provided that it tracks smoothly without any visible height changes (that is: with no jerking or abrupt changes in height or attitude throughout the manoeuvre).
b) But a level flight track which slightly exceeds the stated tolerance (for example, flying 40 cm off the flight track when plus/minus 30 cm is required by the rule) should be considered as a "minor" error. Such a minor error would probably cause the judge to award a mark downgraded by perhaps 0,5 to 1 point.
c) But if a level flight track was off the defined flight track by as much as twice the defined tolerance, this should be considered as a "medium" error and would probably result in the award of a mark downgraded by 1.0 point or more.
d) And level flight errors of three times the defined tolerance from the defined flight track should be considered as "major" errors, which would probably result in the award of marks downgraded by around 1.5 or 2 points.

In order to use this system successfully, judges must be trained to recognise flight path deviations of 30 cm and 60 cm at a viewing distance of approximately 45 metres. This will require relevant and repeated demonstrations to train judges to be able to readily gauge these measurements. Such training is highly recommended for all judges, and this training should also emphasise the various tolerances defined in each manoeuvre description. See also B.1.8. below.

B.1.6. Judging Subjective Errors

a) "Smoothly", etc

A phrase such as "fly smoothly", is subjective, and the degree to which the model flies smoothly cannot be measured. Similarly, rules statements such as " ... the model should fly two smooth and stable laps ...", are difficult to apply when faced with the task of translating a certain lack of smoothness into an actual mark to be awarded to a contestant. As a basic guide, judges should consider terms such as stability and smoothness to be conditions defined by the absence of "wobbles" or "jerks". Therefore "wobbles" or "jerks" are errors, and each judge should decide on the extent of each such error seen, awarding a downgraded mark according to the severity of each of these errors that he has observed; see also B.1.9.

a) Turn radii

Judges should recognise that the intent of the Rule regarding corner radii in manoeuvres such as Square Loops, Square Eights, Triangles, etc. is that model aircraft should turn as sharply (tightly) as possible. Therefore, judges should award the highest marks to model aircraft turning the tighter (sharper) corners (provided that the required line elevation angles and/or the model aircraft's pitch angles have also been achieved) and they should award the lowest marks to model aircraft making the largest (softest) such turns.

B.1.7. Error Interpretation

a) Each manoeuvre description clearly defines numerical values, size, shape, and position. Therefore, judges can observe errors (failure to meet the specified requirement of, say, a line height value). But the rules provide judges with no guidance about the relative importance of those errors. So, the judges' task is twofold in this respect - first, he has to count the total number of errors committed – second, he must also decide on the amount by which each of those errors has deviated from the standard specified in the respective manoeuvre description. As a general principle, a manoeuvre which is flown with a large number of major errors should result in judges awarding a lower mark than would be awarded for a manoeuvre which is flown with just a few errors, all of which are only minor errors.

b) However, judges should also note that if a manoeuvre is flown with a very large number of errors, even if each of those errors may be considered as being, individually, only minor deviations from the manoeuvre description, it would be quite correct to award a lower score for that manoeuvre than for another manoeuvre which is flown with only a few errors (but where each of those individual errors is considered to be a major deviation from the manoeuvre description). This is precisely one of the skills that judges are expected to develop and apply; see also B.1.9.

B.1.8. Awarding Marks (Scoring)

a) Segmented and multiple manoeuvres

Many manoeuvres are described as consisting of several figures, and in many of those the figures have in turn been broken further down into separate segments. But all those segments and figures should be combined to result in the award of only a single mark for the complete manoeuvre. In addition, many of the manoeuvres detailed in the separate manoeuvre descriptions consist of multiple (repeated) figures. Once again judges should award only a single mark for each such manoeuvre (for example, the three consecutive inside loops manoeuvre, the two horizontal square eight manoeuvre and the four-leaf clover manoeuvre should all attract only one mark each from each judge).

b) Principles of marking

Judges should score (mark) manoeuvres flown between the points "Start of manoeuvre:" and "End of manoeuvre": only, as set out in each of the manoeuvre descriptions. When the model reaches the "Start of manoeuvre" point for each manoeuvre, each judge should assume that the manoeuvre will be flown within all the values and tolerances and other requirements defined in the respective manoeuvre description. (If this happened, this would of course mean that the judge should award the full maximum available 10 points if he has seen no errors by the time the manoeuvre is completed). But as the model proceeds through the manoeuvre, each judge will (usually!) observe some deviations from the manoeuvre rule requirements, so he should then mentally deduct point/s from the potential maximum of 10 points whenever a deviation is seen. The number of points to be deducted for each error by each judge will depend on his/her judgement as to whether each of those observed deviations is a "minor" error, a "medium" error, or a "major" error, as described in B.1.5.

So after the model has reached the "end of manoeuvre" point for the manoeuvre the judge's task is to total all the points which have been mentally deducted during the manoeuvre; and the final mark to be entered into the judge's score sheet is simply the maximum available 10 points, minus the total of all the points mentally deducted by the judge while the manoeuvre was being flown. This deduction method, whilst not easy to learn, and while requiring a considerable amount of instruction and practice, does offer the advantage of coming very close to producing repeatable results when using a consistent marking bandwidth for weighting each error seen.

c) Marking bandwidth

The following scale of marks is listed to provide judges with a practical tool to apply to the principles above.

Judges' Observations:	Marks to be awarded:
Nil visible deviations from all values & other requirements:	Mark 10 points
Very few and/or only minor errors seen:	Range: approx. 9,5 to 7,5 points (Note 1)
Few and/or minor errors seen:	Range: approx. 7,5 to 4,5 points (Note 2)
More and/or medium errors seen:	Range: approx. 4,5 to 2,5 points (Note 2)
Many and/or major errors seen:	Range: approx. 2,5 to 1 point (Note 3)

Notes for marking bandwidth table:

Note 1: the number of points actually awarded for each manoeuvre will be dependent upon the total number of errors identified by each judge, and whether each judge considers these to be only minor errors.

Note 2: the number of points actually awarded for each manoeuvre will be dependent upon the total number of errors seen by each judge, and the extent to which each judge decides that each error is either a minor, a medium, or a major error.

Note 3: as per note 2 above, but the mark 0 (zero) points should be reserved only for cases which are listed at F2B.10 and F2B.15.2 paragraphs of the F2B rules.

d) Judges should use the entire marks bandwidth available, as shown above. This means awarding a mark of 10 points to any manoeuvre where the judge does not observe any errors at all (for example, an inverted flight manoeuvre where the model remains truly stable and without "jerking" within the allowed height tolerance of plus/minus 30 cm throughout all judged laps). But as an example of the opposite extreme, a two consecutive horizontal square eight manoeuvre which is flown with line elevation angles of over 60 degrees, with "soft" corners, with angled sides, with slanted tops, with pullouts which are both too high and too low, and with intersections which are missed by several metres - in other words a manoeuvre which is not really recognisable at all - should be awarded a mark of around 1 point, perhaps even less.

e) It should also be noted that since nothing written anywhere in the FAI Sporting Code defines terms such as "general impression", or "flying style", accurate and repeatable marking really is dependant only upon each judge deciding on the total number of errors committed, and the degree to which each error has deviated from the manoeuvre description. This includes judging subjective elements where (apart from stability which can be marked as discussed in B.1.6.) the reality is that each contestant's score should depend simply and solely upon the total number of all the errors observed by each judge coupled with each judge's own personal decision as to how severe each of those errors was.

B.1.9. Considering External Factors

a) It is not permitted for judges' marks to allow for the effects of the wind in marking any phase of any of manoeuvre. Paragraph F2B.5 of the F2B rules gives clear guidance to judges and contest officials on exactly what wind and weather limitations are not acceptable for official flights, and this means that turbulent or stormy/gusty winds should not influence the marks awarded by the judges unless they exceed the limits in paragraph F2B.5 of the F2B rules. If wind in excess of the limit in paragraph F2B.5 does occur, then paragraph F2B.5 also instructs judges and all other contest officials on what actions to take. In other words, either the weather is "flyable" or it's not, and if it is flyable as per paragraph F2B.5 then judges should score all official flights on exactly the same basis as if the wind was non-existent.

b) Similarly, electrical storms are considered to be unsafe conditions for flying control line stunt models, and as for excessive wind speed, paragraph F2B.5 also instructs judges and all other contest officials on what actions to take if thunder and lightning do occur or appear to be imminent during a contest. Other than excessive wind and electrical storms, the F2B rules make it plain that an F2B contest is an all-weather event, so uncomfortable though it may be for all concerned, the

intention is that the contest should proceed as normal. Judges should therefore certainly not adjust their marks according to inclement weather.

c) But on rare occasions other factors which are outside a contestant's control can occur, and sometimes these could adversely affect the contestant's ability to fly in accordance with the manoeuvre descriptions. For example, when flying contests at sites where one or more grass circles are in use, irregularities in the ground surface could adversely affect a particular contestant's take-off ground roll and/or lift off; or could affect the ground roll out at completion of the landing manoeuvre. Deviations from the described procedures for the take-off ground roll (and lift-off) or landing ground roll out should not be penalised if judges are of the opinion that such deviations were caused only by defects in the surface of the flight circle. Similarly, paragraph F2B.7, h) item iii) of the F2B rules gives a possible example (a child or animal wandering into the flight circle), but no set of rules can be expected to be completely comprehensive in such areas. So, judges should therefore always be alert to any "extraordinary occurrence" that is accidental, beyond the contestant's control, and may affect the contestant's performance of an official flight. If in the opinion of the judges such an incident has occurred, then they should be prepared to use their observation and reasoning to make sure (via the Head Judge) that the F2B Contest Director is aware of the occurrence and offers a re-flight accordingly.

B.1.10. Scoring and Processing Manoeuvre/s if Missed by a Judge

If a judge misses the observation of a manoeuvre for any reason, then he or she should not mark the Score Sheet with an estimated "typical" mark for the missed manoeuvre. Instead, the judge who missed the manoeuvre should clearly write an "N.O." (Not Observed) symbol on his/her score sheet in the space for the mark for the manoeuvre which has been missed. This symbol should then alert the scores tabulator(s) to use a procedure which calculates the average of the marks for that manoeuvre as awarded by all the other judges. This calculated average mark should then be entered into the missing mark ("X") area by the scores tabulator(s) before proceeding with processing all the remaining marks from that flight.

B.1.11. Results Awareness

In order to prevent influence of any kind, no judge should look at tabulated results scores and/or at contestants' "placing" until after the completion of a contest. Neither should judges discuss individual official flights, nor the execution of manoeuvres; nor the marks awarded, nor the tabulated results (placing) or scores, with anyone at all during the whole contest. This includes discussions with the other judges, with any contestant, with any Team Manager, and with all spectators. The Head Judge should ensure that all members of the judging panel are aware of this requirement and that they all observe these requirements throughout the contest.

B.1.12. Preparations by Judges before Contest Start

Well before the start of any official flights the Head Judge should approach the FAI Jury, the contest organiser and the F2B Contest Director to define/confirm/verify:

a) Head Judge in charge; F2B Contest Director.
b) The availability of fixed terrain reference points, and/or erected markers (refer B.1.3. b) & c)).
c) Availability and timing of judges' calibration flights.
d) Contestants' flying order.
e) Contestants' pull test procedure and method of ensuring that all pull tests are performed.
f) Procedure for officially calling contestants.
g) The nominated official timekeeper(s), and how times will be communicated to the judging panel.
h) Availability and method of score sheet collection service.
i) Duration and timing of rounds.
j) Score processing procedures.
k) Contestant and classification and ranking procedures.
l) Meal and break times, seating arrangements, sunshades, umbrellas, nearby toilets, etc.

B.1.13. Judges' Calibration Flights

After each of the judges' calibration flights arranged by the contest organiser judges should not discuss the scores that they have individually awarded. Instead, they should go through a manoeuvre-by-

manoeuvre discussion, comparing and discussing their individual assessments of each error (including the severity of errors) that they have seen during every segment of every figure and every manoeuvre flown. In order to prevent the clearly undesirable "levelling" of marks, judges must not discuss the scores they have awarded.

Indeed, contest organisers are not permitted to issue score sheet forms for judges' calibration flights. Rather, the judges' discussions should focus on the number, extent, and degree of severity of each error seen by using copies of the manoeuvre diagrams in the F2B rules as the basis for discussion. It should also be carefully noted that the content of all such judges' calibration flight discussions should not be made public.

B.1.14. Sighting Devices and Terrain Reference Points

Hand-held sighting devices should not be used. Whenever possible, fixed terrain reference points should be used to define intersections, "verticals", line elevation angles, and $^{1}/_{8}{}^{th}$ lap (45-degrees laterally) bottoms and lengths of manoeuvres and/or segments. As noted at B.1.3. c), contest organisers are strongly encouraged to erect suitable markers (for example for the 45-degrees lateral dimension specified in the relevant manoeuvre descriptions), especially when a particular contest site lacks natural fixed reference points. It is recommended that such reference points and/or markers be re-calibrated for each individual contest site on the occasion of every contest held at that site, and that these should be discussed privately between the judges prior to the start of judges' calibration flights.

Final agreement on useable natural reference points and/or erected markers should be reached between all members of the judging panel before the start of official flights.

B.1.15. Timekeeping

It is common practice to assign official timekeeping duties to the Circle Marshall (and this is a definite requirement at World and Continental championships and other limited international contests). At other contests, judges should confirm who is responsible for this task before starting official flights, and at all contests judges should also confirm the method/s by which the results of the official timekeeping will be signalled to the judges. The times recorded by the defined official timekeeper are binding, but as a cross reference it is recommended that the Head Judge runs his own stopwatch in parallel to the official timekeeper. If a contestant's official flight exceeds the 7 minutes permitted, then the elapsed time should be recorded on the score sheets. In the event of any discrepancy the Head Judge's time and that of the official timekeeper the Head Judge should approach the official timekeeper and the F2B Contest Director to resolve the matter accordingly.

B.1.16. Consistency

Judges should use a consistent scale of awarding marks throughout all the rounds of a contest. This scale should be a personal instrument based upon the number of errors seen, plus the judge's own personal valuation of the severity of each error. This personal scale should have been arrived at by careful study of the current F2 volume of the FAI Sporting Code (especially paragraph F2B.15 corresponding to the F2B manoeuvre descriptions), by study of this Judges' Guide and as a result of practical judging experience. Once the official flights of a contest have started, each judge's personal scale should remain firm and fixed and should not (for example) become influenced by factors such as discussions with others (including other judges), by the weather, by model speed, by model type, size, colour, or engine sound, or by an awareness of the reputation or results previously achieved by any particular contestant being judged.

B.1.17. Execution of Manoeuvres

a) " ... a minimum of $1^{1}/_{2}$ laps"

Competitors may choose to fly more than, but may not fly less than, $1^{1}/_{2}$ laps between each manoeuvre (including the recommended entry and exit procedures, all as set out at paragraph F2B.14 of the F2B rules). If a new manoeuvre is started after less than $1^{1}/_{2}$ intervening laps (plus the recommended entry and exit procedures) have been flown, then that manoeuvre should be awarded a mark of 0 (zero) point and 0 (zero) point should also be awarded to every other manoeuvre where less than $1^{1}/_{2}$ laps (plus the recommended entry and exit procedures) are flown between manoeuvres. This is to allow judges

enough time to fully consider (and write down) the score for the preceding manoeuvre before the next manoeuvre is started.

b) Judging the height of intervening laps

The height of the laps flown between manoeuvres is purely a recommendation and should therefore not be judged or marked, but it should be noted that the F2B rules (paragraph F2B.14 c)) specify a height range within which each contestant should fly the intervening laps. This is to ensure that no contestant flies so high that the time taken to complete the intervening laps is too short to allow the judges to record their scores from the previous manoeuvre.

c) Judging attempted manoeuvre(s)

If a contestant makes more than one attempt at any one manoeuvre during an official flight the judges should only mark the first attempt. Any further attempt(s) at the same manoeuvre during the same official flight should not be marked at all. Similarly, if a contestant starts a manoeuvre but obviously does not complete it (for example, due to the motor suddenly losing power, thereby causing the contestant to descend immediately and then fly level laps) the manoeuvre which the contestant failed to complete should receive a mark of zero (0) point.

Annex B2 CLASS F2B – CONCOURS D'ELÉGANCE

B.2.1. Concours d'Elégance

At F2B Continental and World Championships the organiser may arrange a contest for registered F2B pilots competing in F2B with own-constructed Class F2B model airplanes. The winner is awarded the FAI Concours d'Elégance Diploma.

B.2.2. Construction of the model by the pilot; Definition

"Constructed" by the pilot is to be interpreted as the action required to complete a model starting with no more prefabrication than acquiring one of the two main structures preassembled prior to merging and finishing. The two main structures are regarded as: 1) the wing and 2) the fuselage. Flaps, rudders, elevators & horizontal stabilizers are not considered main structures, therefore there are no limitations on level of their prefabrication, and only the finish portion of this rule applies to them. In unconventional stunt designs, such as a multi-engine wing with engine nacelles, or a flying wing, they are to be considered as multiple merged structures, so no level of prefabrication is allowed, and on multi wing planes, the wing total counts as one structure, but the pilot must be the one who joins and aligns the multiple wings together. In the case of take-apart models, the take-apart hardware must be installed by the pilot. The pilot must be the person who applies the finish to the plane, to "finish" meaning the pilot fills the surfaces and applies the covering and finish to the completed model where covering and finish is applied. Whereas on the surface of the main structures, moulded structural surface underlayment's including but not limited to moulded fiberglass, or carbon fibre that are filled or coloured as a result of the manufacturing process that may show as part of the final finish may be used, as long as this surface underlayment is applied, filled and coloured by the pilot. Control systems such as but not limited to the bellcrank, control horns, pushrods, etc. may be purchased but must be installed by the pilot. Other accessories and hardware may be purchased or otherwise obtained for their function such as, but not limited to engines, tanks, wheels, canopies, airframe take-apart hardware and have no bearing in the way "main structures" are counted.

a) At the time of official model processing a competitor wishing to enter the Concours d'Elégance must register his airplane into a list to be prepared by the organiser. By registering his airplane, the competitor bindingly confirms the personal construction of the model as per paragraph B.2.1. For the Concours d'Elégance alone, one model per competitor may be registered.
b) Models processed and registered for the Concours d'Elégance must be marked by suitable means, such as an easy to remove sticker, indicating the pilot's name and the year of the competition.

B.2.3. Appearance Judging

Registered models for the Concours d'Elégance must have flown in at least one F2B qualification round of the ongoing F2B Championship before entering the static display for appearance judging.

a) After the qualification rounds and before the beginning of the fly-off rounds all of the Concours d'Elégance registered model airplanes shall be put on display, arranged side by side and with sufficient space for the judges to walk around.
b) The self-constituent panel of appearance judges consists of three members who shall be:
   i) At two circles contests: the F2B Contest Director plus the two F2B Circle Marshals.
   ii) At single circle contests: the F2B Contest Director plus the F2B Circle Marshal plus a third person holding an official position within the contest organisation or within FAI/CIAM.
   Members of the F2B judges panel must not be part of the panel of Appearance Judges.
c) Appearance judging for all models on display shall not take longer than two hours. While it takes place, public, other officials, and team members must not be present near the models to be judged. With approval from the appearance judge's media representatives may be allowed in.
d) The panel of appearance judges jointly defines the winner of the Concours d'Elégance based on criteria such as elegance of outlines and shapes, visible building and finish quality, colour scheme and complexity and further non-technical aspects contributing to the overall impression of elegance and beauty, while strictly observing article 4.M.1. The panel shall communicate the winner's name and nationality to the organiser. No individual ranking is published, and the winner shall be kept secret until the end of the Championship.

e) Related to the Concours d'Elégance no formal protest can be filed.

B.2.4. Awards

The F2 Subcommittee will arrange for a suitable FAI diploma to be generated.

a) The Diploma will be awarded to the winner at the banquet concluding the event.
b) Illustrated with a high-quality picture of the winning model airplane and its pilot constructor, the organiser communicates the winner of the FAI F2B Concourse d'Elégance Diploma to the media.

ANNEX C1 – Class F2C TEAM RACE PANEL OF JUDGES GUIDE

Purpose

This Panel of Judges (hereafter 'Judges') Guide is intended to guide the Team Race judges and competitors to produce a fair and enjoyable competition. The guide provides the current consensus interpretation of the F2C Sporting Code rules. Suggestions for amendments to Sporting Code rules or this Guide are welcomed by the F2 Subcommittee and will be considered at the appropriate CIAM Plenary meeting.

C.1.1. TEAM RACE JUDGES

The judges must have a working understanding of a common language to reduce delays and errors. It is recommended that the common language be the same language used to issue warnings and disqualification.

C.1.1.1. The duty of the judges is to assure a fair competition between the teams by penalizing any defined actions which would be an advantage for one or a disadvantage for another team. Wherever possible the judges should help the teams achieve their best result by discussion outside the actual racing.

C.1.1.2. The judges' responsibilities regarding the conduct of the racing (issue of warnings, disqualifications and re-flights) begin with the start signal. However, the judges assist the Circle Marshall by checking that other aspects of the contest are in accordance with the rulebook.

Examples of this are:

a) All mechanics wearing helmets.
b) Correct application of the 90 seconds' warm-up and 30-second countdown.
c) Competitors' unauthorised practice in the official circle.

Infringements should be noted, for the Circle Marshall to rectify.

C.1.1.3. The judges should allocate among themselves the specific tasks of warnings operation, microphone use and record keeping prior to the actual racing. They should also practice working together when observing the official practice flights and by viewing videos from recent championships. It is highly recommended that a video recorder to monitor the pilots and the pilot circle is situated in the Judges tower. This "official" video record is not used by the judges to make decisions whilst the race is in progress but may be reviewed at the conclusion of the race to decide whether re-flights are warranted or to review a formal complaint. After the end of each round of racing the competitors may be granted access to the "official" video. The purpose of the "official" video is for:

a) Viewing by the judges and the FAI Jury following a complaint or protest. (NOTE: The FAI jury is not limited to viewing the official video only when considering protests).
b) Review by the judges to improve their coordination.
c) Viewing by teams with the judges for a better all-round understanding.
d) Training of other judges in preparation for subsequent championships.

C.1.1.4. It is recommended that the judges adopt the following procedure for the races:

a) Before the start each judge selects one team (preferably, not his nationality) to watch the start and during pit stops. The specific items to check for are starting the model's engine(s) before the start signal; landing model outside the 19.6m radius flight circle; mechanic retrieving the model from inside the 19.1m radius circle; handle significantly off ground; etc. A judge's decision in these cases is unilateral and, without discussion, and the appropriate penalties must be given. Any single judge making these unilateral decisions needs to be aware that because the judges are operating from a fixed location it may not be possible to view each situation equally, therefore he must be certain that he makes his decision on the grounds of real safety, advantage, disadvantage situations and not a minor technical infringement that can only be seen by virtue of position.
b) For the remainder of the race all three judges should observe all three pilots and conduct a running commentary of their behaviour to allow them to agree on infringements quickly. The

judges are also responsible for observing the models in flight should any collisions occur. Warnings/disqualifications are issued when two judges are in verbal agreement.

c) The judges are responsible for clearly announcing the warnings, disqualification, and re-flight decisions immediately.

C.1.1.5. Competitors who feel they have not received a fair result are encouraged to initially make a complaint to the F2C judges, if this is does not satisfactorily resolve the issue then the competitors have the right to make an official protest.

C.1.1.6. Warnings are effective at the lap or race time when the infringement occurs. Pilots are expected to acknowledge the warning appropriately. Failure to rapidly correct the infringement will risk an additional penalty for same offence.

C.1.1.7. Warnings should be given using short standard phrases wherever possible (see Section 4.C.5). Warnings are issued with reference to the team's racing colour, not their name, and additional verbal communication from the judges should be kept to a minimum to prevent pilot distraction.

C.1.1.8. As there can be variations in the actual marking out of the various circles, the Judges shall be responsible for checking the accuracy of these before the start of the contest. They shall then be responsible for informing all competitors prior to the beginning of the contest, the definitions of inside and outside the line that will be applied in that particular competition. In all cases the definition of "outside/inside the line" shall be the one that encourages the natural progress of the race without causing a genuine safety, advantage or disadvantage situation. (See pictures in section C.1.4.)

C.1.2. STANDARDS OF JUDGING

C.2.1.1. A contest consists of three distinct sections: qualifying heats, semi-finals, and final. Each section poses unique problems for the judges and competitors.
The judges shall observe the official practice and conduct a briefing for all competitors before the first qualification heats or semi-finals start, and also before the final, in order to attempt to maintain an even judging and flying standard through each section of the contest. It is important that the judges and competitors understand that the first couple of qualification heats have a significant effect establishing these standards for the rest of the contest. It is very important that the judges have a unified understanding of their judging standard before the first heat.

C.2.1.2. Semi-finals are between contestants with very little difference in airspeed and ability. The judges should aim to keep a similar consistent judging standard as in the qualifying heats but with additional emphasis on overtaking and blocking infringements.

C.2.1.3. The final is a unique race in that it is double the distance and takes four warnings to result in disqualification. A more lenient attitude toward technical infringements (for example:- model landing just outside the flight circle, model pitted on the line not outside it, mechanic having one foot slightly inside the flight circle when retrieving his model and the other models being sufficiently far away as not to cause a safety risk) is warranted but the judges must issue warnings where safety is at risk and for infringements that provide a team an unfair advantage or disadvantage (whipping, blocking, taking the centre, etc). When a team with three warnings is guilty of a further technical infringement that will not materially alter the race result the judges are urged to announce the infringement but to consider allowing the race to continue unless that team continues to race in a dangerous, obstructive or advantageous way. It is preferable that the results are determined by this approach and would allow a team to protest a judge's decision and the finals results be adjusted if the protest is upheld. Only in cases where that team continues to race in a dangerous, obstructive or advantageous way should that team be instructed to immediately land their model.

C.2.1.4. 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 judges operate from a fixed location and must take this into account. Judges should not give warnings for technical infringements whereby virtue of position they cannot treat all teams equally unless there is a significant safety risk or gross misconduct.

C.2.1.5. The rules state that model may not fly for more than two consecutive laps with the engine not running. When the judges cannot directly observe the lap counting devices it is important that the timekeepers provide a 98-lap and 198-lap notice.

C.1.3. PILOT FLYING STYLE

C.1.3.1. The judges should be looking for correct positioning of each pilot in the circle. This can be determined by:

a) 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.

b) 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's path.

c) 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. If the pilot's right foot is placed to the outside of the circle being walked and behind the position of the model, then the pilot is behind centre.

C.1.3.2. The judges should be trying to identify the cause of bad pilot positioning. This can be determined by the spacing between the pilots. When a faster pilot approaches to overtake and there is no space between the overtaking pilot and the pilot in front and the overtaking pilot's handle cannot be positioned any further forward (Figure F2C.2.1) and it then falls behind the position of the corresponding model, the pilot in front is blocking. This could be because the front pilot:

a) has his non-flying arm positioned between himself and the overtaking pilot;

b) has his left shoulder positioned between himself and the overtaking pilot;

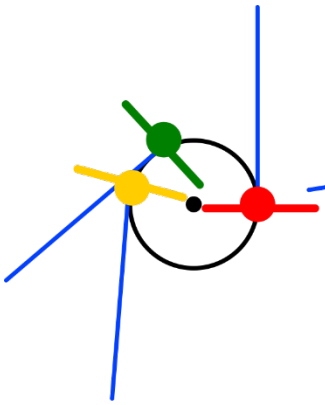


Figure 4.3.2.1

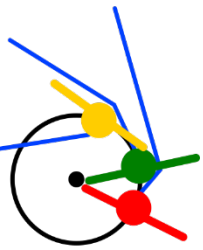


Figure 4.3.2.2

c) is positioned behind centre because of the incorrect position of his right foot.

When a blocking situation occurs, and the third pilot is also a faster pilot. then another layer is introduced into the problem (Figure F2C.2.2). If there are no spaces between the overtaking pilots, 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 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.

C.1.3.3. The pilot should keep his controlling hand laterally on the centreline of his body, with his hand in close proximity to his chest (approx. 30 cm), and vertically located from the middle of his chest and top of his forehead (rule F2C.6 i)). He is allowed to move his handle away from the body (forward), but still on the lateral centreline, or above his forehead, in order to better control the model during overtaking for a maximum of three laps. During overtaking the pilot may move his head from the centreline for better vision of his model. During take-off and landing rule (F2C.6 i)) does not apply (for up to 2 laps) however this exception does not permit a pilot to whip.

C.1.4. Rule F2C.8 Warnings, Disqualifications & Penalties

The primary consideration of the Judges is to maintain an equal standard for all competitors within each section of the contest. Their intent should be to allow each competitor to achieve his best result.

Warnings / disqualifications should only be given where either safety is compromised, or a team is gaining an unfair advantage by its action or causing a disadvantage to another team in that race.

Judges should not give warnings / disqualifications for purely technical actions that have no safety, advantage or disadvantage implications on the result of that race.

Example- the rules state that normal flying height is between two and three meters.

A model flying below 2 m whilst other teams are carrying out pit stops is a clear safety and disadvantage situation and should be penalised but where only one model remains in the race - flying below 2 m solo is not an infringement but flying above 3 m solo is an infringement.

Where the circles have been marked accurately the definitions of outside / inside the line are:

(See the pictures)

Pilot foot on line - No Penalty

Pilot foot outside line - Disqualification

Landing outside line before catch - Disqualification

Pitting inside line - Warning

Mechanic foot on line - No penalty

Mechanic foot inside line - Disqualification

Model on the line before catch -
No penalty

The Judges should not wait until an incident/collision occurs before giving warnings – this would be unfair to the competitors who have had their flight obstructed or their model damaged. The judges' responsibility is to give warnings in these situations as a mechanism to maintain a satisfactory flying standard so that a dangerous or unfair situation does not arise.

Each warning shall be notified to the team concerned both visually and orally.

Flagrant breaches of the rules should be interpreted as being:

a) Unsafe actions and/or
b) Unsporting actions.

Actions which may be considered unsafe or unsporting depend upon the specific circumstances in each case:

1) Pilot flies too high immediately after take-off.
2) Pilot stands erect or raises his hand above his head immediately after take-off and before fully joining other pilots in the centre.
3) Pilot does not immediately join other pilots in the centre.
4) Pilot does not lower his head and bend down during landing approach.
5) Pilot does not promptly bring his model below 2m after engine has stopped.
6) During landing, the pilot runs model on the ground for more than 1 segment and does not attempt to avoid (hop over) the lines of other model(s) that are fuelling and starting.

7) Pilot flies the model at an effectively dangerous radius when passing over another mechanic (his handle should remain inside the 3m. centre circle until his own segment).
8) Mechanic releases his model with physical effort.
9) Mechanic has the model or its lines significantly off the ground during repair, adjustment, change of segment, catching, refuelling or restarting.
10) Mechanic releases the model without properly checking that no other model is over flying his pit position on a normal landing approach and causes the landing model to bypass its mechanic to avoid a collision (re-flight for the landing model's team). Note: if a collision occurs then the team releasing its model is disqualified.
11) In a situation where multiple infringements take place simultaneously, and the judges do not have sufficient time to give each warning separately, "SERIOUS BREACH". In this case the individual infringements are communicated to the team at the end of the race.
12) Rule F2C.8.2 g) states that "When the mechanic steps inside the flight circle line or reaches inside the safety circle line". This rule was introduced to ensure that mechanics remain in a safe location when retrieving their model.
13) Retrieving a model in this context should generally be taken as recovering the model from an area outside a pitting segment. The penalty of disqualification should not be applied to mechanics that may have one foot slightly inside the flight circle or reach in to catch the model slightly over the 0.5metre stated limit. The reasoning behind this interpretation is that during a normal pitting activity, mechanics will be balanced on both feet and facing in the direction of other approaching model. They will, therefore, easily be able to move clear of any other approaching model. (See also C.1.4. 7)), which makes it the responsibility of the landing/taking off pilot to not fly his model at an effectively dangerous radius.)
When a mechanic is retrieving his model from any area outside a normal pit stop, he is likely to be under pressure to do it quickly and may well have his back towards other model. It is in these circumstances that he is at risk, and the disqualification penalty should be applied. Note also that the penalty should be applied where a mechanic carries out a non-normal pit stop such that he either excessively steps inside the flight circle or reaches so far inside that the judges determine he has caused a significant risk to safety.

4.C.4.4. Teams that are disqualified have the right of protest to the FAI Jury. If the protest is upheld, they will be granted an attempt and thus a re-flight. Their original race time will not be counted and there is, therefore, no advantage to be gained by flying on after disqualification except in a final. When a team has been disqualified and instructed to land the model immediately this should be done within 10 laps. If the pilot does not attempt to land and continues to prevent the other pilots from racing without interference, the judges will recommend (to the Contest Director) the team be disqualified from the whole contest. See section 4.C.2.1 for teams that are disqualified in a final.

4.C.4.5. Rule F2C.6 o) states that during the start and refuelling pit stops the pilot must keep his handle and lines as close to the ground as defined by the judges. Judges should interpret this as meaning below knee height with the pilot in a fully crouched position on circuits where there is no risk of the lines becoming caught on the ground and 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 that is making a normal landing and to permit safe overflying.

Where the judges determine that the circuit has a rough surface that may cause the lines to be caught then they can allow the handle to be held higher, but the pilot must still keep one hand in contact with the ground.

Teams must accept their responsibility to allow other competitors to fly, land, and pit normally.

A normal landing is generally defined as having sufficient airspeed to clear the preceding pit segments by 0.5 metres in height and with no part of the model passing above the pitting area as this would prevent the mechanic from continuing with his normal pitting activity. See figure 5.

There are legitimate occasions when the landing/taking off model may not be able to maintain this 0.5metre separation, therefore, it would be a prudent course of action for the pitting pilot to place his handle and lines in contact with the ground on these occasions to prevent an obstruction.

4.C.4.6. Rule F2C.1 b) states that the race is not complete until either 6 minutes (12 minutes for a final race) have elapsed or the first condition of the five listed has been met. 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 rule F2C.8.

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

C.1.5. PHRASES USED BY THE JUDGES

C.1.5.1. "WHIPPING"

is the application of physical force to increase the speed of the model. This occurs when the model is behind the line perpendicular to the pilot's shoulders. See also figures 1 and 2 at the end of the Guide. 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 (M). The CR can be determined, as illustrated in figure 2, by observing the rotation of the pilot's handle and taking the midpoint of the maximum left and right movement of the handle.

C.1.5.2. "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. See figure 1d. 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 period while he clears the obstruction. Excessive blocking to directly prevent being overtaken is a disqualification offence.

C.1.5.3. "PIVOTING"

is defined as keeping the handle in the centre of the circle with the pilot's body behind the centre. May also be called as "BEHIND CENTRE".

C.1.5.4. "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.

C.1.5.5. "LINE SHORTENING"

occurs when either.

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.

C.1.5.6. "ILLEGAL HANDLE POSITION"

occurs when the pilot does not fly in accordance with rule F2C.6 i) this is frequently a precursor to a blocking situation.

C.1.5.7. "PILOT INTERFERENCE"

is defined as:

a) Holding.
b) Pulling another pilot such that the pilot's normal activities are impeded.
c) Preventing another pilot from moving around correctly by raising his arm/elbow to occupy the "free space".
d) Warnings should not be given when a pilot only touches another pilot to help his orientation.

C.1.5.8. "PILOTS GO TO THE CENTRE"

is necessary because the pilots' rotational centre can move them towards the edge of the 3 m circle potentially causing problems of lack of space for landing/taking off pilots. 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 in a controlled and fair manner.

C.1.5.9. "STOP RACING – SAFETY"

when this command is given by the judges all the teams must immediately respond to it and the race will be declared null and void (after the application of any appropriate penalties). This command will only be given when, in the view of the judges that there is an immediate, significant safety risk. It is expected that the FAI Jury would support this course of action.

C.1.5.10. "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.

C.1.5.11. GENERAL POINTS

a) The draws for flying order should be made by the F2C Contest Director in the presence of the judges as early as possible so that competitors are given the maximum time to prepare.

For the semi-finals both rounds are drawn at the same time using a matrix.

C.2.11.1. Semi-final draws. If three competitors of one nation have qualified, then they are placed diagonally across the matrix (A); other multiple nations are placed in the matrix randomly across the X axis (B).

Sequence	Round
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 and order of the races.

C.2.11.2. All qualifying and semi-final races with only two teams (for example if a team withdraws) will be put at the end of the round in order to allow the third team (either re-flight or semi-final standby) a reasonable time to prepare. If necessary, a new draw for pitting segments will be made under the responsibility of the judges.

C.2.11.3. In the case of re-flights there will be a new draw for pitting segments (unless it is a complete re-flight of the same three teams).

C.2.11.4. The judges should take an interest in the processing of the competitors' models as part of its overall responsibility to ensure a fair and even standard for all competitors.

C.2.11.5. Rule F2C.4 a) states that "the tank .... must be accessible and capable of being measured accurately". As these units become ever more complex and unique, the judges support the following statements:

a) It is the competitor's responsibility to supply any specialist equipment other than the normal flexible fuel tubing that is required to link the measuring equipment with the competitor's models fuel system.

b) Organisers are only required to make two correctly executed attempts to measure the capacity of the system at the officially designated processing time.

c) If the system cannot be verified by two attempts, then the competitor will be allowed to return after the end of the official processing time to complete the verification of the system, with a further two attempts.

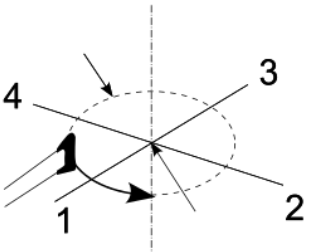
C.2.11.6. Rule F2C.9.b states "Teams advanced to the semi-finals shall not be granted a re-flight". The only intent of this rule is to prevent a possible situation developing where a standby team seeks to claim a re-flight because of an incident that prevented it from completing its attempt since this would then require a further 2 standby teams also being brought into the semi-finals. In theory, this could be repeated until all the original non-semi-final qualified teams had been brought forward into the semi-finals!

C.2.11.7. If a semi-final is terminated before the standby team has recorded a result (either time, number of laps or disqualified), then the attempt is deemed to be null, and void and the team reverts to its official standby status available to be called forward should any further semi-final race require a third team.

Diagrams (Figures 1 to 5) appear overleaf.

Figure 1

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



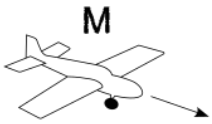
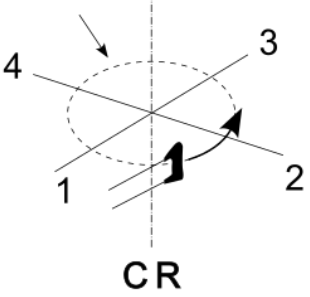


Figure 1b
Classical whipping position.
If pilot walks forward, no blocking occurs.



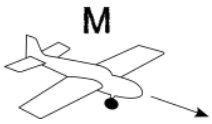
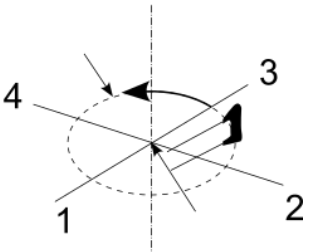


Figure 1c
Whipping and shortening of flight radius. Severe blocking of oppontents may occur. This position is very often combined with walking backwards.
(e.g. walking backwards after overtaking)



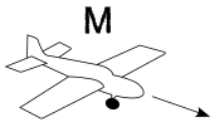
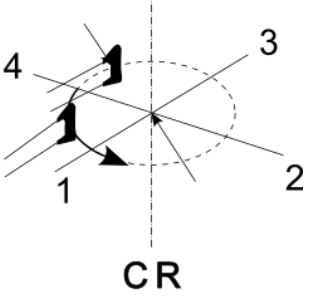


Figure 1d
Walking forward but in the wrong segment results in blocking of the opponents as well as in shortening of the flying radius.



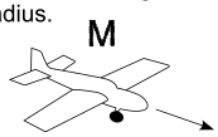


Figure 2

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

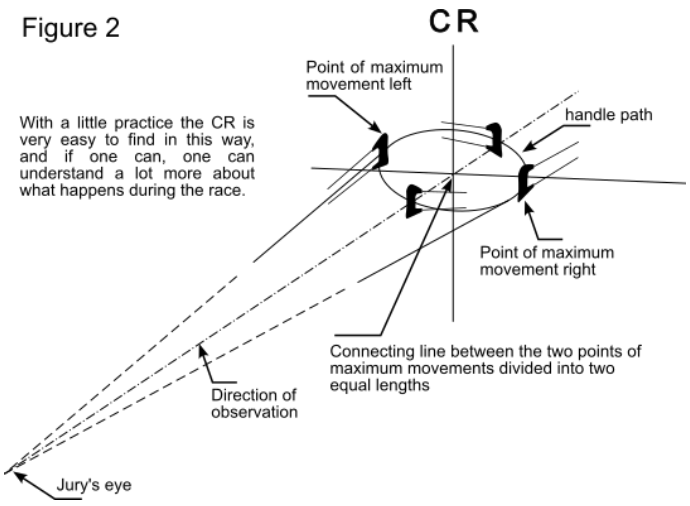


Figure 3

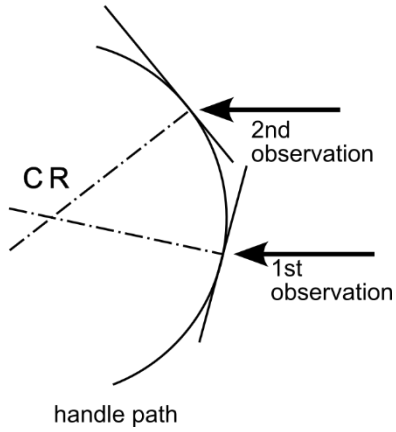


Figure 4

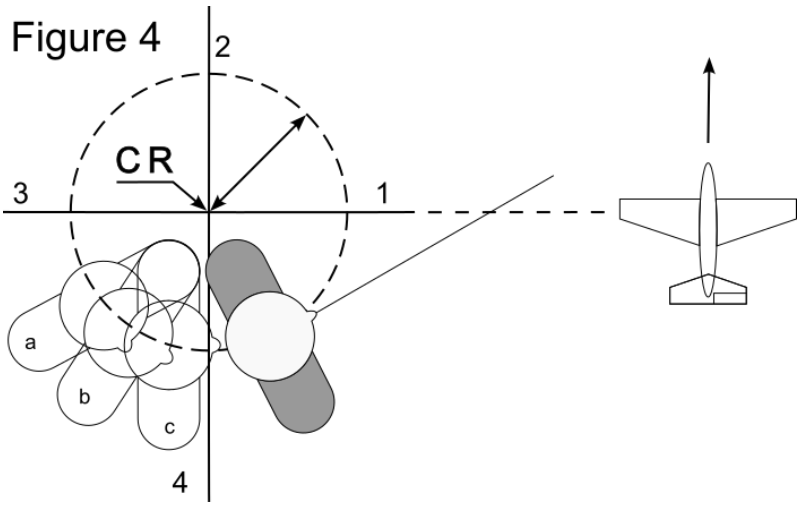
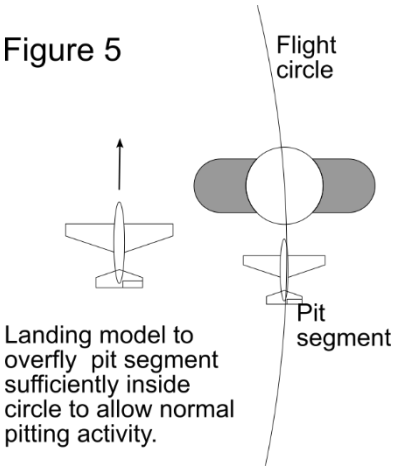


Figure 5



Landing model to overfly pit segment sufficiently inside circle to allow normal pitting activity.

C.2. Annex C2 - CLASS F2C – ENGINE EXTRA AIR INTAKE PROCESSING GUIDE

C.2.1. Method for Testing F2C Engine Crankcase Leakage

Evaluation method

The proposed evaluation method is to use a small adjustable flow 12V diaphragm vacuum pump connected to adaptors that can form a seal with the engine crankcase at the front, as well as through the rear (with exhaust port, top of case and prime nipple sealed), so that a vacuum reading can be established whilst allowing the crankshaft to be rotated.

After the adaptor is secured to the front of the engine and ensured that it is sealing well (as well as the sticky tapes for the exhaust port and the top of the crankcase), the vacuum pump is turned on and the speed or air bleed valve (for finer adjustment) is adjusted to achieve a steady reading of about 8.0 or 10.0 inch Hg (28 or 34 kPa) on the vacuum gauge.

The crankshaft is then slowly rotated through 720 degrees and the highest and lowest gauge reading recorded.

The adaptor is then removed and secured to the rear of the crankcase, ensuring the taped-up exhaust port and top of crankcase are sealing perfectly, then the same measuring process is repeated.

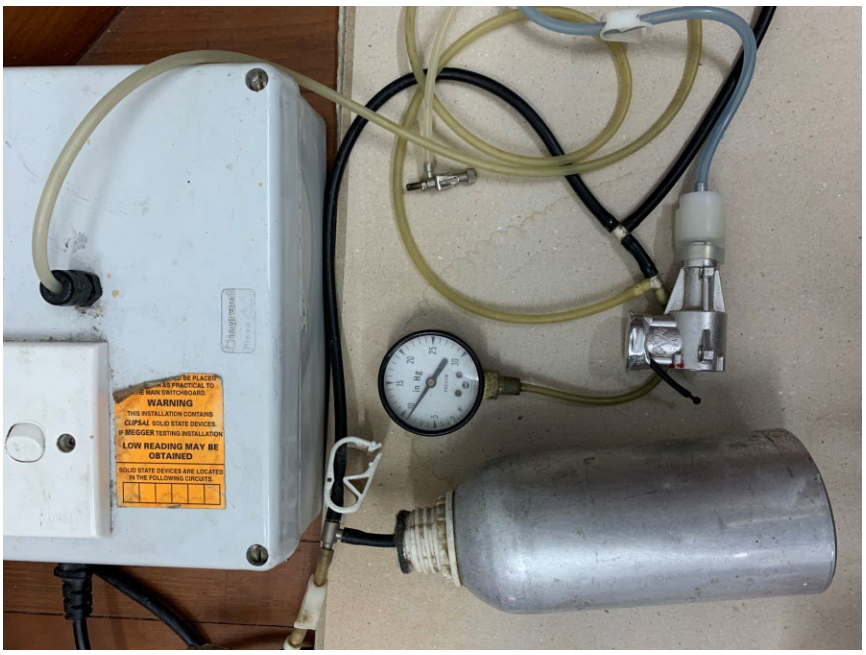
Vacuum Measurements (~8 or 10 in-Hg as datum)	**Inch-Hg**	**Pass**	**Crankshaft Disassemble**
Evaluation from Front	High - Low	= or <1.0	>1.0
Evaluation from Rear	High - Low	= or <1.0	>1.0
Average of high and low	Front - Rear	= or <1.0	>1.0

C.2.2. Suggested Equipment List:

C2.2.1 Variable output 12 volts DC power supply that can sustain a continuous draw of 10 watts or more.
C2.2.2 DC 12V Diaphragm vacuum pump, 55 kpa (16.5 in.Hg) vacuum or higher rating.
C2.2.3 >300 ml hard plastic or metal canister as a vacuum reservoir.
C2.2.4 Dial face 5 cm vacuum gauge 0-100 kPa in 2 kPa graduations (2 inch 0-30 in.Hg in 0.5 or 1 in.Hg graduation. Preferred as it is easier to read).
C2.2.5 Fine graduation needle valve as fine adjustment bleed valve.
C2.2.6 Derlin adaptor holder ~16.8 mm OD and 15-20 mm length, with 8.0 diameter x 10 mm depth hole drilled at one end and an airtight pressure nipple machined or fastened into the other end. Exact OD of the adaptor will depend on the diameter and wall thickness of the silicon rubber tube available.
C2.2.7 20 mm OD silicon rubber tube with wall thickness approximately 1.8 mm.
C2.2.8 Small diameter silicon tubing as appropriate.
C2.2.9 T-joint tubing connectors of appropriate size.
C2.2.10 "Duck" brand waterproofing tape for sealing top and exhaust opening of crankcase (consists of butyl rubber mastic adhesive on heavy aluminium foil, will conform to uneven surfaces).

C.2.3. Photos relating:

Vacuum measuring jig with adaptor attached to front and rear of crankcase respectively:



ANNEX D – Class F2D – Judge's Guide

Purpose of this Guide

This Guide is intended as an aid for Judges/Circle Marshals, Officials and Organisers as well as Competitors on how to interpret, understand and use the Sporting Code rules concerning F2D Combat.

Most of the content in this guide can also be used for class F2E.

D.1.1. Processing (before the contest)

At processing, before the contest, the following issues should be checked and/or tested:

1. Measurement of:
   a) the venturi inlet diameter using the simple plug gauge.
   b) the silencer outlet diameter using the simple plug gauge.
   c) the silencer volume by filling with an appropriate liquid (oil or other).
   d) the interconnecting chamber (maximum volume 1,75 cm^3).
   e) of the silencer length.
   f) of the swept volume of the motor(s) (random check).
2. Inspect the:
   a) silencer's internal compartment to determine if it is truly "simple" i.e. that it is an empty container with no internal components and a single exhaust opening.
   b) working shut-off.
   c) streamer retaining device.
3. Check:

a) the wing area and model weight.
b) that the model is marked with the FAI Licence Number or the FAI Unique ID number (minimum size specified in CIAM General Rule C.11.1 a) i).
c) the FAI sticker and that the Model Specification Card (one per model type) is properly completed, signed, and stamped.

Note: Although checked at processing this does not certify that a competitor's equipment cannot be a source of disqualification in the competition.

4. Mark the models and engines and record the number of models and engines
5. Pull test the safety strap and safety wire and check that the safety strap works properly.

D.1.2. Rule F2D.3. Combat Site

If the centre (pilot) circle is laid out on other material other than grass, it is recommended that this material have a maximum radius of 4 metres although the pilot (centre) circle must be marked with a radius of 2 metres.

Circles should be made with white colour using paint, chalk, or plastic strip (can be used except for the pilots' circle). If plastic strip is used, the organizer must make sure it is laid out and fastened in such a way that it will not cause a trip hazard to pilots or mechanics.

To improve the visibility of the marking, a second line of a different colour can be added to the circles. To help red/green colour-blind pilots, mechanics and officials, red lines should never be used on grass.

Contestants not directly involved in the organisation or flying in a heat should always be requested to withdraw behind the safety fences or outside the contest area. Spectators and others not involved in the Combat Contest must at all times stay behind the safety fences or at the designated places.

The organisers should provide special safety fences for the Scorers/Timekeepers. Judges and Team Managers should also use this safety measure as intended when flying is in progress.

The safety strap and shut offs must be used during practice flights.

It is strongly recommended that the Circle Marshal, the pilots and the mechanics use a protective helmet that includes a face guard (grid) and neck protector. It is also recommended that upper body protection in the form of a long-sleeved jacket or vest reinforced with "Kevlar" or a similar material is worn during the match.

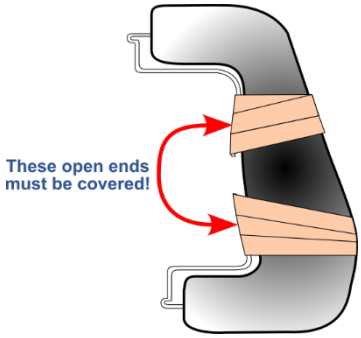
D.1.3. Rule F2D.4. Competitor

There is no rule saying that the mechanic(s) must be of the same nationality as the competitor. This means that a single competitor from a country can find and employ mechanics at World or Continental Championships. The only requirements are that they possess a valid Sporting Licence and are not registered for another National Team.

When the pilot is outside the centre circle for reasons other than picking up the handle or waiting for his model to be serviced, all rules that apply to mechanic(s) also apply to the pilot.

D.1.4. Rule F2D.6. Characteristics

b) All handle and line connections should be covered in such a way so as not to interfere with the opponent's lines but may not be longer than required to cover the connectors. More than one connector per line at the handle and at the model aircraft is not permitted. Note that open connection connectors are not allowed (see sketch). Pilots using this type of handle must tape the



handle before the heat.

f) There must always be a safety wire connection between the engines and the lines.

h) No sharp edges, abrasive or sticky areas that might assist the cutting of the streamers are allowed on the model.

k) When referring to the engine shut-off (engine stop) device this covers both the anti fly-away device (shut-off) and the system used to stop the engine at the pilots will.

D.1.5. Rule F2D.7. Technical Verification

d) Demonstrations of a working shut-off can be requested at random by an official.

e) When pull testing the safety wire it is recommended to ask the competitor (owner of the model) in which direction to pull.

D.1.6. Rule F2D.9 Streamer

The mechanic(s)/pilot may not ask for another streamer just to save time in a heat; for example, if it is wrapped around the lines or if a fly-away occurs. If a fly-away occurs and the model is stuck up in a tree or a net or is unable to be reached, the pilot may choose to continue with a new full-length streamer instead of having a re-flight (if granted be the Judges).

All parts of the opponent's streamer/string should be cleared from the pilot's own streamer/string before re-launching.

No matter that the competitor uses a metal ring or not to attach the streamer to the model, the string should have a single loop and one knot.

D.1.7. Rule F2D.10. The Heat from Start to Finish

f) When the model is launched, the pilot should walk directly into the centre circle. It is the responsibility of the competitor to make sure where the Circle Marshal is to avoid running into him.

h) At take-off and before the signal to start combat the models should fly level in an anticlockwise direction. The competitors are not allowed to do any loops or other manoeuvres unless asked to

i) do so by the Circle Marshal in order to separate the models. Take-off should take place in level

flight forward, not upwards or backwards. Any contravention of these rules will result in a disqualification.

k) In conditions of heavy wind, a grounded model which does not have a running engine may be moved to a safer launching position under supervision by the Judges. While doing this, the mechanics are not allowed to carry the model aircraft and lines over an opponent's grounded model aircraft and/or pitting crew. Parts of a crashed model aircraft are not considered a grounded model aircraft. It is a crashing/landing team's responsibility to maintain a safe distance. If two teams crash/land close to each other it is the rearmost team's responsibility to move backwards unless they are blocked by the other team's second model. This will be supervised by the Judges, and they will advise the teams if any unclear situation occurs.

l) The mechanic(s)/pilot may move around within their pitting area. A team's pitting area is considered as the place where they have one or both models and a distance of approximately 2 metres on each side of the model(s). To assist in untangling lines, mechanics/pilots may be allowed to move around inside the flight circle.

n) The pilot will receive a yellow card if he uses a rough or unsafe flying style, causes a line tangle or if he shows unsportsmanlike behaviour. The Judges/Circle Marshal shall not hesitate to give a yellow card to keep the level of combat on an acceptable and fair level. A yellow card can be given during the heat or after the heat when the Judges/Circle Marshals have had a chance to confer about situations during the heat. The first yellow card is a 40-point penalty while the second and/or third yellow card is a disqualification from the heat. If the first yellow card incident is considered severe, the pilot shall also be disqualified for the offence.

o) The scorers must be observant and aware that the heat can be stopped.

p) If he chooses to bring the model back closer to the pitting circle, the model and remaining lines should be left at least three metres outside the pitting circle. If the model lands in the pitting circle, or close to it, the model and remaining lines must be collected and kept within the pitting area. The purpose of this is to make sure that there is a clear path for mechanics when running between pitting positions.

The landings shall be supervised and directed by the Circle Marshal to avoid dangerous situations.

C.2.2. Rule F2D.11. Scoring

b) No matter what part of the pilot's equipment (model, propeller, lines, streamer etc) makes the cut, it should be counted.

c) The scorers' times should be rounded down to the nearest whole second and then added together. The added result should be divided by the number of scorers and then rounded down to the nearest whole second. This result should be the competitor's official time in the heat. If any scorer's time shows a significant deviation from the average, it should be excluded (but still noted on the score sheet). If a fly-away occurs the scorers should stop the watches when the model lands. It is then the Judges' responsibility to measure and deduct the number of seconds that occurred between the fly-away and the landing. The same should be done if the pilot is asked to land due to streamer or silencer problems/replacement i.e. the scorers stop their watches when the model lands and the Judges deduct the measured time from the point of decision until the landing.

D.1.8. Rule F2D.12. Re-flights

c) A re-flight may be granted if, for instance, the model is stuck high up in a tree or in a safety net where it will take too long, or be impossible, to retrieve the streamer. The pilot may choose to continue with a new full-length streamer instead of accepting the granted re-flight. It is also possible for the Judges to grant a re-flight if an unsafe situation occurs and continuing the heat would cause risk to the competitors or others.

The Circle Marshal can also grant a re-flight if there is a line tangle where both models are grounded, and he considers the tangle impossible to clear. Before a re-flight is called, both pilots should be asked if they would agree to continue the match without clearing the tangle.

D.1.9. Rule F2D.13. Penalties and disqualifications

A. A competitor will receive a penalty of 40 points:

a) No penalties should be given to the pilot if he is pushed out of the circle. Instead, his opponent should receive a yellow card or be disqualified (F2D.13.C.e) unless the Circle Marshal considers it an accidental incident where neither of the pilots is to blame.

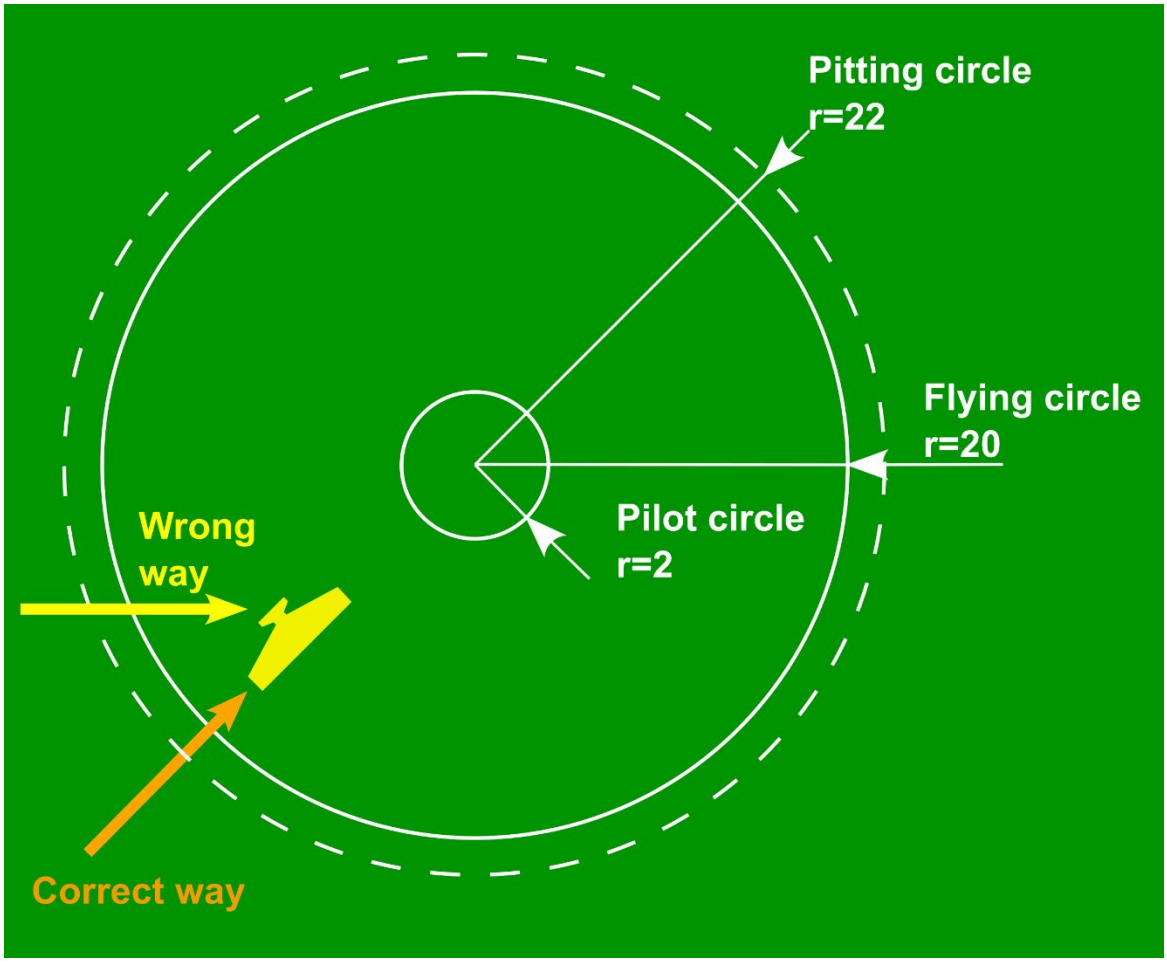
G.1.1.1. Illustration of meaning "step-in" and "step-out":

No step-in	Step-in
	
No step-out	**Step-out**
	

And equally the same feet position is valid for both feet in and out

b) In order to reach a grounded model, the mechanics are not allowed to cut across the flying or pitting circle (see sketch). If a model has crashed close to the centre circle, it is especially important that the mechanic(s) are observant regarding the point at which to enter the circle.

A penalty should be given if, for example, the pilot picks up the crashed model on one side of the centre circle and brings it out on the opposite side of the circle.



If a mechanic runs in the pitting area and jumps over the other team's model or lines, the pilot should be disqualified instead of getting minus 40 points as this is a safety issue.

c) Be observant that all line tangles must be cleared before the model is serviced or the streamer is moved to the spare model. (Except for the case where both pilots have the permission of the Circle Marshal to continue). This rule is also valid if the model is outside the flight circle, for example because of a fly-away.

When a model is withdrawn from the flight circle it must be placed within the pitting area. It must remain outside the flight circle and inside the pitting area otherwise the pilot will receive a penalty of 40 points. A fly-away model may be left where it has landed but lines crossing the pitting area must be cleared so as not to cause interference with the opponent.

f) See F2D.10.n.

j) This rule only applies when his opponent is still flying. However, when both models are grounded both pilots must be observant of their opponent thereby avoiding unsafe situations.

B. A competitor will receive a penalty of 100 points:

a), b), c) and d):

The situation when a model loses the streamer must be carefully watched by the Judges and if the streamer/string can be thought to have been hit or partly cut in a previous attack or mid-air collision then it should be counted as a cut for the opponent (no landing for replacing the streamer).

A part of the string must always be attached to the streamer retaining device. Having only the metal ring (if used) is not enough. If the streamer retaining device is bent or missing due to a mid-air collision, then the pilot should not be given the penalty. Also, if the string is missing and device is intact, but the

model is damaged close to the device, and it can be concluded that the string has been cut in the loop, no penalty should be given.

In all cases during the heat the missed string or streamer should be replaced with a new full-length streamer. In case of an unfurled streamer the pilot can choose to unfurl it or replace it with a new full-length streamer.

If the model lands after the heat and has no string, only the penalty should be given.

F2D.6. c):

A landed model without a silencer or with a damaged silencer must have the silencer replaced before the model can be used again.

C. A competitor will be disqualified from the heat:

a) This means that a model without a silencer, a working shut-off, a streamer hook etc cannot be used again until repaired.

c) For safety reasons, it is not allowed to attach tools, weights etc to a crashed model to compensate for a lost outer wing.

f) If lines or handles are dragged into the centre circle by accident, the Circle Marshal should order the pilots to cease combat and fly level until the circle is cleared and it is safe to continue.

h) It is the responsibility of each competitor, and his Team Manager, to be aware of when his flight is scheduled.

m) Crossed lines which do not interfere with the course of the heat are not a problem and is no reason for disqualification. If the spare model aircraft is needed to take-off and it is prohibited by the crossed lines of the opponent, then another situation is created and rule F2D.13.C.t is applied: Interference with his opponent's equipment.

o) When a pilot without a streamer chooses to fly level and combat still is going on, and his opponent flies in such a way to cause a crash or collision the opponent will be disqualified.

p) If his mechanic(s) enters the flying circle while both models are flying, or during a line tangle where at least one of the models remains airborne, or when a model is flying without the control of the pilot.

s) See F2D.10.n.

t) For example, any tampering with the streamer in any way, shape or form can result in a disqualification. This rule can also be used to disqualify a competitor for any other breach of the rules that is not covered in a separate paragraph.

If the mechanic picks up an opponent's model by mistake and immediately puts it back on the ground, then no penalty shall be given unless an unfair situation has been created that negatively affects the opponent.

D.1.10. Rule F2D.14 The Use of Video Equipment

Note that is only the Judges/Circle Marshal/FAI Jury that can decide whether to look at the video recording or not. A competitor may make a request, or his Team Manager may submit a protest after a heat but if the Judges/Circle Marshal feel certain, then they are not obliged to look at the video recording.

D.1.11. Rule F2D.15 Individual and Team Classification

f) Although this competitor will fly his heat in the following round, his score will count in the round where he was the odd one.

i) A junior fly-off follows the rules in F2D.15.h.

D.1.12. Rule F2D.16. Judges and Timekeepers

a) It is most important that the Judges have a good understanding of the rules and that they have a common language as this will reduce delays and possible errors. The Circle Marshal has the main responsibility for the centre circle and the pilots and their behaviour although all the Judges have the right to give penalties. Penalties may be given after a heat when the Judges/Circle Marshal have had a chance to discuss situations that occurred in the heat. In case of three Judges one should be assigned to each pilot and his mechanic(s) while the third Judge will have an overall function. The Judges must work together and watch any models landing/crashing close to them.

b) All scorers should count cuts as well as record airtime for the competitor. Every scorer should have a notepad where he can make records of the number of cuts as well as the airtime (after the heat). A good way is to divide the six scorers into three pairs and spread them around the circle. Each pair will consist of a scorer for each pilot, and they should be instructed to talk to each other during the scoring. If, after the heat, the scorers have a different cut count they must confer and try to come to a decision. They may also ask the Judges for advice.

   It is also recommended that three Scorers per competitor are used at World Cup contests.

ANNEX E – Control Line World Cup Rules

E.1. Classes

The following separate classes are recognised for World Cup competition in Control Line: F2A (Speed), F2B (Aerobatics), F2C (Team Racing), F2F (Team Racing), F2D (Combat) and F2G (Electric Speed).

E.2. Competitors

a) All competitors in the specified open international contests are eligible for the World Cup. See also rule E.3 c).
b) In the F2C and F2F classes, a junior competitor is defined as a team consisting of both the pilot and the mechanic to comply with the CIAM General Rules, C.5.1.

E.3. Contests

Contests included in the World Cup must appear on the FAI Contest Calendar and be run according to the FAI Sporting Code. The contests to be counted for a World Cup in a particular year are to be nominated at the CIAM Bureau Meeting at the end of the preceding year and are to be indicated on the FAI Contest Calendar. The selection of the contests for each class should be according to the following guidelines:

a) Any country may host two competitions in each class on its own behalf unless the specific country extends over three or more time zones, when it may host two competitions on its own behalf within each time zone.
b) Additionally, any country may host a maximum of one competition in each class on behalf of another organising country regardless of whether or not the host country extends over three or more time zones.
c) In the case of b), at least one competitor from the organising country must compete in the competition for the competition to be valid. The competitor(s) from the organising country must comply with the definitions in E.4. Points Allocation.
d) Each competitor (team in F2C) may count only one competition from each organising country in Europe (taking the better score for any European organising country in which he has scored in two competitions). When two competitions per time zone have been organised and held within a time zone, the better score per time zone counts.

E.4. Points Allocation

In each competition, points in a class will only be allocated if the competitors who have completed a flight in that class are from at least two different countries.

A competitor (team in F2C) has completed a flight if:

- he registers a speed not equal to zero (0) in F2A or F2G.
- he registers a score not equal to zero (0) in F2B.
- he registers a time not equal to zero (0) in F2C.
- he flies in a heat in F2D

In F2A and F2G, the points allocated to each competitor will be the same as the achieved speed result in km/h.

In F2B, F2C and F2D, the points to be allocated to competitors (teams in F2C) will depend on the number (N) of competitors (teams in F2C) who will have completed at least one flight in the event.

Points are allocated to competitors (teams in F2C) who will have completed at least one flight according to their placing in the results given in the following tables:

a) N > 20

Placing	1	2	3	4	5	6	.....	20	21 and after
Points	20	19	18	17	16	15	.....	1	0

A bonus of 8 points is given to the first, 5 points to the second and 3 points to the third.

b) N < 20 or N = 20

Placing	1	2	3	4	5	6	.....	N-1	N
Points	N	N-1	N-2	N-3	N-4	N-5	.....	2	1

The bonus is defined as follows:

- for first: N/3 rounded up to the nearest whole number of points with a maximum of 7 points;
- for second: N/5 rounded up to the nearest whole number of points with a maximum of 4 points;
- for third: N/7 rounded up to the nearest whole number of points with a maximum of 3 points

In the event of a tie for any placings, the competitors (teams in F2C) with that placing will share the points which would have been awarded to the places covered had the tie been resolved (round up the score to the nearest whole number of points).

E.5. Classification

The World Cup results are determined by considering the total of points obtained by each competitor (team in F2C) in the World Cup events. Up to three events may be counted, selecting each competitor's (teams in F2C) best scores during the year. The winner of the World Cup is the competitor (team in F2C) with the greatest total.

In the event of a tie for first, second and third place, the place will be determined according to the following scheme. The number of events counted is increased from three, one at a time, until the place is obtained. If this does not separate the tied competitors, then the winner will be determined by considering in the best three events:

- in F2B and F2D the points obtained in each event multiplied by the number of competitors who will have completed at least one flight in the event; the winner is the one with the greatest total thus calculated.
- in F2A the best speed and in F2C the best time.

E.6. Awards

The winner is awarded the title of the winner of the World Cup. Medals and diplomas shall be awarded in accordance with CGR C.2.2.3. Further trophies may be awarded by the CIAM F2 Subcommittee as available.

a) Juniors

There will be a separate classification for juniors and females provided that 5 or more competitors compete in any World Cup class of the World Cup series. The winner is awarded the title of winner of the Junior World Cup. Medals and diplomas shall be awarded in accordance with CGR C.2.2.3. Further trophies may be awarded by the CIAM F2 Subcommittee as available.

E.7. Organisation

The F2 Subcommittee shall be responsible for organising the World Cup and may nominate a responsible person or special subcommittee to collect the results.

E.8. Communication

The F2 Subcommittee should receive the results from each contest in the World Cup and then calculate and publish the Current World Cup positions. These should be distributed to the news agencies and should also be available, by payment of a subscription, to any interested bodies or individuals. Final results of the World Cup are to be sent also to the FAI, National Airsports Controls and Model Aircraft press.

E.9. Responsibilities of Competition Organisers

Competition organisers must propose their event for inclusion in the World Cup when nominating events for the FAI International Sporting Calendar. The final selection of events from these proposals is

made by the CIAM Bureau as defined in paragraph 3. Immediately after the event, the competition organiser must send the results to the World Cup organiser, at least within one month as required in the Sporting Code B.5.5. Any failure to return results promptly will be reviewed by the CIAM Bureau when considering the competition calendar for the following year.

E.10. Board of Judges

A Board of three persons shall be nominated by the F2 Subcommittee Chairman in accordance with CIAM General Rules C.7.4 World Cup Board.

ANNEX F – CLASS F2F – CL DIESEL PROFILE TEAM RACING

The rules for F2F are the same as F2C except for the variations shown below.

The difference between F2C and F2F are the specifications of the aircraft/equipment used. The focus in this racing class is on flying, not on technical development/innovation.

The specifications of the equipment used, are set to make this class sustainable and affordable, and to offer competitors a platform for developing their flying skills.

F.1.1. Diesel Profile Team Racing Event.

a) See F2C.1
b) Race
   i) The maximum time allowed for a qualifying race is 5 minutes.
   ii) The qualifying races are run over 100 laps corresponding to 10 kilometres. The final race is run over 200 laps corresponding to 20 km. Two pit stops (landings for refuelling) are mandatory for a qualifying race and five for a final race.

F.1.2. Team racing Site

See F2C.2

F.1.3. Team Racing Model, Engine and Control System

See F2C.3

F.1.4. Engine Characteristics

a) The engine maximum swept volume of motor: 2.5 cc.
b) The engine must be a diesel type with suction feed.

F.1.5. Model Characteristics

a) See F2C.3.2
b) Weight
   i) Total maximum weight with empty tank is 700 g.
   ii) Total minimum weight with empty tank is 350g.
c) Profile fuselage: minimum height at the top of the cockpit: 100 mm, maximum width: 26 mm.
d) The propeller must be a commercially available plastic/glass composite type of 7" × 5.5" (177.8mm × 139.7mm) or larger. Moulded carbon and/or fibre glass propeller are forbidden. The minimum diameter of the propeller at the start of a race is 170 mm.
e) The maximum volume of fuel and oil permitted in the single tank shall be 15cc.
f) The use of multi fuel refuelling systems is not allowed.
g) The landing gear must be arranged to permit normal take-off and landing. The landing gear must be of the permanent fixed type. Retract landing gear is prohibited.
h) Engines of the front exhaust type may be fitted with a simple deflector shield preventing exhaust gasses being blown back into the exhaust port.
i) The engine must be side mounted and can only be covered by the maximum fuselage width; all other parts of the engine must be totally exposed. Any engine integral parts or the addition of any parts that form a cowl, ducting, cover or shield, whether attached to the engine or the model airframe, are forbidden.

F.1.6. Fuel

No fuel restrictions.

F.1.7. Technical Checks

See F2C.4

F.1.8. Organisation of Races

See F2C.5.

F.1.9. Race from Start to Finish

See F2C.6.

F.1.10. Definition of an Official Flight

An official flight is completed when the conditions in 4.H.7 are met.

F.1.11. Warnings Disqualifications and Penalties

See F2C.8

F.1.12. Classification

See F2C.9

F.1.13. Timekeepers

See F2C.12

F.1.14. F2F Panel of Judges

See F2C.13

Annex G - Control Line Organisers' Guide

Foreword

This guide is intended to give some helpful advice to organisers of international contests. The guide should be looked upon as a set of recommendations concerning contest organising, and the statements are in no way to be regarded as definite rules except in those cases when they quote the Sporting Code. This guide is written for World Championships but can be used for any international competition. If so, compare with the Sporting Code for deviations.

FIRST PART: PRE-CONTEST ARRANGEMENTS

Contents:

For the time schedule for organising World and European Championships and the information required by the CIAM Bureau, see General Organisation of a World Championship.

G.1. Information

G.1.1. The offer to organise will be given not later than at the CIAM Plenary meeting the year previous to the WCh/CCh.
G.1.2. First information can be given at the next Plenary meeting.
G.1.3. First information to intended judges and jury members should preferably be distributed not later than 1st January of the year of the WCh. This information is that approved by the CIAM Bureau at the previous December meeting.
G.1.4. The jury members must be chosen according to CIAM General Rule C.7.1.
G.1.5. The Judges must be chosen from the approved FAI list of judges and according to Sporting Code CIAM General Rule C.7.5 and Volume F2 Section 4C para. 4.2.11, F2C.13. and F2D.15.
G.1.6. Information to National Airsports Controls and entry forms must be dispatched in accordance with CIAM General Rule C.15.4. This information must contain date, place, time, schedule and name and address of contact person. It is possible to ask for a preliminary number of entrants at an early stage and have this figure completed with names at a later date but not later than one month before the competition.
G.1.7. Information to the CIAM Bureau shall be given by a delegate from the organising nation at the Bureau meeting in the December prior to the competition.
G.1.8. This information shall include jury and judges according to CIAM General Rules C.7.1 and C.7.5 and Volume F2 rules 4.2.11, F2C.13 and F2D.15.
G.1.9. An example of this information is given in General Organisation of World Championships.
G.1.10. The organiser must acknowledge receipt of the entry form and the entry fees (CIAM General Rule C.13.4 c)). This should be done in due time before the contest.

G.2. Publicity

G.2.1. A first set of information to national press, radio and TV can be dispatched about half a year before the contest. It should contain common information about model flying and some basic information about the international contest which is to be run.
G.2.2. Simultaneously a set of information should be sent to the international model flying press.
G.2.3. About two months before the contest, an information meeting should be arranged with invited guests from the main national newspapers and radio and TV.
G.2.4. At this stage it should be possible to release detailed information about the contest, such as the number of entrants, etc.
G.2.5. A second set of information should be distributed as 2.1. and it should contain mainly the same information as given under 2.3. It should also be sent to the international model flying press.
G.2.6. Press conferences to be held during the contest should be prepared.
G.2.7. Posters about the contest should be distributed at least in the city where the contest area is located about one month prior to the contest.

G.3. Time Schedule

G.3.1. A common time schedule for Control Line WCh/CCh is as follows:

1st day	Arrival			
	F2A	F2B	F2C	F2D
2nd day	Processing, Official training, Opening ceremony			
3rd day	1st Round	1st Qualifying flights	1st Round	Eliminating round
4th day	2nd Round	1st / 2nd Qualifying flights	2nd Round	Eliminating round
5th day	3rd Round	2nd Qualifying flights	3rd Round	Eliminating round
6th day	Free training	2nd Qualifying flights		Eliminating round
7th day	4th Round	Fly off rounds	Semi-finals, and finals	Semi-finals, and finals
8th day	Departure			

F2A: The round start time should be set so that the round will finish at approximately 18.00. This time should be calculated to include 30% of the entry anticipated to make second attempts. Round four should be scheduled to finish immediately prior to the F2C final.

G.4. Practice Flights

G.4.1. The fact that some teams prefer to arrive several days in advance for practice flying should be considered. Accommodations should be arranged or at least advised prior to the contest, and the tracks or any suitable area in the neighbourhood must be open for flying.
G.4.2. During the contest it should be possible to perform practice flights within the contest area or in another suitable place close to it. The tracks should be open for test flights whenever they are not used for contest rounds, except for Combat.
G.4.3. If space permits an extra circle for test flying is recommended within the contest site.
G.4.4. If test flying only can be arranged far away from the contest site a transportation system of suitable frequency (e.g. mini-buses) must be available.

G.5. Awads

(CIAM General Rule C.21.)

5.1. The organiser should contact the FAI and the CIAM Secretary to confirm that perpetual trophies, diplomas and medals are delivered to the contest in due time.
5.2. If there is any intention to offer a new perpetual trophy, it should be approved by the CIAM Plenary Meeting the year before the contest.

G.6. Contest Grounds

G.4.5. General

The site should be chosen in such a way that the following are considered:

6.1.1. Distances between accommodation - meal places - contest ground should be kept to a minimum.
6.1.2. Easy transports for entrants and spectators. Bus tours should be organised.
6.1.3. Parking areas for entrants and spectators.
6.1.4. Noise problems (if any).
6.1.5. Windy places should be avoided, if possible.
6.1.6. Turbulence caused by trees or houses surrounding the circle (especially for Aerobatics) should be avoided.

G.5. Layout

G.5.1. The area should preferably contain three hard circles and if Combat is included two grass circles. The circles shall be horizontal.
G.5.2. The distances between the circles must permit safe passage of pedestrians while the model aircraft are flying.

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

For Combat, the circles should be laid out on grass.

G.6. Depots

G.6.1. 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- shades.
G.6.2. Avoid putting the depots so close to the tracks that motor testing interferes with the starting procedures.
G.6.3. The depots should be organised in such a way that spectators cannot obtain access to them. They should be easily entered by the competitors.
G.6.4. 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.

G.6.5. Tables and chairs in each depot are always appreciated.

G.7. Site

G.7.1. 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.

G.7.2. 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.

G.7.3. The Combat circles should be laid out on grass. The centre piloting circle may be laid out on grass or any other suitable (non-slippery) material having a radius of maximum 4 metres.

G.7.4. Except for Combat, 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.

G.7.5. Except for Combat, if the flying surface is shaped like a ring, then enough space must be left both inside and outside the 19.6 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.

G.7.6. For Combat a space of at least 5 metres should be left free around the pitting circle to position scorers/timekeepers, team managers and judges with their protective fences and to give space to the pitting crews (when running).

G.7.7. 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 take-offs and landings.

G.8. Tracks

G.8.1. Speed

6.5.1.1. The Speed circle must be surrounded by a fence (see rule 4.0.1). It should be placed as close to the track as possible, but the radius must not be less than 24 m. There should also be a place for timekeepers, officials and their equipment.

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

6.5.1.3. On the fence, diametrically opposite to the timekeepers' place, there should be a mark on the fence, preferably a white board, 20 cm wide and at least 2 m high. It should be placed at the normal flight level at 1 - 3 m height.

6.5.1.4. At three evenly spread places there shall be T-marks showing the flight heights of 1 m, 3 m & 6 m.

6.5.1.5. The fence shall have one entrance and one exit opposite to each other.

6.5.1.6. Just outside the entrance there shall be a line control area, fenced off with a low fence or a rope. In this area the line length 17.69 m will be marked by marks firmly fixed to the ground. The marks should preferably be of the edge type, and the edges not wider than 2 mm.

6.5.1.7. In the centre of the circle there shall be a Speed pylon according to para. 4.1.7. The pylon must be firmly fixed to the ground.

6.5.1.8. Any protruding part which may engage the pilot's clothes must be avoided on the lower (non-rotating) parts of the pylon.

6.5.1.9. The pylon must be checked for sufficient stiffness in the fully extended position. The pylon must reach a sufficient height to permit flying with the handle at shoulder level.

6.5.1.10. The device which holds the upper (rotating) part of the pylon at the height chosen by the pilot, must be built in such a way that it assures a positive positioning avoiding any displacement during the official flight. Checks are recommended in this respect, in case of an old pylon, after prolonged use and wear.

6.5.1.11. The swivel must be free from any appreciable friction or stiffness.

6.5.1.12. eventual bolts for fixing the pylon to its base or the ground must be under ground level or conveniently covered flush to the ground, so the pilot is allowed to run around the pylon with his feet close to it without hindrance. If the pylon has a flange for fixing it to the ground, the same aspects should be regarded.

6.5.1.13. The judges and the timekeepers should be placed in a special area with a safety fence between themselves and the flying models. The area must be chosen so the officials have the sun behind their backs, and so it does not interfere with the timekeeping.

6.5.1.14. A duplex electronic timing system is used, the sensors shall be placed in a shaded area facing away from the sun. Care should be taken to ensure that no moving shadows cross the sight path of the sensors.

6.5.2. Aerobatics

6.5.2.1. Contest organisers shall provide a site with one or more Contest Flight Circle/s that are, relative to the centre of the circle, horizontal within plus/minus 30 cm across the entire diameter of each circle. Contest Flight Circles shall also be flat and have smooth and ridge-free surfaces. If surfaced in asphalt, concrete, or similar hard material, the surface should be dust-free (that is: not packed gravel or sand, nor paved or tiled with openings between the paving material). Hard surfaces should, as a minimum, provide sufficient hard area to include at least the whole of the pilot's circle plus a "ring" for model aircraft to use during take-off and landing (see diagram). During contest flying all grass, soil, etc, lying between these 2 areas shall be kept short enough and level so as not to interfere with control lines when model aircraft are taking-off and landing.

6.5.2.2. If Contest Flight Circle/s are wholly grass (or similar), the same requirements as in paragraph a) above shall apply, and also, the centre (pilot's) circle and take-off and landing area should have an underlying surface which is free from any bumps and/or holes. The standard required shall be better than that of a typical local sports field (a football field for example), and should be as close as possible to a high quality, level, well-tended and well-drained domestic lawn. The length of grass shall be kept to a maximum of 2.5 cm over the complete Contest Flight Circle during contest flying.

6.5.2.3. The diagram at Appendix II shows the dimensions for contest **and practice** flight circles and the markers to be erected **at first category events** every 1/8th of a lap interval indicating the height of the horizontal base which lies 1.5 m above the centre of the circle. As a minimum standard, all contest flight circle/s shall have the centre (pilot's) circle and outer diameter circle clearly marked with lines of 10 cm width. The erection of a safety fence (or other suitable barrier) around the outside of all contest flight circles as shown below is also recommended.

6.5.2.4. The use of "Ready Box"/es is recommended at all contests. These should be clearly marked, segregated from general access by barriers, and be large enough to contain a model aircraft with full-length lines attached. Ideally three such Ready Boxes should be provided if the site is large enough. It is also recommended that one "Exit Box" is also provided. This should be positioned on the opposite side of the Contest Flight Circle to the Ready Box/es, of a similar size to the Ready Box/es, and similarly marked and segregated.

6.5.2.5. At World and Continental Championships and other limited international contests, organisers shall also provide Practice Circle/s. These shall be located at the contest site itself, but in any event shall not require more than 30 minutes of normal travelling time to reach from the contest site. Organisers should provide a minimum of one Practice Circle for every 50 registered contestants. All Practice Circles shall be freely open and available for use by all contestants for at least the duration of the contest, plus also for a suitable time before the start of the contest. All Practice Circles should be as close as possible to the standard and maintenance conditions set out at paragraphs a) and/or b) above; but except for the marking of the centre of the centre (pilots') circle and the outside diameter circle, the marking of circles as described at paragraph c) above shall not be required. However if the Practice Circle/s site is open to public access then organisers shall also erect suitable safety barrier/s and warning signs in the local language.

6.5.3. Team Racing

7.1.10.1. 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. F2C.2. The circle lines shall be 10 cm wide. The safety circle shall be a broken line consisting of dashes 25 cm long with 25 cm gaps, and a width of 2.5 cm. 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 I.

7.1.10.2. The Team Race circle must be surrounded by a fence 2,5 m high (see rule 4.0.1). It should be placed as close to the track as possible but the radius to the circle centre shall not be less than 24 meter.

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

7.1.10.4. 6.5.3.4. Wire fences 2 to 2,5 m height and 2 to 2.5 m wide must be provided to protect all staff who have to be inside the circle during races. These fences may also be used by pitmen and team managers. The judges must also be provided with a similar safety fence.

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

7.1.10.6. The fence shall have separate entrance and exit areas to allow a smooth flow of entrants at the end and beginning of each race.

7.1.10.7. 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.

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

7.1.10.9. 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.

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

7.1.11. Combat

6.5.4.1. The Combat track should consist of short cut grass.

6.5.4.2. The centre (piloting) circle (radius 2 m) the flight circle (radius 20 m) and the pitting circle (radius 22 m) must be clearly marked on the ground.

6.5.4.3. The centre piloting circle may be laid on grass or any other suitable non-slippery material that has a maximum radius of 4 metres.

6.5.4.4. The track should be fenced off with low fences or rope or by other means. A football ground or similar is ideal. A safety fence with a minimum height of 3 metres (5 metres preferred) should protect all spectator areas. If a stand is being used for spectators then the net should be of a corresponding height.
Fabric nets with meshes of around 12 cm are ideal. The meshes should not be so small as to impede the visibility of the model aircraft and streamers for the spectators.

6.5.4.5. A square for processing and line tests shall be arranged. It should contain two line length marks 15.92 m apart and protected by a meshed fence of 3 m height. For the administration and other officials their working area should be protected by a meshed fence of minimum 3 m high.

6.5.4.6. The judges, time-keepers/scorers and team managers should be protected by small mobile fences of 2 to 2.5 m height and 1.5 to 2 m width. Placing 6 of these around the pitting circle will be adequate.

6.5.4.7. In an attempt to stop fly-way models, even if they have a workable engine shut-off, from leaving the flying site in unwanted directions long posts with a safety net can be erected outside parts of the pitting circle. Only the competitor, his helpers and the officials are allowed to stay inside the safety fences or safety circles. Persons who have fulfilled their mission must leave the flying area.

G.7. PA Systems

7.1. One system addressing the spectators.

7.2. One system addressing the entrants, calling them for flights, etc.

7.3. One system to be used by the Team Race jury addressing teams during their races.

7.4. Fixed devices are needed in Combat and are very useful in Speed and Aerobatics.

Note: 7.1. and 7.2. can be combined. 7.3. cannot be combined with any other use.

G.8. Equipment

G.8.1. Measuring Equipment Specification:

The contest organisers should procure the following minimum equipment for use at the Championships:

G.8.2. Line Measuring

8.2.1 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.)

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

8.2.3 Pin gauges of 0.35 mm for Team Race and 0.4 mm diameter for Speed and Combat to DIN 2269 standard to calibrate the micrometer and thickness gauge.

G.8.3. Engine Measuring

G.8.3.1. For measuring the bore a minimum of a self-centring (three-point) micrometer gauge with a minimum graduation of 0.005 mm and an accuracy of +- 0.002 mm should be used. A standard sizing ring appropriate to the instrument and manufactured to the appropriate DIN standard must also be supplied in order to calibrate the bore gauge prior to use.

G.8.3.2. For measuring the stroke a dial gauge with a minimum of 20 mm travel, a minimum graduation of 0.01 mm and an accuracy of +- 0.020 mm fitted with a suitable stop to rest on the top of the liner should be used. For measuring an engine which is close to top limit of capacity, a 0 to 25 mm depth micrometer with minimum graduations of 0.005 mm and an accuracy of +- 0.002 mm should be used. The dial gauge is the preferred instrument for stroke measurement because of its ease of use.

G.8.4. Measuring Equipment Method of Use

G.8.4.1. 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*.

G.8.4.2. Methodology for Engine Measuring Equipment

There are different problems associated with measuring Speed, Combat and Team Race engines. These problems are related to the fit and construction of Team Race engines.

G8.4.2.1 Speed & Combat Engines

On engines using removable heads, as commonly used in Speed and Combat and where it is possible to turn the engine over TDC easily, the bore should be measured at or near TDC as currently specified.

The stroke should be measured using the dial gauge supported on a suitable foot and mounted on the top of the crankcase or liner.

8.4.1.1 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

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 Speed

An optical electronic timing device in duplex or 3 stopwatches showing at least 1/100 sec for clocking the speeds.

1 stopwatch for clocking the attempt times

1 pair of field glasses, on a tripod, used to check the position of the handle in the pylon fork.

1 pylon (para 4.1.7.)

1 handle (para. 4.1.7.)

1 table and a sufficient number of chairs for the officials.

Sun- or rain-shades for the officials

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 $\pm$ 5 g accuracy

1 spring balance for pull tests 0 - 50 kef.

1 measuring tape 20 m

Fuel to the standard formula (para. 4.1.3.)

A number of plastic bottles about 200 cm^3 capacity for filling of tanks.

1 - 3 squeeze bottles or injection-syringes for rinsing the tanks.

8.6 Aerobatics

1 or 2 stopwatch(es) for clocking time phases (paragraph 4.2.13)

1 or 2 device(s) for pull tests 0-35 kgf (paragraph 4.2.4)

1 2m x 2m outline (for checking maximum wingspan & overall length (paragraph 4.2.2))

1 balance minimum 4 kg capacity $\pm$ 10 g accuracy

1 or 2 measuring tapes minimum 25 m

1 voltmeter minimum up to 50 V dc

1 or 2 device(s) for visual signalling of the time phases (paragraph 4.2.13.)

3 or 6 chairs and 3 or 6 rain- or sunshades for the judges

3 or 6 blotting pads for the judges

8.7 Team Racing

9 stopwatches registering at least 1/100 sec.

9 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 (para. F2C.13.b.)

2 sets of coloured pieces of cloth for each team. 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

Sun- or rain-shades if needed

1 table for the Panel of Judges

Cleaning equipment so the oil and fuel could quickly be removed from the starting positions.

8.8 Combat

Venturi and silencer gauges.

Micrometer for line thickness measurements.

1 stopwatch to clock the heat time.

6 stopwatches with start/stop functions (accumulating) to clock the flight times

1 micrometer 1/100 mm resolution

1 depth micrometer 1/100mm resolution

1 internal diameter micrometer with its calibrating tool (0-15 mm)

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 spring balance for pull tests 0 - 50 kgf.

1 measuring tape 25 m

1 flag

1 starting pistol, whistle, etc.

2 sets of 6-9 vests of different colours to be used be the pilots and mechanics.

Audible signal horn to be used by the circle marshal.

Streamers

6 chairs for the timekeepers and 3 for the judges in case they require them.

1 table for the judges and administration

6 blotting pads for the jury and the timekeepers

Aspirin for all the officials

8.9 Secretariat

The Secretariat should be kept in a house or a caravan, or a suitable tent or office container.

- Computer
- Desk calculators
- Spare stopwatches
- Combat streamers
- Scoreboard
- Felt pens
- Printing equipment

For processing:

- Slide rules
- Contest numbers
- Contest portfolios
- Stamps
- Table of nationality markings
- Sporting Code

Rules displayed, FAI language

Rules displayed, national language

In the Secretariat there should be a sufficient number of officials to serve the different classes such as: calculating personnel, messenger persons, recording personnel etc.

Aerobatic results should be checked twice, by two different officials, before they are released.

Timekeepers and other officials must have sufficient experience.

Special education and training courses for officials must be arranged if there is any lack of experience from international contests.

8.10 Recording of Results

It is recommended that the organisers use software programmes which are approved by the F2 subcommittee to record the Championships results. Where possible results shall be transferred electronically between the contest directors and the Championship secretariat.

G.9. Officials and Judges:

The number of officials needed varies between the different classes. The numbers given are those officials needed for each separately, and the fact that officials sometimes can have doubled duties has not been taken into account.

G.9.1. Contest management:

1 Contest manager

1 Treasurer
1 Quartermaster
1 Secretary
1 PR officer
1 Official in charge of each class
1 Official in charge of transport
1 Official in charge of PA systems

G.9.2. FAI Jury

3 jury members (CIAM General Rules C.7.1 and C.7.2)

G.9.3. Speed:

3 timekeepers (para. 4.1.16.a)
2 judges (para. 4.1.16.b)
1 senior judge (para 4.1.16.c)
2 officials for line tests
1 circle marshal, could be main timekeeper or one of the judges

G.9.4. AErobatics

For Single-Circle Format Contests:
5 judges (para. 4.2.11.)
1 timekeeper (para. 4.2.13.)
1 official for line and pull tests
Tabulating personnel in the Secretariat

For Double-Circle Format Contests:
6 judges (para. 4.2.11.)
2 timekeeper (para. 4.2.13.)
2 officials for line and pull tests
Tabulating personnel in the Secretariat

G.9.5. Team Racing

3 Judges (para. F2C.12.a)
9 timekeepers (para. F2C.12.b)
1 circle marshal (para. F2C.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

G.9.6. Combat:

3 judges
1 circle marshall
6 timekeepers/score counters
2 officials in charge of pull tests
1 official in charge of distribution of official fuel, collection of empty bottles and coloured vests.

G.10. Emergency - First Aid

At least one medical attendant should always be available on the site when flying is permitted. One ambulance, on request.

G.11. Insurance

The organiser must take measures so every entrant is insured against public liability during the contest and during the organised practice flights.

G.12. Accommodation

Accommodation should be of a satisfactory standard. Special attention must be paid to the hygienic problem. Showers should be available. There must be a sufficient number of toilets for all the entrants.

If possible there should be family accommodations as well as separate lodgings for men and women.

Camping facilities are always requested.

G.13. Food

The menu should not be too locally composed, but should rather be of an international kind.

The fact that some entrants' religions could limit the choice of food must be considered.

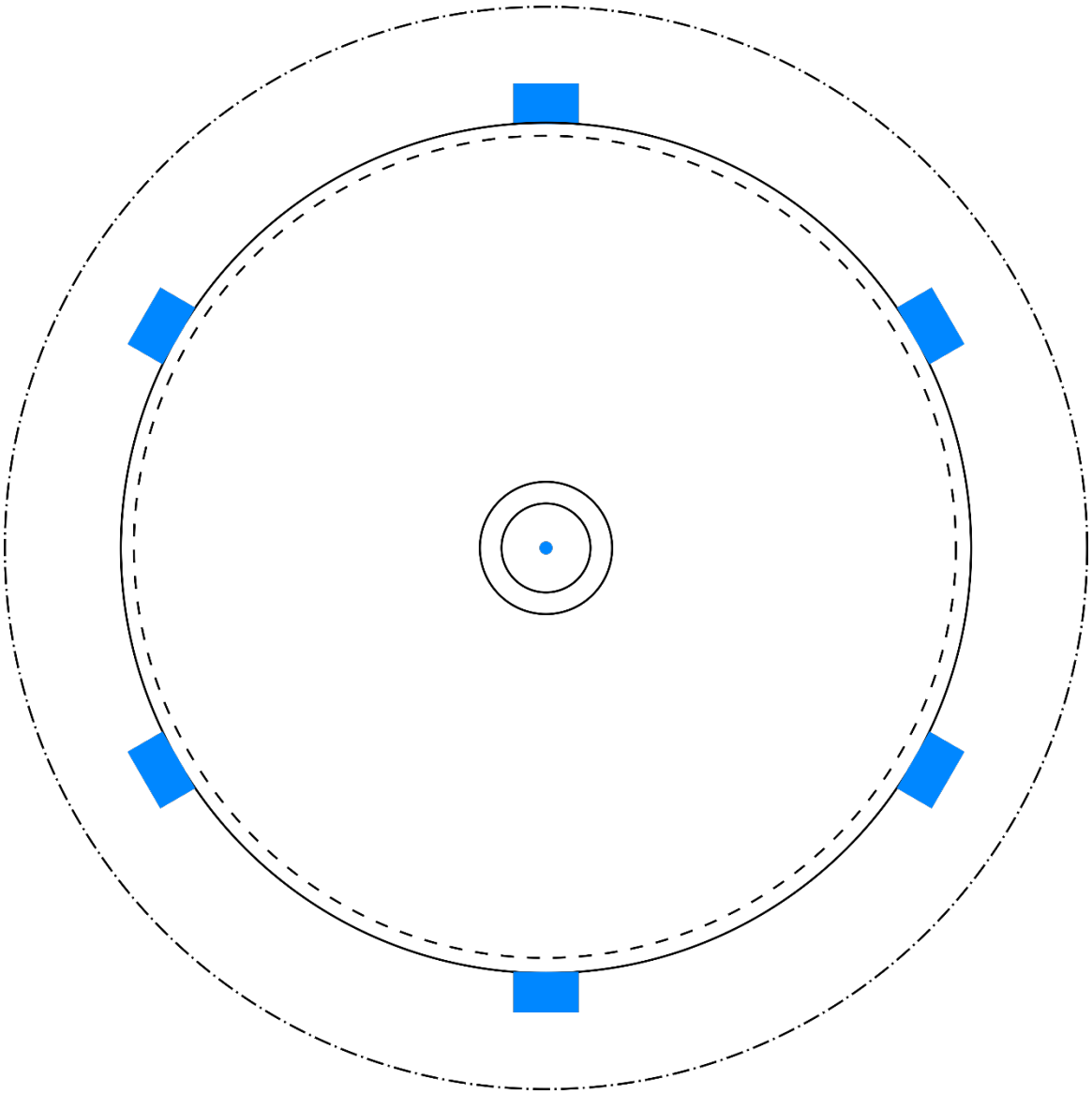
G.14. Fuel

World Championships: The organisers shall provide, 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.

Note: For time schedule, see General Organisation of a World Championship.

Appendixes begin overleaf.

APPENDIX I Team Racing Circle Dimensions



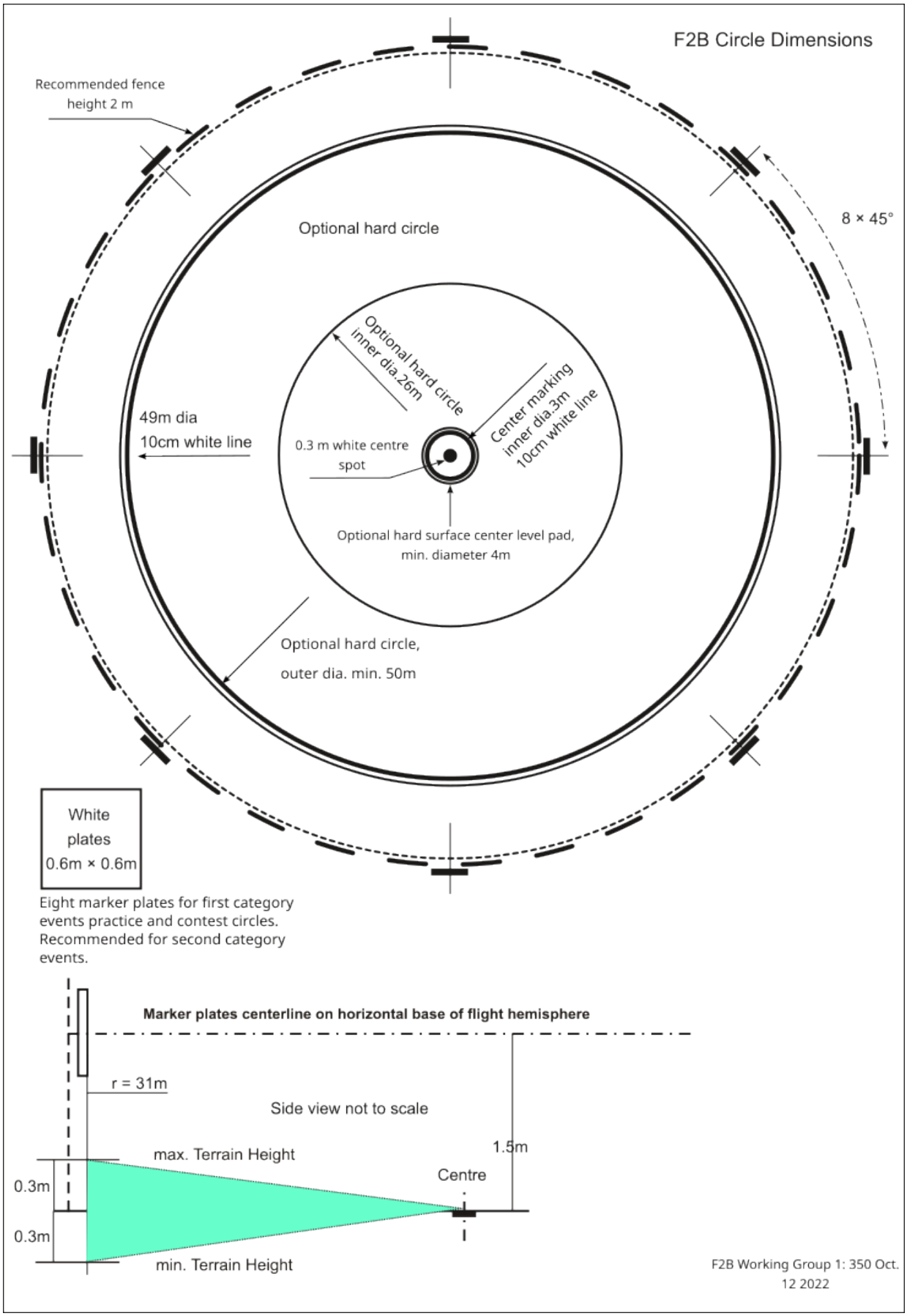
The inner circle, centre circle, safety circle and flight circles shall be marked (painted) on the ground in a colour having a high contrast to the ground, according to Sporting Code Volume F2 para. F2C.2. The circle lines shall be 10 cm wide. The safety circle shall be a broken line consisting of dashes 25 cm long with 25 cm gaps, and a width of 2.5 cm. 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

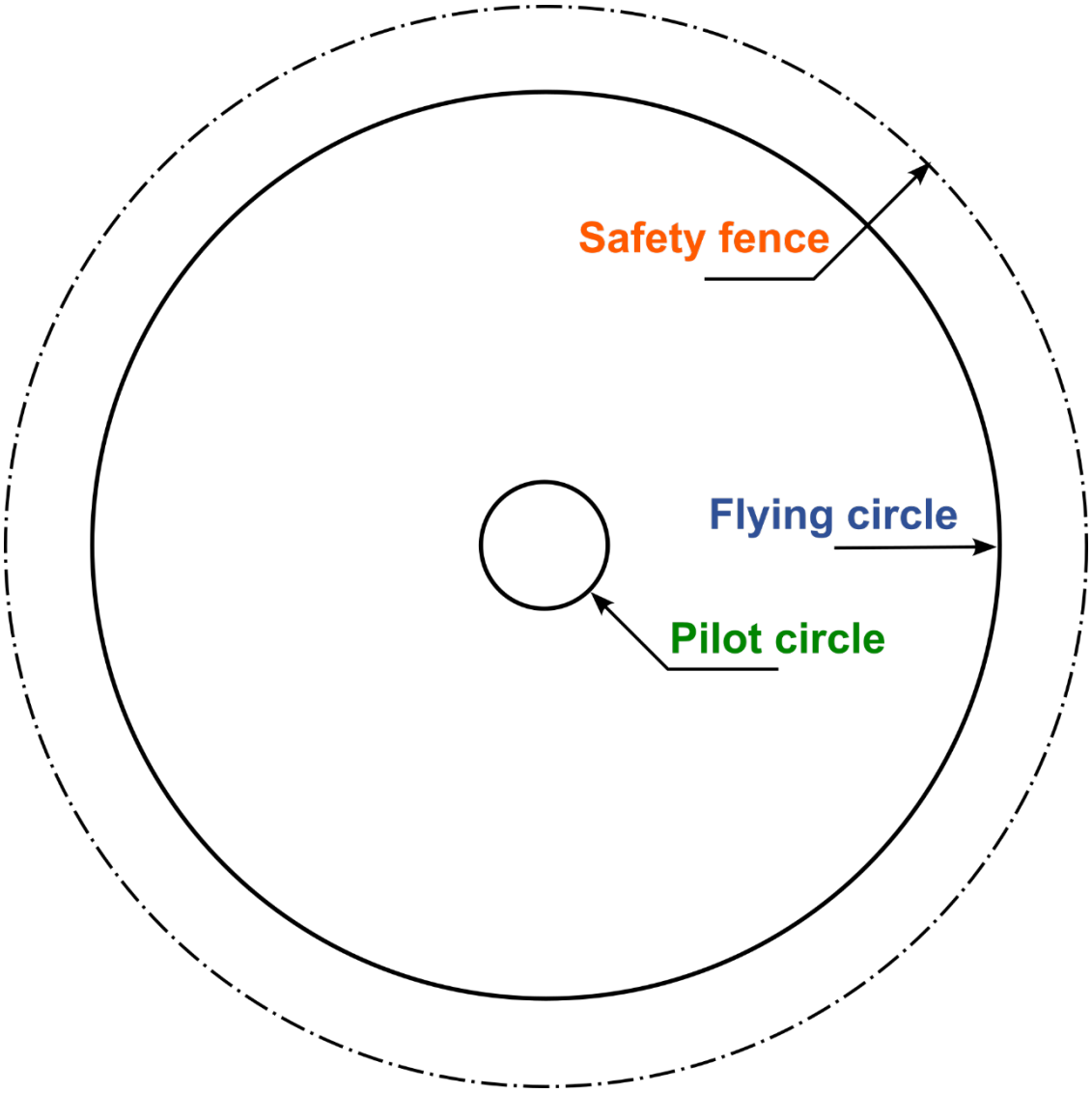
The middle of the centre circle shall be marked with a spot of 0,3 m diameter in the same colour as the circles.

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.

APPENDIX II - Aerobatics Circle Dimensions


F2B Circle Dimensions
Recommended fence height 2 m
8 × 45°
Optional hard circle
Optional hard circle inner dia.26m
Center marking inner dia.3m 10cm white line
49m dia
10cm white line
0.3 m white centre spot
Optional hard surface center level pad, min. diameter 4m
Optional hard circle, outer dia. min. 50m
White plates 0.6m × 0.6m
Eight marker plates for first category events practice and contest circles. Recommended for second category events.
Marker plates centerline on horizontal base of flight hemisphere
r = 31m
Side view not to scale
max. Terrain Height
1.5m
Centre
0.3m
0.3m
min. Terrain Height
F2B Working Group 1: 350 Oct. 12 2022

APPENDIX III - Speed Circle Dimensions



	Radius:	Height:
Pilot circle:	3 m	**N.A.**
Flying circle:	21 m	
Safety fence:	Min. 25 m	2,5 m
Temporary circles:	Min. 25 m	Min. 2 m

Second Part: Contest Arrangements begins overleaf.

G.15. SECOND PART: CONTEST ARRANGEMENTS

Contents:

G.15.1. Reception

Reception should be laid out in such a manner so as to allow the quick handling of arriving teams (or part teams). The name of the team manager should be known in advance so that he may be given details of team managers' meetings, processing times, practice times, need to inspect teams' sporting licences, etc.

As soon as the participants or supporters arrive, they should be given their food vouchers (if applicable) and the place and details (map if necessary) of their sleeping and lodging arrangements. It is of course advisable to have several persons working in parallel to deal with the inevitable sudden influx of competitors.

In addition to the personnel dealing with the above, two other officials should be available at the reception area. One to deal with financial arrangements - late entry fees, etc. and one prepared to

answer any questions of a general nature about the competition timetable, transport, practice times and places, etc.

Some competitors at this time are understandably tense and nervous and are likely to have problems with language and general procedure in a foreign country. Every effort should be made to assist them to join smoothly into a previously prepared scheme.

Verification of sporting licences can often cause a bottle-neck at reception. A possible alternative is to insist that the team managers bring their teams' sporting licences to the team managers' meeting for inspection.

Where transport is available, reception should enquire if arrivals need transportation and make a note of those teams that will require daily transport throughout the contest.

G.15.2. Transport

If the placement of the participants' lodgings are further than a reasonable walking distance to the competition site, the organisers should be in a position to offer transport (to and from the site) to those teams requiring it.

G.15.3. Team Managers Meeting

It is important to hold the first of these meetings as soon as conveniently possible after the arrival of all teams. This information could well be published in the pre-contest material together with a time and place (if known in advance).

A suggested agenda for the TMs meeting is as follows:

a) Welcome of teams by Contest Director
b) Urgent problems involving lodgings, transport or feeding of competitors
c) Introduction of members of juries, judges, etc.
d) Draw for any necessary flying order
e) Comments from FAI Jury on any new rules or flight procedures they feel should be emphasised
f) Comments from other judges or jury members about interpretation of rules or general competition procedure
g) Questions from T/Ms.

Team managers meetings may be held at other times during the contest if the organisers or judges/juries feel that they are necessary.

G.15.4. Opening Ceremony

Where a formal opening ceremony is envisaged, it is suggested that an explanation and a clear order of march and/or standing position of the teams, be given to each team manager at their arrival at reception. Many opening ceremonies have suffered through foreign teams not fully understanding what was expected of them.

G.15.5. Spectators

Understandably at world championships and other major international events, large groups of spectators can be expected. This is often of financial benefit to the organising Airsport Control and indirectly to the competitor (lower entry fees, etc.). Two points must however be considered:

a) In the interest of attracting the spectators to run on other days of the contest, some form of commentary or easily seen, up to the minute, results should be available, in addition to reasonable viewing areas at all circles.

b) The layout of the circles and spectators' enclosures *must* allow for *spectator-free* access to all circles for the competitors and officials.

If spectators are required for financial reasons, then pre-contest publicity must of course be aimed at attracting "the man in the street" in addition to interested aeromodellers.

G.15.6. Secretariat

During the contest the Secretariat should have sufficient personnel to cope with:

a) General queries from competitors and officials
b) Collation and recording of all results
c) Immediate presentation of all results on clearly visible scoreboards adjacent to the Secretariat
d) On a day-to-day basis, the organiser must provide the team managers with copies of the results of each round for each class.

G.15.7. Scoreboards

Scoreboards should be of a type whereby the name, country and placing of each competitor is clearly visible. They should be continuously staffed so as to publish the results as soon as possible after they have been verified and recorded by the Secretariat.

G.15.8. Prizegiving

The possibility of "on the field" recognition of the winners should be considered from the point of view of spectator appeal. The Olympic system of three different height platforms has proved popular. (For team events, two-person platforms might be required).

The official prizegiving usually takes place after all the competitors have finished and before, at or after an official prizegiving banquet. The actual process of prizegiving is up to the host Airsports Control ingenuity, but it is felt that this should not be too prolonged a procedure, bearing in mind that relaxation in tension and naturally festive inclination amongst the competitors.

G.15.9. 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 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, the Panel of Judges, and the team and team manager of the team whose model aircraft are undergoing processing.

G.15.10. Practice

In the interest of giving the competitor the opportunity of performing at his best, provision of practice circles is required. One day prior to the start of the contest is usually set aside for practice (CIAM General Rule C.16.1 d). 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.

G.15.11. Pull Tests

Pull tests on CL models' lines should be carried out as recommended by the Sporting Code or the Safety Rules promulgated by the F2 Subcommittee.

The personnel conducting these tests must be experienced in the use of the equipment recommended and fully understand the safety hazard of an incorrectly performed pull test.

G.15.12. Timekeepers

The organising Airsport control is responsible for supplying the appropriate number of timekeepers for each event as stated in the para. 4.1.16 (F2A), para. 4.2.13 (F2B), para. F2C.12. (F2C), para. F2D.18 (F2D).

The organisers must ensure that the timekeepers are familiar with the class of model to be timed and if any doubt exists, practice sessions before the contest should be arranged. It is particularly important that the timers for class F2A - Speed, should have previous experience in timing these models.

G.15.13. Field Processing

To forestall any infringement of the rules, the organisers should have the facilities and personnel for running spot checks on models throughout the contest.

A random selection of 20% must be processed during the contests (CIAM General Rule C.12 d).) in addition to any models suspected of having characteristics different from those recorded when processed prior to the start of the contest. For F2A, the organisers and FAI Jury must ensure that the potential 1-2-3 placing models are processed immediately after the appropriate flight. In order to do this, they must establish what the likely winning speed might be and the model of any pilot who is within 5 km/h of this speed must be processed after each appropriate flight.

Note: This affects both the individual and team classifications.

G.15.14. Processing of Winners

CIAM General Rule C.12 e) states that all results are subject to the rechecking of the declared characteristics of the first, second and third place models. The organisers must be prepared to impound and process T/R models immediately after the finals.

G.15.15. Ranking - International Team Classification

Complete three competitor teams are ranked ahead of two competitor teams, which are in turn ranked ahead of single competitor teams.

F2D - Individual and team standings will be based solely on the number of matches won. Losses will not be subtracted. Complete 3 competitor teams are ranked ahead of 2 competitor teams, which are in turn ranked ahead of single competitor teams.

G.16. Third Part: Post-contest arrangements

Contents:

1. Results

a) The official results should be released and given to all entrants and the team managers not later than at the banquet on the last day of the event. (General Section 4.16.2.2.)
b) Result information should be given to radio/TV and press agencies continuously during the competition, but also the official results must be given to them as soon as possible when the contest is finished.
c) The official results must be sent to the FAI in accordance with CIAM General Rule C.13.6 c).

2. Reports

a) The international modelling press in some cases have their own reporters present at the competition, at least if it a W/Ch contest. In these cases where the contest is not so well covered by the press the organiser is advised to send reports to those magazines which are not represented at the contest. These reports should also contain a complete list of the official results for all the entrants and, if possible, some snapshots from the competition.
b) Reports must usually be given to the local newspapers together with the results, unless they have had their own journalists covering the event. It is important that these reports are well prepared in advance so that they can be released as soon as possible after the flights.

3. Correspondence

a) The organiser is advised to thank the local authorities which have contributed to the arrangements, by official letters.
b) In some cases the organisers feel that a letter to the National Airsports Control or government authorities of a special team can help the sport in that particular country. In other cases it might be necessary to write a letter of complaint about the behaviour of a special team. The decision to send these kind of letters is, however, entirely up to the judgement of the organiser.

4. Equipment

Any equipment, flags, etc. which have been borrowed from the FAI should be returned as soon as possible after the contest, and not later than one month after the termination of the competition unless anything else is agreed upon by the FAI Secretariat.

G.17. FOURTH PART: SAFETY RULES FOR CONTROL LINE

1. The following safety rules can be enforced by:

- the FAI Jury
- the judges
- the contest director
- the circle marshal
- the processing officials
- pull test officials

The highest authority regarding safety questions is the FAI Jury.

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

3. Safety Precautions

Immediately before each attempt for an official flight the model aircraft, the lines and the control handle shall be pull-tested with a load as specified in the individual sections of the Sporting Code Section 4 Volume F2.

Crash-proof safety helmets with a chin strap should be worn by mechanics in F2C and by mechanics and pilots in F2D. For F2D, all officials and personnel within the flying area should also wear protective headgear.

G.18. Conduct

G.16. During flights, the following is forbidden:

- to deliberately release the control handle while the model aircraft is moving (penalty: disqualification from the contest).
- jettisoning.
- for F2D, the handle with the strap should never be released during combat.

  all safety rules in the Sporting Code Section 4 Volume F2 must be obeyed.

G.19. 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 rule 4.0.1.

This fence should be placed as close to the track as possible but the radius to the track centre should not be less than 24 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 27 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.

G.20. Insurance

The organiser is responsible for ensuring that all competitors are insured against public liability.

ANNEX A - CLASS F2 Speed - JUDGES' GUIDE

The speed classes F2A and F2G are, essentially, simple classes to administer with very few rules. However, it is important that there is continuity of interpretation from one Championship to another and it is for this reason that this Judges' Guide has been written.

A.19. Rule F2A.1.1. Definition of Speed Model Aircraft

Requires no clarification.

A.20. Rule F2A.1.2. Characteristics of Speed Model Aircraft

f) When measuring the surface area, allowance should be made for the geometrically projected shape where the wing and tail join the fuselage.

g) Model aircraft must be checked for the fitment of a shutoff.

h) The shutoff must be checked for mechanical function in the line check prior to each attempt.

i) To check shutoff function:

iii) Using a squash bottle, fuel must be shown to flow from the fuel tank to the engine.

iv) The shutoff must then be activated and resistance to fuel flow from the fuel tank to the engine using a squash bottle must be felt.

j) The fuel bottle should be of approximately 100 cc capacity and must be fitted with a fuel filter.

A.21. Rule F2A.1.3. Fuel

g) It should be noted that the lubricant specified is castor oil only.

h) No additives are allowed so only first pressing castor oil may be used.

i) Proprietary brands such as Castrol M™ which may contain additives may not be used. This is essential to maintain standardisation of fuel supply throughout the world.

j) The fuel mix ratio should be measured by volume and mixed thoroughly.

k) The fuel mix should be tested for methanol/oil ratio by testing its specific gravity using a standard calibrated float.

l) The fuel mix must be verified by the FAI Jury.

c) This rule should cause no problem, but plated wire is not permitted under rule 4.1.4. which states that “no coating material may be applied to the lines”.

d) A micrometer, as detailed in 8.1.1 of Annex 4F Control Line Organiser’s Guide, must be supplied and used by the contest organisers to measure the control line wires.

c) The measured distance covered by the model aircraft must be at least one kilometre.

d) The radius of the flight circle must be 17.69 m (9 laps = 1 km).

c) The pull test must be applied to the handle grip NOT the horizontal cross bar.

d) The pull test on the wrist strap is to test the strength of the strap and its attachment to the handle. It is not to test the strength of the control system.

h) This rule states that “the horizontal cross bar must be in continuous contact with the pylon fork during the official flight”.

i) This statement does not mean that the cross bar must be behind the fork and above the “V” piece as illustrated in the sketch.

j) The important factor is that the cross bar stays in contact with both of the fork prongs throughout the flight.

k) The cross bar may be above or below the “V” or one end of the cross bar may be in front of the fork.

l) Any position other than that illustrated in the sketch makes it more difficult for the pilot and he will therefore always strive to achieve that position.

m) The “V” is there only to assist the pilot achieve the preferred position. There is no speed advantage to be obtained from any other position. The pilot cannot see the pylon and it could be disastrous for him to look to check the position.

n) It is recommended that the locking of the pylon height should be by a clamping mechanism which allows for unlimited adjustment and not by pre-set increments.

Annex B – Class F2B – CL Aerobatic Judge’s Guide

c) The competitor has 3 (three) minutes from the starting signal to take-off and place his handle in the pylon.

d) The timing sequence will then take place. Thus, the timing of the official flight may start and finish more than the 3 (three) minutes after the time of the starting signal.

Annex B – Class F2B – CL Aerobatic Judge’s Guide

Competitors may not take their second attempt without first returning to the line check area in order to comply with rules 4.1.3. and 4.1.6.

Annex B – Class F2B – CL Aerobatic Judge’s Guide

l) It is recommended that the draw should be arranged so that competitors fly at five-minute intervals.

m) The draw should be arranged so that competitors from one nation are not required to fly within fifteen minutes of each other.

n) After the draw has taken place, it should be split into three equal groups, A, B and C.

o) For round one, group A flies first, followed by group B and then group C.

p) For round two, group B flies first, followed by group C and then group A.

q) For round three, group C flies first, followed by group A and then group B.

r) For round four competitors will fly in the reverse order of position after round three, up to position four. The competitors in first, second and third places after round three then fly in sequential order, first, second, third.

s) There should be a ten-minute break at the end of each hour of flying.

t) Re-flights (second attempts) should take place at the end of each round.

u) Replacement attempts may take place at the end of the group in which the attempt was scheduled, or in the scheduled ten-minute break at the end of each hour of flying

v) Replacement attempts and second attempts shall be taken in the original draw order.

Annex B – Class F2B – CL Aerobatic Judge’s Guide

An audible signal should be made to the pilot at the end of the timed flight by one of the timekeepers.

Requires no clarification.

Annex B – Class F2B – CL Aerobatic Judge's Guide

- Care must be taken to ensure that this rule is complied with.
- In addition to the two helpers, the team manager may enter the contest circle. When this is the case, he may not assist the pilot or helpers, but he is permitted to carry and hold any equipment which the pilot and helpers require to use.
- In the case of an incomplete team, only speed team members of other incomplete teams or supporters or competitors from other control line classes may be registered to act as helpers.
- They can help only one team.
- Except for incomplete teams, competitors may not act as helpers for competitors from other nations

A.22. Rule F2A.1.13. Start of Timing

i) The chief timekeeper should determine when the pilot has placed his handle in the pylon - NOT the judge who is observing the conduct of the pilot.

j) The chief timekeeper must call when the pilot has placed his handle in the pylon.

k) For manual timekeeping, he will call "two" when, after the pilot has placed his handle in the pylon, the model aircraft first passes the height marker. He will then call "one" as the model aircraft again passes the height marker.

l) The timekeepers start timing the next time the model aircraft passes the height marker.

m) The timekeepers should preferably be positioned one behind the other, not side by side.

n) When an electronic timing system is used, the chief timekeeper will initiate the primary timing device when he observes that the pilot has placed his handle in the pylon. As he does so he will call "in" and the backup timekeeper will immediately initiate the backup system.

o) The judge who is observing the pilot must call if the pilot removes the handle from the pylon.

p) The timekeepers and circle judges must use the official practice session to train in their individual and collective duties.

A.23. Rule F2A.1.14 Height of Flight

d) Two judges must be used for this task: one for each of the height markers.

e) They must be positioned at eye level to the respective height marks.

f) The height restriction applies only during the timed run.

A.24. Rule F2A.1.15 Cancellation of Flight

Requires no clarification.

A.25. Rule F2A.1.16. Number of Timekeepers and Judges

Requires no clarification.

A.26. Rule F2A.1.18. Classification

Requires no clarification.

A.27. Training/Practice

e) The official training/practice session should continue on the draw basis as currently used where each competitor is allocated a ten-minute slot.

f) The circle should not be available for practice during the round (allowing practice at, say, lunchtime can give unfair advantage to competitors drawn to fly after lunch).

g) Practice on free days and after the rounds should not be on a draw basis.

h) Speed competitors have learned to self-regulate circle use by each taking one flight in rotation. This system allows many more practice flights per hour than any draw-based practice session. All competitors then have a chance to make a test flight, go away and make adjustments, think about

what is required and return for another test.

ANNEX B1 - CLASS F2B - JUDGES' GUIDE

Purpose

This Judges' Guide is an aid to judging and marking FAI class F2B contests. It should be used both for the training of potential F2B judges and for maintaining the proficiency of judges who are already judging at F2B contests. This Judges' Guide forms an integral part of the FAI Sporting Code Section IV Volume F2 applicable to class F2B.

B.1.18. Judges' Qualifications and Selection of Judges for Contests

The National Aero Club (NAC) of each country having F2B judges who join (or who wish to join) judging panels at international F2B contests should ensure that a defined standard of judging proficiency is reached and maintained by each of the judges for which it has responsibility. Each such NAC should therefore:

e) Provide translations into their own language of both the current FAI Sporting Code Volume F2 applicable to F2B (that is the whole of paragraph 4.2) and of this complete Judges' Guide.
f) Arrange suitable means and procedures to ensure that each judge is fully trained. This means arranging training courses which include regular and repeated group training in both theoretical (classroom) and practical (flight) venues where every aspect of both the current Sporting Code and of this Judges' Guide may be examined and practised in detail.
g) Provide suitable means for officially recording each such training session attended by every judge within its national responsibility. Such official record should include dates, duration, and number of flights observed at such training sessions, and should also separately list details of all the national and international F2B contests at which each judge has been a member of the judging panel.
h) Establish selection criteria which clearly define the minimum periods of undergoing such training and of actually judging high quality F2B flights at national level before prospective judges are eligible to be nominated or invited to join judging panels at international F2B contests.

Providing all the above will ensure that the judging of all international F2B contests is carried out to the same basic standard. These measures will also enable the organisers of international contests to be sure that all judges invited or nominated to a judging panel do indeed meet the required standards of qualification and experience. The organisers of all World and Continental Championships should therefore submit a list of proposed judges' names, together with their NAC qualification details as at paragraph c) above, to their own NAC and to the F2 Subcommittee of the CIAM.

To ensure a continuous pool of suitably qualified international F2B judges it is also recommended that, with suitable modifications, each NAC apply the criteria and procedures at the above paragraphs a) through d) inclusive to the selection and training of F2B judges for contests at national level.

B.1.19. Sporting Code and F2B Manoeuvres Knowledge

The primary requirements for fair, accurate, and consistent judging are:

e) A clear understanding of all of the applicable regulations and definitions within the complete Section IV of the FAI Sporting Code.
f) An in-depth and fully detailed knowledge of all the current F2B rules and manoeuvres descriptions.
g) A fully detailed knowledge of this complete Judges' Guide.

Self-study of all of the above points is a must, as is regular detailed group training at both classroom and flight venues. Such training should cover the practical application of all of the above points to the judging of high quality F2B contest flights. It is stressed here that individual "interpretation" of the intent and/or meaning of the F2B manoeuvre descriptions and rules is strongly discouraged - the purpose of this Judges' Guide and of the new rules is to eliminate any need for such "interpretation" by individuals.

B.1.20. Judging Focus

In order to get a complete picture of each manoeuvre, judges should focus their attention on four major aspects:

d) Shape
This is the form or outline of the entire manoeuvre, but shape also relates to the position of each of the figures making up a complete manoeuvre. In manoeuvres consisting of repeated multiple figures (for example, the three consecutive inside loops), an important criterion is that the shape of each individual loop figure is consistently the same for each repetition, and that consecutive manoeuvres should be performed with the second and subsequent manoeuvres all positioned in exactly the same place as the first (superimposed). All manoeuvres should be of the shape defined in the various manoeuvre rules - that is round loops should be round with no flat spots; square manoeuvres should have clearly defined corners connected by "straight line" flight paths (refer to paragraph F2B.15.1 of the F2B rules).

e) Size
Manoeuvre sizes are often defined in the manoeuvre descriptions by specifying line elevation angle (in degrees of arc above the normal 1.5 metres upright level flight height). Judges should watch for manoeuvres being flown with their tops above or below the specified 45-degrees, 42 degrees, and 90 degrees line elevation angles - and as a result of such errors, judges should therefore watch for complete figures which are either larger or smaller than specified in the respective rule. All such errors should be downgraded in the marks awarded by judges. The use of visible fixed terrain reference points at each site to help judges "fix into memory" both the 1.5 metres normal upright and inverted level flight height, and 45-degrees lateral angle ($^{1}/_{8}^{th}$ lap) is recommended. Contest organisers are also encouraged to erect suitable markers at contest sites to assist judges, particularly at sites where suitable natural fixed features are missing. Judges should practice using the available terrain features and any erected markers at each contest site during the judges' calibration flight sessions held before the start of each particular contest (see also 4.B.15 below).

f) Intersections
The judging (and therefore the marking) of the intersections between the various elements of complex manoeuvres is also made easier if judges use fixed terrain reference marks and/or erected markers to "fix into memory" the visual position of the model when it passes an intersection point for the first time in a manoeuvre. Then, by comparing that "locked-in" point with the position of the model when it comes to the same intersection point at later stages of the same manoeuvre, judges will be more easily able to gauge the degree to which the pilot has met the intersection. As already noted, the erection of suitable markers is encouraged to assist in this practice at sites which lack suitable fixed terrain reference points (see also 4.B.15).

h) Bottoms
Normal upright level flight and inverted level flight is specified in the manoeuvre descriptions as being required to be flown at a height 1.5 metres with an allowed tolerance of plus/minus 30 cm. These are all clearly described for each manoeuvre and judges should mark accordingly, as per 4.B.7 and 4.B.10 below, plus also paying close attention to the notes about values and tolerances which appear at F2B.15 of the F2B rules.

B.1.21. General Comments on the Marking of Manoeuvres

Although control line model aircraft actually fly on the surface of a hemisphere, when seen from the pilot's position, all manoeuvres are flown in two-dimensional plane geometry. In other words, because all points on the surface of the hemisphere are at an equal distance from the pilot (that distance is the length of the lines), the pilot sees all manoeuvres as if they were drawn on a flat sheet of paper. But from their position outside the circle, the judges are not in the ideal position to view manoeuvres. Therefore, the judges' marking tasks include a large element of personal analysis and situational awareness that must take their own (less than ideal) viewing position into consideration when awarding marks. There are however a number of precise definitions and values within the manoeuvre descriptions which judges must assess accurately if they are to award fair and consistent marks. These are:

k) Recognition of level flight altitude of 1.5 metres, plus/minus 30 cm.
l) Recognition of height by judging 45-degrees line elevation angle.
m) Recognition of height by judging 42 degrees line elevation angle.
n) Recognition of a position directly overhead the centre of the flight circle (that is above the centre of the pilot's body and head if he is standing erect).
o) Recognition of "vertical" climbing and diving flight paths (perpendicular to the ground).
p) Recognition of "horizontal" flight paths (parallel to the ground).

q) Recognition of a turn in corner as an abrupt change of direction with the requirement for the model to fly the tightest (sharpest) possible corner (see also 4.B.7).
r) Recognition of the correct "Start" and "Stop" points specified in the F2B rules for each manoeuvre (as highlighted within each manoeuvre description by the paragraphs a)"Start of manoeuvre:" and x) "End of manoeuvre").
s) Recognition of the fact that all the above values are specified as seen and measured from the pilot's viewing point, so judges must make due allowance for models of different sizes, flown on different length lines, and for the difference between the pilot's position and the judges' viewing position/s.
t) Judges should also note the requirements of rule 4.2.11a) which not only limits the amount by which judges shall move their original position (to account for changes in wind direction) during a single official flight ($^{+}/_{-}{}^{1}/_{8}$ lap), but which also limits the times at which such moves may be made.

B.1.22. Judging Objective Errors

The systematic deduction of points will provide the most uniformity in of standards in judging F2B contests. This system can be applied to all manoeuvres in the following way:

e) Taking normal level flight as an example, judges are expected to award maximum points provided that the model remains inside the values and tolerances defined in the rules throughout all of the judged laps, and provided that it tracks smoothly without any visible height changes (that is: with no jerking or abrupt changes in height or attitude throughout the manoeuvre).
f) But a level flight track which slightly exceeds the stated tolerance (for example, flying 40 cm off the flight track when plus/minus 30 cm is required by the rule) should be considered as a "minor" error. Such a minor error would probably cause the judge to award a mark downgraded by perhaps 0,5 to 1 point.
g) But if a level flight track was off the defined flight track by as much as twice the defined tolerance, this should be considered as a "medium" error and would probably result in the award of a mark downgraded by 1.0 point or more.
h) And level flight errors of three times the defined tolerance from the defined flight track should be considered as "major" errors, which would probably result in the award of marks downgraded by around 1.5 or 2 points.

In order to use this system successfully, judges must be trained to recognise flight path deviations of 30 cm and 60 cm at a viewing distance of approximately 45 metres. This will require relevant and repeated demonstrations to train judges to be able to readily gauge these measurements. Such training is highly recommended for all judges and this training should also emphasise the various tolerances defined in each manoeuvre description. See also 4.B.9 below.

B.1.23. Judging Subjective Errors

b) "Smoothly", etc

A phrase such as "fly smoothly", is subjective, and the degree to which the model flies smoothly cannot be measured. Similarly, rules statements such as " ... the model should fly two smooth and stable laps ...", are difficult to apply when faced with the task of translating a certain lack of smoothness into an actual mark to be awarded to a contestant. As a basic guide, judges should consider terms such as stability and smoothness to be conditions defined by the absence of "wobbles" or "jerks". Therefore "wobbles" or "jerks" are errors, and each judge should decide on the extent of each such error seen, awarding a downgraded mark according to the severity of each of these errors that he has observed; see also 4.B.10.

a) Turn radii

Judges should recognise that the intent of the Rule regarding corner radii in manoeuvres such as Square Loops, Square Eights, Triangles, etc. is that model aircraft should turn as sharply (tightly) as possible. Therefore, judges should award the highest marks to model aircraft turning the tighter (sharper) corners (provided that the required line elevation angles and/or the model aircraft's pitch angles have also been achieved) and they should award the lowest marks to model aircraft making the largest (softest) such turns.

B.1.24. Error Interpretation

c) Each manoeuvre description clearly defines numerical values, size, shape, and position. Therefore, judges can observe errors (failure to meet the specified requirement of, say, a line height value). But the rules provide judges with no guidance about the relative importance of those errors. So, the judges' task is twofold in this respect - first, he has to count the total number of errors committed – second, he must also decide on the amount by which each of those errors has deviated from the standard specified in the respective manoeuvre description. As a general principle, a manoeuvre which is flown with a large number of major errors should result in judges awarding a lower mark than would be awarded for a manoeuvre which is flown with just a few errors, all of which are only minor errors.

d) However, judges should also note that if a manoeuvre is flown with a very large number of errors, even if each of those errors may be considered as being, individually, only minor deviations from the manoeuvre description, it would be quite correct to award a lower score for that manoeuvre than for another manoeuvre which is flown with only a few errors (but where each of those individual errors is considered to be a major deviation from the manoeuvre description). This is precisely one of the skills that judges are expected to develop and apply; see also 4.B.10.

B.1.25. Awarding Marks (Scoring)

f) Segmented and multiple manoeuvres

Many manoeuvres are described as consisting of several figures, and in many of those the figures have in turn been broken further down into separate segments. But all those segments and figures should be combined to result in the award of only a single mark for the complete manoeuvre. In addition, many of the manoeuvres detailed in the separate manoeuvre descriptions consist of multiple (repeated) figures. Once again judges should award only a single mark for each such manoeuvre (for example, the three consecutive inside loops manoeuvre, the two horizontal square eight manoeuvre and the four-leaf clover manoeuvre should all attract only one mark each from each judge).

g) Principles of marking

Judges should score (mark) manoeuvres flown between the points "Start of manoeuvre:" and "End of manoeuvre": only, as set out in each of the manoeuvre descriptions. When the model reaches the "Start of manoeuvre" point for each manoeuvre, each judge should assume that the manoeuvre will be flown within all the values and tolerances and other requirements defined in the respective manoeuvre description. (If this happened, this would of course mean that the judge should award the full maximum available 10 points if he has seen no errors by the time the manoeuvre is completed). But as the model proceeds through the manoeuvre, each judge will (usually!) observe some deviations from the manoeuvre rule requirements, so he should then mentally deduct point/s from the potential maximum of 10 points whenever a deviation is seen. The number of points to be deducted for each error by each judge will depend on his/her judgement as to whether each of those observed deviations is a "minor" error, a "medium" error, or a "major" error, as described in 4.B. 6. So after the model has reached the "end of manoeuvre" point for the manoeuvre the judge's task is to total all the points which have been mentally deducted during the manoeuvre; and the final mark to be entered into the judge's score sheet is simply the maximum available 10 points, minus the total of all the points mentally deducted by the judge while the manoeuvre was being flown. This deduction method, whilst not easy to learn, and while requiring a considerable amount of instruction and practice, does offer the advantage of coming very close to producing repeatable results when using a consistent marking bandwidth for weighting each error seen.

h) Marking bandwidth

The following scale of marks is listed to provide judges with a practical tool to apply to the principles above.

Judges' Observations:	Marks to be awarded:
Nil visible deviations from all values & other requirements:	Mark 10 points
Very few and/or only minor errors seen:	Range: approx. 9,5 to 7,5 points (Note 1)
Few and/or minor errors seen:	Range: approx. 7,5 to 4,5 points (Note 2)

More and/or medium errors seen:	Range: approx. 4,5 to 2,5 points (Note 2)
Many and/or major errors seen:	Range: approx. 2,5 to 1 point (Note 3)

Notes for marking bandwidth table:

Note 1: the number of points actually awarded for each manoeuvre will be dependent upon the total number of errors seen by each judge, and whether or not each judge decides that these are all only minor errors.

Note 2: the number of points actually awarded for each manoeuvre will be dependent upon the total number of errors seen by each judge, and the extent to which each judge decides that each error is either a minor, a medium, or a major error.

Note 3: as per note 2 above, but the mark 0 (zero) points should be reserved only for cases which are listed at F2B.10 and F2B.15.2 paragraphs of the F2B rules.

i) Judges should use the entire marks bandwidth available, as shown above. This means awarding a mark of 10 points to any manoeuvre where the judge does not observe any errors at all (for example, an inverted flight manoeuvre where the model remains truly stable and without "jerking" within the allowed height tolerance of plus/minus 30 cm throughout all judged laps). But as an example of the opposite extreme, a two consecutive horizontal square eight manoeuvre which is flown with line elevation angles of over 60 degrees, with "soft" corners, with angled sides, with slanted tops, with pullouts which are both too high and too low, and with intersections which are missed by several metres - in other words a manoeuvre which is not really recognisable at all - should be awarded a mark of around 1 point, perhaps even less.

j) It should also be noted that since nothing written anywhere in the FAI Sporting Code defines terms such as "general impression", or "flying style", accurate and repeatable marking really is dependant only upon each judge deciding on the total number of errors committed, and the degree to which each error has deviated from the manoeuvre description. This includes judging subjective elements where (apart from stability which can be marked as discussed in 4.B.7) the reality is that each contestant's score should depend simply and solely upon the total number of all the errors observed by each judge coupled with each judge's own personal decision as to how severe each of those errors was.

B.1.26. Considering External Factors

a) It is not permitted for judges' marks to allow for the effects of the wind in marking any phase of any of manoeuvre. Paragraph F2B.5 of the F2B rules gives clear guidance to judges and contest officials on exactly what wind and weather limitations are not acceptable for official flights, and this means that turbulent or stormy/gusty winds should not influence the marks awarded by the judges unless they exceed the limits in paragraph F2B.5 of the F2B rules. If wind in excess of the limit in paragraph F2B.5 does occur, then paragraph F2B.5 also instructs judges and all other contest officials on what actions to take. In other words, either the weather is "flyable" or it's not, and if it is flyable as per paragraph F2B.5 then judges should score all official flights on exactly the same basis as if the wind was non-existent.

b) Similarly, electrical storms are considered to be unsafe conditions for flying control line stunt models, and as for excessive wind speed, paragraph F2B.5 also instructs judges and all other contest officials on what actions to take if thunder and lightning do occur or appear to be imminent during a contest. Other than excessive wind and electrical storms, the F2B rules make it plain that an F2B contest is an all-weather event, so uncomfortable though it may be for all concerned, the intention is that the contest should proceed as normal. Judges should therefore certainly not adjust their marks according to inclement weather.

c) But on rare occasions other factors which are outside a contestant's control can occur, and sometimes these could have an affect the contestant's ability to fly in accordance with the manoeuvre descriptions. For example, when flying contests at sites where one or more grass circles are in use, irregularities in the ground surface could adversely affect a particular contestant's take-off ground roll and/or lift off; or could affect the ground roll out at completion of the landing manoeuvre. Deviations from the described procedures for the take-off ground roll (and lift-off) or landing ground roll out should not be penalised if judges are of the opinion that such deviations were

caused only by defects in the surface of the flight circle. Similarly, paragraph 4.2.7, h) item iii) of the F2B rules gives a possible example (a child or animal wandering into the flight circle), but no set of rules can be expected to be completely comprehensive in such areas. So, judges should always be alert for an "extraordinary occurrence" which is both accidental in nature and beyond the control of a contestant, and which could also have an affect on a contestant's performance of an official flight. If in the opinion of the judges such an incident has occurred, then they should be prepared to use their observation and reasoning to make sure (via the Head Judge) that the F2B Contest Director is aware of the occurrence and offers a re-flight accordingly.

B.1.27. Scoring and Processing Manoeuvre/s if Missed by a Judge

If a judge misses the observation of a manoeuvre for any reason, then he or she should not mark the Score Sheet with an estimated "typical" mark for the missed manoeuvre. Instead, the judge who missed the manoeuvre should clearly write an "N.O." (Not Observed) symbol on his/her score sheet in the space for the mark for the manoeuvre which has been missed. This symbol should then alert the scores tabulator(s) to use a procedure which calculates the average of the marks for that manoeuvre as awarded by all the other judges. This calculated average mark should then be entered into the missing mark ("X") area by the scores tabulator(s) before proceeding with processing all the remaining marks from that flight.

B.1.28. Results Awareness

In order to prevent influence of any kind, no judge should look at tabulated results scores and/or at contestants' "placing" until after the completion of a contest. Neither should judges discuss individual official flights, nor the execution of manoeuvres; nor the marks awarded, nor the tabulated results (placing) or scores, with anyone at all during the whole contest. This includes discussions with the other judges, with any contestant, with any Team Manager, and with all spectators. The Head Judge should ensure that all members of the judging panel are aware of this requirement and that they all observe these requirements throughout the contest.

B.1.29. Preparations by Judges before Contest Start

Well before the start of any official flights the Head Judge should approach the FAI Jury, the contest organiser and the F2B Contest Director to define/confirm/verify:

m) Head Judge in charge; F2B Contest Director.
n) The availability of fixed terrain reference points, and/or erected markers (refer 4.B.4 b) & c)).
o) Availability and timing of judges' calibration flights.
p) Contestants' flying order.
q) Contestants' pull test procedure and method of ensuring that all pull tests are performed.
r) Procedure for officially calling contestants.
s) The nominated official timekeeper(s), and how times will be communicated to the judging panel.
t) Availability and method of score sheet collection service.
u) Duration and timing of rounds.
v) Score processing procedures.
w) Contestant and classification and ranking procedures.
x) Meal and break times, seating arrangements, sunshades, umbrellas, nearby toilets, etc.

B.1.30. Judges' Calibration Flights

After each of the judges' calibration flights arranged by the contest organiser judges should not discuss the scores that they have individually awarded. Instead, they should go through a manoeuvre-by-manoeuvre discussion, comparing and discussing their individual assessments of each error (including the severity of errors) that they have seen during every segment of every figure and every manoeuvre flown. In order to avoid the definitely undesirable "levelling" of marks awarded by each judge, the actual marks (scores) awarded by each judge should not be discussed. Indeed, contest organisers are not permitted to issue score sheet forms for judges' calibration flights. Rather, the judges' discussions should focus on the number, extent, and degree of severity of each error seen by using copies of the manoeuvre diagrams in the F2B rules as the basis for discussion. It should also be carefully noted that the content of all such judges' calibration flight discussions should not be made public.

B.1.31. Sighting Devices and Terrain Reference Points

Hand-held sighting devices should not be used. Whenever possible, fixed terrain reference points should be used to define intersections, "verticals", line elevation angles, and $^{1}/_{8}^{th}$ lap (45-degrees laterally) bottoms and lengths of manoeuvres and/or segments. As noted at 4.B.4c), contest organisers are strongly encouraged to erect suitable markers (for example for the 45-degrees lateral dimension specified in the relevant manoeuvre descriptions), especially when a particular contest site lacks natural fixed reference points. It is recommended that such reference points and/or markers be re-calibrated for each individual contest site on the occasion of each contest held at that site, and that these should be discussed privately between the judges prior to the start of judges' calibration flights.

Final agreement on useable natural reference points and/or erected markers should be reached between all members of the judging panel before the start of official flights.

B.1.32. Timekeeping

It is common practice to assign official timekeeping duties to the Circle Marshall (and this is a definite requirement at World and Continental championships and other limited international contests). At other contests, judges should confirm who is responsible for this task before starting official flights, and at all contests judges should also confirm the method/s by which the results of the official timekeeping will be signalled to the judges. The times recorded by the defined official timekeeper are binding, but as a cross reference it is recommended that the Head Judge runs his own stopwatch in parallel to the official timekeeper. If a contestant's official flight exceeds the 7 minutes permitted, then the elapsed time should be recorded on the score sheets. In the event of any discrepancy the Head Judge's time and that of the official timekeeper the Head Judge should approach the official timekeeper and the F2B Contest Director to resolve the matter accordingly.

B.1.33. Consistency

Judges should use a consistent scale of awarding marks throughout all the rounds of a contest. This scale should be a personal instrument based upon the number of errors seen, plus the judge's own personal valuation of the severity of each error. This personal scale should have been arrived at by careful study of the current F2 volume of the FAI Sporting Code (especially paragraph F2B.15 corresponding to the F2B manoeuvre descriptions), by study of this Judges' Guide and as a result of practical judging experience. Once the official flights of a contest have started, each judge's personal scale should remain firm and fixed and should not (for example) become influenced by factors such as discussions with others (including other judges), by the weather, by model speed, by model type, size, colour, or engine sound, or by an awareness of the reputation or results previously achieved by any particular contestant being judged.

B.1.34. Execution of Manoeuvres

a) " … a minimum of $1^{1}/_{2}$ laps"

Competitors may choose to fly more than, but may not fly less than, $1^{1}/_{2}$ laps between each manoeuvre (including the recommended entry and exit procedures, all as set out at paragraph 4.2.14 of the F2B rules). If a new manoeuvre is started after less than $1^{1}/_{2}$ intervening laps (plus the recommended entry and exit procedures) have been flown, then that manoeuvre should be awarded a mark of 0 (zero) point and 0 (zero) point should also be awarded to every other manoeuvre where less than $1^{1}/_{2}$ laps (plus the recommended entry and exit procedures) are flown between manoeuvres. This is to allow judges enough time to fully consider (and write down) the score for the preceding manoeuvre before the next manoeuvre is started.

b) Judging the height of intervening laps

The height of the laps flown between manoeuvres is purely a recommendation and should therefore not be judged or marked, but it should be noted that the F2B rules (paragraph 4.2.14 c)) specify a height range within which each contestant should fly the intervening laps. This is to ensure that no contestant flies so high that the time taken to complete the intervening laps is too short to allow the judges to record their scores from the previous manoeuvre.

c) Judging attempted manoeuvre(s)

If a contestant makes more than one attempt at any one manoeuvre during an official flight the judges should only mark the first attempt. Any further attempt(s) at the same manoeuvre during the same official flight should not be marked at all. Similarly, if a contestant starts a manoeuvre but obviously does not complete it (for example, due to the motor suddenly losing power, thereby causing the contestant to descend immediately and then fly level laps) the manoeuvre which the contestant failed to complete should receive a mark of zero (0) point.

Annex B2 CLASS F2B – CONCOURS D'ELÉGANCE

B.2.5. Concours d'Elégance

At F2B Continental and World Championships the organiser may arrange a contest for registered F2B pilots competing in F2B with own-constructed Class F2B model airplanes. The winner is awarded the FAI Concours d'Elégance Diploma.

B.2.6. Construction of the model by the pilot; Definition

"Constructed" by the pilot is to be interpreted as the action required to complete a model starting with no more prefabrication than acquiring one of the two main structures preassembled prior to merging and finishing. The two main structures are considered to be: 1) the wing and 2) the fuselage. Flaps, rudders, elevators & horizontal stabilizers are not considered main structures, therefore there are no limitations on level of their prefabrication, and only the finish portion of this rule applies to them. In unconventional stunt designs, such as a multi-engine wing with engine nacelles, or a flying wing, they are to be considered as multiple merged structures, so no level of prefabrication is allowed, and on multi wing planes, the wing total counts as one structure, but the pilot must be the one who joins and aligns the multiple wings together. In the case of take-apart models, the take-apart hardware must be installed by the pilot. The pilot must be the person who applies the finish to the plane, to "finish" meaning the pilot fills the surfaces and applies the covering and finish to the completed model where covering and finish is applied. Whereas on the surface of the main structures, moulded structural surface underlayment's including but not limited to moulded fiberglass, or carbon fibre that are filled or coloured as a result of the manufacturing process that may show as part of the final finish may be used, as long as this surface underlayment is applied, filled and coloured by the pilot. Control systems such as but not limited to the bellcrank, control horns, pushrods, etc. may be purchased but must be installed by the pilot. Other accessories and hardware may be purchased or otherwise obtained for their function such as, but not limited to engines, tanks, wheels, canopies, airframe take-apart hardware and have no bearing in the way "main structures" are counted.

c) At the time of official model processing a competitor wishing to enter the Concours d'Elégance must register his airplane into a list to be prepared by the organiser. By registering his airplane, the competitor bindingly confirms the personal construction of the model as per paragraph 4.M.1. For the Concours d'Elégance alone, one model per competitor may be registered.
d) Models processed and registered for the Concours d'Elégance must be marked by suitable means, such as an easy to remove sticker, indicating the pilot's name and the year of the competition.

B.2.7. Appearance Judging

Registered models for the Concours d'Elégance must have flown in at least one F2B qualification round of the ongoing F2B Championship before entering the static display for appearance judging.

f) After the qualification rounds and before the beginning of the fly-off rounds all of the Concours d'Elégance registered model airplanes shall be put on display, arranged side by side and with sufficient space for the judges to walk around.
g) The self-constituent panel of appearance judges consists of three members who shall be:
   iii) At two circles contests: the F2B Contest Director plus the two F2B Circle Marshals.
   iv) At single circle contests: the F2B Contest Director plus the F2B Circle Marshal plus a third person holding an official position within the contest organisation or within FAI/CIAM.
   Members of the F2B judges panel must not be part of the panel of Appearance Judges.
h) Appearance judging for all models on display shall not take longer than two hours. While it takes place, public, other officials, and team members must not be present near the models to be judged. With approval from the appearance judge's media representatives may be allowed in.
i) The panel of appearance judges jointly defines the winner of the Concours d'Elégance based on criteria such as elegance of outlines and shapes, visible building and finish quality, colour scheme and complexity and further non-technical aspects contributing to the overall impression of elegance and beauty, while strictly observing article 4.M.1. The panel shall communicate the winner's name and nationality to the organiser. No individual ranking is published, and the winner shall be kept secret until the end of the Championship.

j) Related to the Concours d'Elégance no formal protest can be filed.

B.2.8. Awards

The F2 Subcommittee will arrange for a suitable FAI diploma to be generated.

c) The Diploma will be awarded to the winner at the banquet concluding the event.
d) Illustrated with a high-quality picture of the winning model airplane and its pilot constructor, the organiser communicates the winner of the FAI F2B Concourse d'Elégance Diploma to the media.

ANNEX C1 – Class F2C TEAM RACE PANEL OF JUDGES GUIDE

Purpose

This Panel of Judges (hereafter 'Judges') Guide is intended to guide the Team Race judges and competitors to produce a fair and enjoyable competition. The guide is a reflection of the current consensus interpretation of the Sporting Code F2C rules. Suggestions for amendments to Sporting Code rules or this Guide are welcomed by the F2 Subcommittee and will be considered at the appropriate CIAM Plenary meeting.

C.1.6. TEAM RACE JUDGES

The judges must have a working understanding of a common language to reduce delays and errors. It is recommended that the common language be the same language used to issue warnings and disqualification.

C.1.1.9. The duty of the judges is to assure a fair competition between the teams by penalizing any defined actions which would be an advantage for one or a disadvantage for another team. Wherever possible the judges should help the teams achieve their best result by discussion outside the actual racing.

C.1.1.10. The judges' responsibilities regarding the conduct of the racing (issue of warnings, disqualifications and re-flights) begin with the start signal. However, the judges assist the Circle Marshall by checking that other aspects of the contest are in accordance with the rulebook.

Examples of this are:

d) All mechanics wearing helmets.
e) Correct application of the 90 seconds' warm-up and 30-second countdown.
f) Competitors' unauthorised practice in the official circle.

Infringements should be noted, for the Circle Marshall to rectify.

C.1.1.11. The judges should allocate among themselves the specific tasks of warnings operation, microphone use and record keeping prior to the actual racing. They should also practice working together when observing the official practice flights and by viewing videos from recent championships. It is highly recommended that a video recorder to monitor the pilots and the pilot circle is situated in the Judges tower. This "official" video record is not used by the judges to make decisions whilst the race is in progress but may be reviewed at the conclusion of the race to decide whether re-flights are warranted or to review a formal complaint. After the end of each round of racing the competitors may be granted access to the "official" video. The purpose of the "official" video is for:

e) Viewing by the judges and the FAI Jury following a complaint or protest. (NOTE: The FAI jury is not limited to viewing the official video only when considering protests).
f) Review by the judges to improve their coordination.
g) Viewing by teams with the judges for a better all-round understanding.
h) Training of other judges in preparation for subsequent championships.

C.1.1.12. It is recommended that the judges adopt the following procedure for the races:

d) Before the start each judge selects one team (preferably, not his nationality) to watch the start and during pit stops. The specific items to check for are starting the model's engine(s) before the start signal; landing model outside the 19.6m radius flight circle; mechanic retrieving the model from inside the 19.1m radius circle; handle significantly off ground; etc. A judge's decision in these cases is unilateral and, without discussion, and the appropriate penalties must be given. Any single judge making these unilateral decisions needs to be aware that because the judges are operating from a fixed location it may not be possible to view each situation equally, therefore he must be certain that he makes his decision on the grounds of real safety, advantage, disadvantage situations and not a minor technical infringement that can only be seen by virtue of position.
e) For the remainder of the race all three judges should observe all three pilots and conduct a running commentary of their behaviour to allow them to agree on infringements quickly. The

judges are also responsible for observing the models in flight should any collisions occur. Warnings/disqualifications are issued when two judges are in verbal agreement.

f) The judges are responsible for clearly announcing the warnings, disqualification, and re-flight decisions immediately.

C.1.1.13. Competitors who feel they have not received a fair result are encouraged to initially make a complaint to the F2C judges, if this is does not satisfactorily resolve the issue then the competitors have the right to make an official protest.

C.1.1.14. Warnings are effective at the lap or race time when the infringement occurs. Pilots are expected to acknowledge the warning appropriately. Failure to rapidly correct the infringement will risk an additional penalty for same offence.

C.1.1.15. Warnings should be given using short standard phrases wherever possible (see Section 4.C.5). Warnings are issued with reference to the team's racing colour, not their name, and additional verbal communication from the judges should be kept to a minimum to prevent pilot distraction.

C.1.1.16. As there can be variations in the actual marking out of the various circles, the Judges shall be responsible for checking the accuracy of these before the start of the contest. They shall then be responsible for informing all competitors prior to the beginning of the contest, the definitions of inside and outside the line that will be applied in that particular competition. In all cases the definition of "outside/inside the line" shall be the one that encourages the natural progress of the race without causing a genuine safety, advantage or disadvantage situation. (See pictures in section 4.C.4.)

C.1.7. STANDARDS OF JUDGING

C.2.2.1. A contest consists of three distinct sections: qualifying heats, semi-finals, and final. Each section poses unique problems for the judges and competitors.
The judges shall observe the official practice and conduct a briefing for all competitors before the first qualification heats or semi-finals start, and also before the final, in order to attempt to maintain an even judging and flying standard through each section of the contest. It is important that the judges and competitors understand that the first couple of qualification heats have a significant effect establishing these standards for the rest of the contest. It is very important that the judges have a unified understanding of their judging standard before the first heat.

C.2.2.2. Semi-finals are between contestants with very little difference in airspeed and ability. The judges should aim to keep a similar consistent judging standard as in the qualifying heats but with additional emphasis on overtaking and blocking infringements.

C.2.2.3. The final is a unique race in that it is double the distance and takes four warnings to result in disqualification. A more lenient attitude toward technical infringements (for example:- model landing just outside the flight circle, model pitted on the line not outside it, mechanic having one foot slightly inside the flight circle when retrieving his model and the other models being sufficiently far away as not to cause a safety risk) is warranted but the judges must issue warnings where safety is at risk and for infringements that provide a team an unfair advantage or disadvantage (whipping, blocking, taking the centre, etc). When a team with three warnings is guilty of a further technical infringement that will not materially alter the race result the judges are urged to announce the infringement but to consider allowing the race to continue unless that team continues to race in a dangerous, obstructive or advantageous way. It is preferable that the results are determined by this approach and would allow a team to protest a judge's decision and the finals results be adjusted if the protest is upheld. Only in cases where that team continues to race in a dangerous, obstructive or advantageous way should that team be instructed to immediately land their model.

C.2.2.4. 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 judges operate from a fixed location and must take this into account. Judges should not give warnings for technical infringements whereby virtue of position they cannot treat all teams equally unless there is a significant safety risk or gross misconduct.

C.2.2.5. The rules state that model may not fly for more than two consecutive laps with the engine not running. When the judges cannot directly observe the lap counting devices it is important that the timekeepers provide a 98-lap and 198-lap notice.

C.1.8. PILOT FLYING STYLE

C.1.3.4. The judges should be looking for correct positioning of each pilot in the circle. This can be determined by:

d) 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.

e) 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's path.

f) 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. If the pilot's right foot is placed to the outside of the circle being walked and behind the position of the model, then the pilot is behind centre.

C.1.3.5. The judges should be trying to identify the cause of bad pilot positioning. This can be determined by the spacing between the pilots. When a faster pilot approaches to overtake and there is no space between the overtaking pilot and the pilot in front and the overtaking pilot's handle cannot be positioned any further forward (Figure F2C.2.1) and it then falls behind the position of the corresponding model, the pilot in front is blocking. This could be because the front pilot:

d) has his non-flying arm positioned between himself and the overtaking pilot;

e) has his left shoulder positioned between himself and the overtaking pilot;

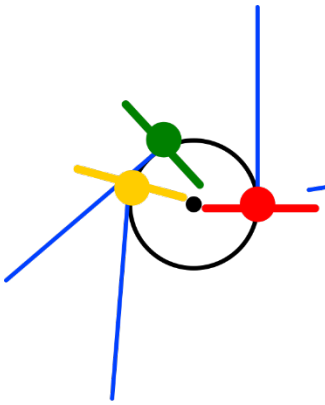


Figure 4.3.2.1

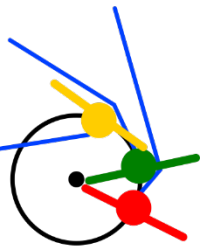


Figure 4.3.2.2

f) is positioned behind centre because of the incorrect position of his right foot.

When a blocking situation occurs, and the third pilot is also a faster pilot. then another layer is introduced into the problem (Figure F2C.2.2). If there are no spaces between the overtaking pilots 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 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.

C.1.3.6. The pilot should keep his controlling hand laterally on the centreline of his body, with his hand in close proximity to his chest (approx. 30 cm), and vertically located from the middle of his chest and top of his forehead (rule F2C.6 i i)). He is allowed to move his handle away from the body (forward), but still on the lateral centreline, or above his forehead, in order to better control the model during overtaking for a maximum of three laps. During overtaking the pilot may move his head from the centreline for better vision of his model. During take-off and landing rule (F2C.6 i i)) does not apply (for up to 2 laps) however this exception does not permit a pilot to whip.

C.1.9. Rule F2C.8 Warnings, Disqualifications & Penalties

The primary consideration of the Judges is to maintain an equal standard for all competitors within each section of the contest. Their intent should be to allow each competitor to achieve his best result.

Warnings / disqualifications should only be given where either safety is compromised, or a team is gaining an unfair advantage by its action or causing a disadvantage to another team in that race.

Judges should not give warnings / disqualifications for purely technical actions that have no safety, advantage or disadvantage implications on the result of that race.

Example- the rules state that normal flying height is between two and three meters.

A model flying below 2 m whilst other teams are carrying out pit stops is a clear safety and disadvantage situation and should be penalised but where only one model remains in the race - flying below 2 m solo is not an infringement but flying above 3 m solo is an infringement.

Where the circles have been marked accurately the definitions of outside / inside the line are:

(See the pictures)

Pilot foot on line - No Penalty

Pilot foot outside line - Disqualification

Landing outside line before catch - Disqualification

Pitting inside line - Warning

Mechanic foot on line - No penalty

Mechanic foot inside line - Disqualification

Model on the line before catch -
No penalty

The Judges should not wait until an incident/collision occurs before giving warnings – this would be unfair to the competitors who have had their flight obstructed or their model damaged. The judges' responsibility is to give warnings in these situations as a mechanism to maintain a satisfactory flying standard so that a dangerous or unfair situation does not arise.

Each warning shall be notified to the team concerned both visually and orally.

Flagrant breaches of the rules should be interpreted as being:

c) Unsafe actions and/or
d) Unsporting actions.

Actions which may be considered unsafe or unsporting depend upon the particular circumstances in each case:

14) Pilot flies too high immediately after take-off.
15) Pilot stands erect or raises his hand above his head immediately after take-off and before fully joining other pilots in the centre.
16) Pilot does not immediately join other pilots in the centre.
17) Pilot does not lower his head and bend down during landing approach.
18) Pilot does not promptly bring his model below 2m after engine has stopped.
19) During landing, the pilot runs model on the ground for more than 1 segment and does not attempt to avoid (hop over) the lines of other model(s) that are fuelling and starting.

20) Pilot flies the model at an effectively dangerous radius when passing over another mechanic (his handle should remain inside the 3m. centre circle until his own segment).
21) Mechanic releases his model with physical effort.
22) Mechanic has the model or its lines significantly off the ground during repair, adjustment, change of segment, catching, refuelling or restarting.
23) Mechanic releases the model without properly checking that no other model is over flying his pit position on a normal landing approach and causes the landing model to bypass its mechanic in order to avoid a collision (re-flight for the landing model's team). Note: if a collision occurs then the team releasing its model is disqualified.
24) In a situation where multiple infringements take place simultaneously, and the judges do not have sufficient time to give each warning separately, "SERIOUS BREACH". In this case the individual infringements are communicated to the team at the end of the race.
25) Rule F2C.8.2 g) states that "When the mechanic steps inside the flight circle line or reaches inside the safety circle line". This rule was introduced to ensure that mechanics remain in a safe location when retrieving their model.
26) Retrieving a model in this context should generally be taken as recovering the model from an area outside a pitting segment. The penalty of disqualification should not be applied to mechanics that may have one foot slightly inside the flight circle or reach in to catch the model slightly over the 0.5metre stated limit. The reasoning behind this interpretation is that during a normal pitting activity, mechanics will be balanced on both feet and facing in the direction of other approaching model. They will, therefore, easily be able to move clear of any other approaching model. (See also 4.C.4.7)), which makes it the responsibility of the landing/taking off pilot to not fly his model at an effectively dangerous radius.)
When a mechanic is retrieving his model from any area outside a normal pit stop, he is likely to be under pressure to do it quickly and may well have his back towards other model. It is in these circumstances that he is at risk and the disqualification penalty should be applied. Note also that the penalty should be applied where a mechanic carries out a non-normal pit stop such that he either excessively steps inside the flight circle or reaches so far inside that the judges determine he has caused a significant risk to safety.

4.C.4.7. Teams that are disqualified have the right of protest to the FAI Jury. If the protest is upheld, they will be granted an attempt and thus a re-flight. Their original race time will not be counted and there is, therefore, no advantage to be gained by flying on after disqualification except in a final. When a team has been disqualified and instructed to land the model immediately this should be done within 10 laps. If the pilot does not attempt to land and continues to prevent the other pilots from racing without interference, the judges will recommend (to the Contest Director) the team be disqualified from the whole contest. See section 4.C.2.1 for teams that are disqualified in a final.

4.C.4.8. Rule F2C.6 o) states that during the start and refuelling pit stops the pilot must keep his handle and lines as close to the ground as defined by the judges. Judges should interpret this as meaning below knee height with the pilot in a fully crouched position on circuits where there is no risk of the lines becoming caught on the ground and with either hand in contact with the ground as this will ensure that:

c) The lines are sufficiently above the surface to prevent them catching on any obstructions at ground level.
d) The lines are sufficiently low enough to prevent them catching another model that is making a normal landing and to permit safe overflying.

Where the judges determine that the circuit has a rough surface that may cause the lines to be caught then they can allow the handle to be held higher, but the pilot must still keep one hand in contact with the ground.

Teams must accept their responsibility to allow other competitors to fly, land, and pit 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 passing above the pitting area as this would prevent the mechanic from continuing with his normal pitting activity. See figure 5.

There are legitimate occasions when the landing/taking off model may not be able to maintain this 0.5metre separation, therefore, it would be a prudent course of action for the pitting pilot to place his handle and lines in contact with the ground on these occasions to prevent an obstruction.

4.C.4.9. Rule F2C.1 b) states that the race is not complete until either 6 minutes (12 minutes for a final race) have elapsed or the first condition of the five listed has been met. 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 rule F2C.8.

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

C.1.10. PHRASES USED BY THE JUDGES

C.1.10.1. "WHIPPING"

is the application of physical force to increase the speed of the model. This occurs when the model is behind the line perpendicular to the pilot's shoulders. See also figures 1 and 2 at the end of the Guide. 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 (M). The CR can be determined, as illustrated in figure 2, by observing the rotation of the pilot's handle and taking the midpoint of the maximum left and right movement of the handle.

C.1.10.2. "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. See figure 1d. 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 period while he clears the obstruction. Excessive blocking to directly prevent being overtaken is a disqualification offence.

C.1.10.3. "PIVOTING"

is defined as keeping the handle in the centre of the circle with the pilot's body behind the centre. May also be called as "BEHIND CENTRE".

C.1.10.4. "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.

C.1.10.5. "LINE SHORTENING"

occurs when either.

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

C.1.10.6. "ILLEGAL HANDLE POSITION"

occurs when the pilot does not fly in accordance with rule F2C.6 i) this is frequently a precursor to a blocking situation.

C.1.10.7. "PILOT INTERFERENCE"

is defined as:

e) Holding.
f) Pulling another pilot such that the pilot's normal activities are impeded.
g) Preventing another pilot from moving around correctly by raising his arm/elbow to occupy the "free space".
h) Warnings should not be given when a pilot only touches another pilot to help his orientation.

C.1.10.8. "PILOTS GO TO THE CENTRE"

is necessary because the pilots' rotational centre can move them towards the edge of the 3 m circle potentially causing problems of lack of space for landing/taking off pilots. 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 in a controlled and fair manner.

C.1.10.9. "STOP RACING – SAFETY"

when this command is given by the judges all the teams must immediately respond to it and the race will be declared null and void (after the application of any appropriate penalties). This command will only be given when, in the view of the judges that there is an immediate, significant safety risk. It is expected that the FAI Jury would support this course of action.

C.1.10.10. "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.

C.1.10.11. GENERAL POINTS

a) The draws for flying order should be made by the F2C Contest Director in the presence of the judges as early as possible so that competitors are given the maximum time to prepare.

For the semi-finals both rounds are drawn at the same time using a matrix.

C.2.11.8. Semi-final draws. If three competitors of one nation have qualified, then they are placed diagonally across the matrix (A); other multiple nations are placed in the matrix randomly across the X axis (B).

Sequence	Round
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 and order of the races.

C.2.11.9. All qualifying and semi-final races with only two teams (for example if a team withdraws) will be put at the end of the round in order to allow the third team (either re-flight or semi-final standby) a reasonable time to prepare. If necessary, a new draw for pitting segments will be made under the responsibility of the judges.

C.2.11.10. In the case of re-flights there will be a new draw for pitting segments (unless it is a complete re-flight of the same three teams).

C.2.11.11. The judges should take an interest in the processing of the competitors' models as part of its overall responsibility to ensure a fair and even standard for all competitors.

C.2.11.12. Rule F2C.4 a) states that "the tank .... must be accessible and capable of being measured accurately". As these units become ever more complex and unique, the judges support the following statements:

d) It is the competitor's responsibility to supply any specialist equipment other than the normal flexible fuel tubing that is required to link the measuring equipment with the competitor's models fuel system.

e) Organisers are only required to make two correctly executed attempts to measure the capacity of the system at the officially designated processing time.

f) If the system cannot be verified by two attempts, then the competitor will be allowed to return after the end of the official processing time to complete the verification of the system, with a further two attempts.

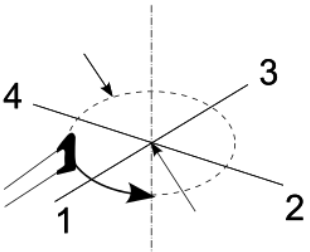
C.2.11.13. Rule F2C.9.b states "Teams advanced to the semi-finals shall not be granted a re-flight". The only intent of this rule is to prevent a possible situation developing where a standby team seeks to claim a re-flight because of an incident that prevented it from completing its attempt since this would then require a further 2 standby teams also being brought into the semi-finals. In theory, this could be repeated until all the original non-semi-final qualified teams had been brought forward into the semi-finals!

C.2.11.14. If a semi-final is terminated before the standby team has recorded a result (either time, number of laps or disqualified), then the attempt is deemed to be null, and void and the team reverts to its official standby status available to be called forward should any further semi-final race require a third team.

Diagrams (Figures 1 to 5) appear overleaf.

Figure 1

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



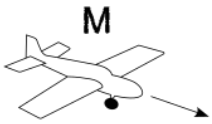
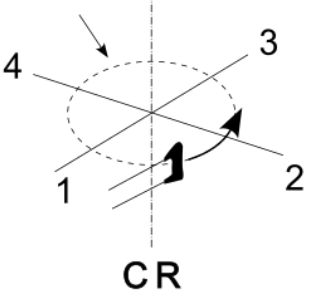


Figure 1b
Classical whipping position.
If pilot walks forward, no blocking occurs.



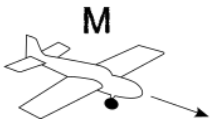
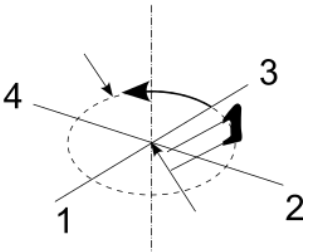


Figure 1c
Whipping and shortening of flight radius. Severe blocking of oppontents may occur. This position is very often combined with walking backwards.
(e.g. walking backwards after overtaking)



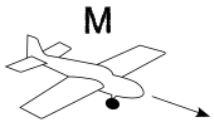
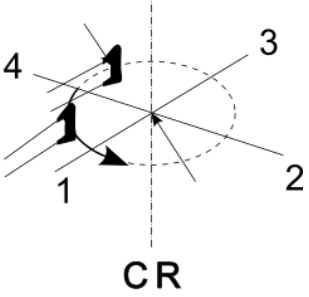


Figure 1d
Walking forward but in the wrong segment results in blocking of the opponents as well as in shortening of the flying radius.



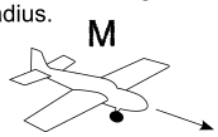


Figure 2

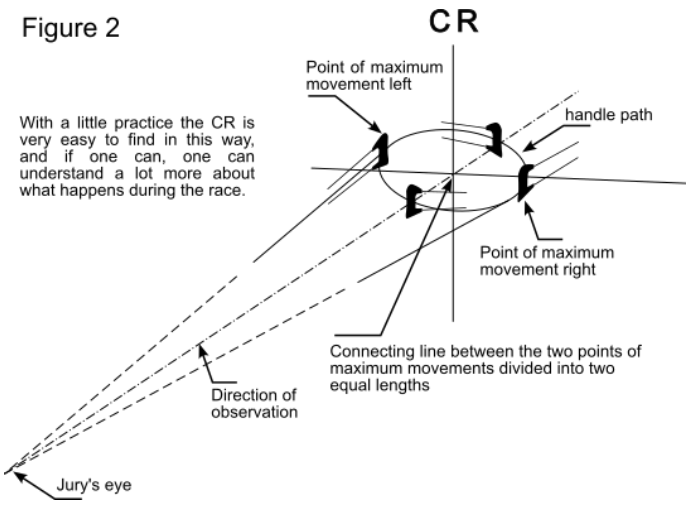


Figure 3

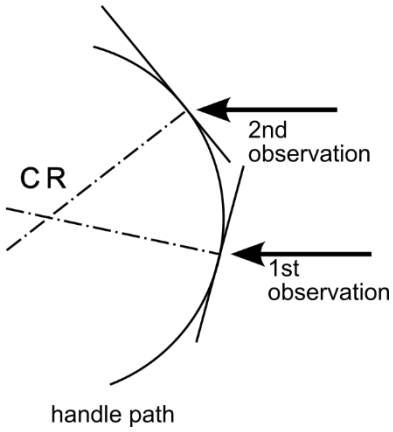


Figure 4

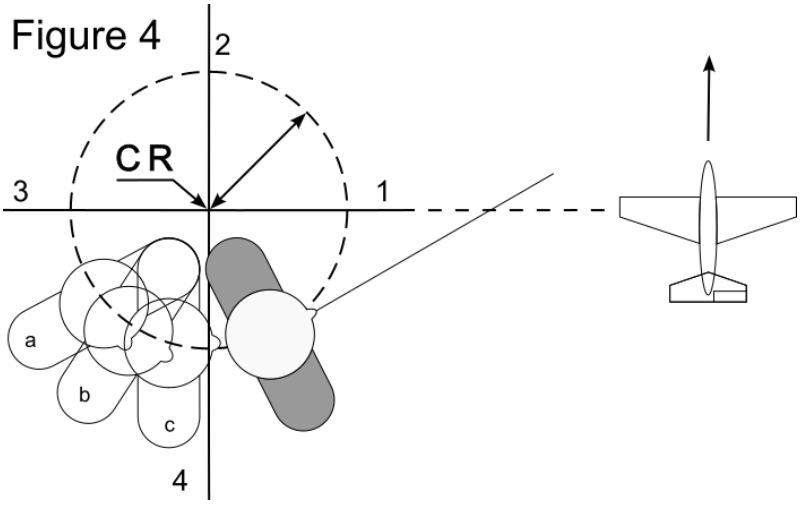
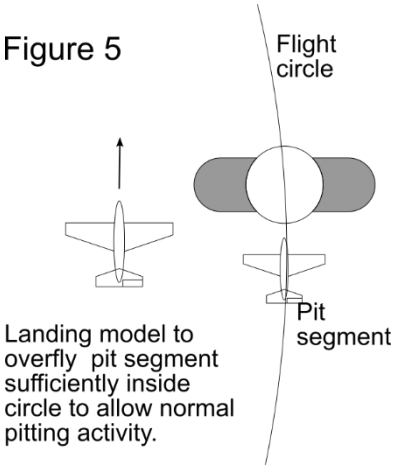


Figure 5



Landing model to overfly pit segment sufficiently inside circle to allow normal pitting activity.

C.3. Annex C2 - CLASS F2C – ENGINE EXTRA AIR INTAKE PROCESSING GUIDE

C.3.1. Method for Testing F2C Engine Crankcase Leakage

Evaluation method

The proposed evaluation method is to use a small adjustable flow 12V diaphragm vacuum pump connected to adaptors that can form a seal with the engine crankcase at the front, as well as through the rear (with exhaust port, top of case and prime nipple sealed), so that a vacuum reading can be established whilst allowing the crankshaft to be rotated.

After the adaptor is secured to the front of the engine and ensured that it is sealing well (as well as the sticky tapes for the exhaust port and the top of the crankcase), the vacuum pump is turned on and the speed or air bleed valve (for finer adjustment) is adjusted to achieve a steady reading of about 8.0 or 10.0 inch Hg (28 or 34 kPa) on the vacuum gauge.

The crankshaft is then slowly rotated through 720 degrees and the highest and lowest gauge reading recorded.

The adaptor is then removed and secured to the rear of the crankcase, ensuring the taped-up exhaust port and top of crankcase are sealing perfectly, then the same measuring process is repeated.

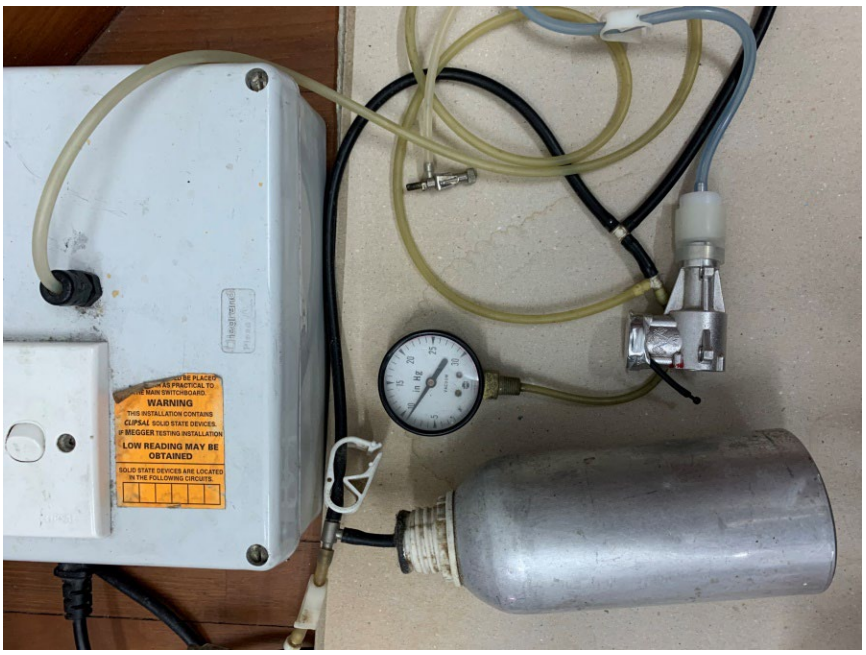
Vacuum Measurements (~8 or 10 in-Hg as datum)	**Inch-Hg**	**Pass**	**Crankshaft Disassemble**
Evaluation from Front	High - Low	= or <1.0	>1.0
Evaluation from Rear	High - Low	= or <1.0	>1.0
Average of high and low	Front - Rear	= or <1.0	>1.0

C.3.2. Suggested Equipment List:

C2.2.11 Variable output 12 volts DC power supply that can sustain a continuous draw of 10 watts or more.
C2.2.12 DC 12V Diaphragm vacuum pump, 55 kpa (16.5 in.Hg) vacuum or higher rating.
C2.2.13 >300 ml hard plastic or metal canister as a vacuum reservoir.
C2.2.14 Dial face 5 cm vacuum gauge 0-100 kPa in 2 kPa graduations (2 inch 0-30 in.Hg in 0.5 or 1 in.Hg graduation. Preferred as it is easier to read).
C2.2.15 Fine graduation needle valve as fine adjustment bleed valve.
C2.2.16 Derlin adaptor holder ~16.8 mm OD and 15-20 mm length, with 8.0 diameter x 10 mm depth hole drilled at one end and an airtight pressure nipple machined or fastened into the other end. Exact OD of the adaptor will depend on the diameter and wall thickness of the silicon rubber tube available.
C2.2.17 20 mm OD silicon rubber tube with wall thickness approximately 1.8 mm.
C2.2.18 Small diameter silicon tubing as appropriate.
C2.2.19 T-joint tubing connectors of appropriate size.
C2.2.20 “Duck” brand waterproofing tape for sealing top and exhaust opening of crankcase (consists of butyl rubber mastic adhesive on heavy aluminium foil, will conform to uneven surfaces).

C.3.3. Photos relating:

Vacuum measuring jig with adaptor attached to front and rear of crankcase respectively:



ANNEX D – Class F2D – Judge's Guide

Purpose of this Guide

This Guide is intended as an aid for Judges/Circle Marshals, Officials and Organisers as well as Competitors on how to interpret, understand and use the Sporting Code rules concerning F2D Combat.

Most of the content in this guide can also be used for class F2E.

D.1.13. Processing (before the contest)

At processing, before the contest, the following issues should be checked and/or tested:

6. Measurement of:
   g) the venturi inlet diameter using the simple plug gauge.
   h) the silencer outlet diameter using the simple plug gauge.
   i) the silencer volume by filling with an appropriate liquid (oil or other).
   j) the interconnecting chamber (maximum volume 1,75 cm^3).
   k) of the silencer length.
   l) of the swept volume of the motor(s) (random check).
7. Inspect the:
   d) silencer's internal compartment to determine if it is truly "simple" ie that it is an empty container with no internal components and a single exhaust opening.
   e) working shut-off.
   f) streamer retaining device.
8. Check:

d) the wing area and model weight.

e) that the model is marked with the FAI Licence Number or the FAI Unique ID number (minimum size specified in CIAM General Rule C.11.1 a) i).

f) the FAI sticker and that the Model Specification Card (one per model type) is properly completed, signed, and stamped.

Note: Although checked at processing this does not certify that a competitor's equipment cannot be a source of disqualification in the competition.

9. Mark the models and engines and record the number of models and engines
10. Pull test the safety strap and safety wire and check that the safety strap works properly.

D.1.14. Rule F2D.3. Combat Site

If the centre (pilot) circle is laid out on other material other than grass, it is recommended that this material have a maximum radius of 4 metres although the pilot (centre) circle must be marked with a radius of 2 metres.

Circles should be made with white colour using paint, chalk, or plastic strip (can be used except for the pilots' circle). If plastic strip is used, the organizer must make sure it is laid out and fastened in such a way that it will not cause a trip hazard to pilots or mechanics.

To improve the visibility of the marking, a second line of a different colour can be added to the circles. To help red/green colour-blind pilots, mechanics and officials, red lines should never be used on grass.

Contestants not directly involved in the organisation or flying in a heat should always be requested to withdraw behind the safety fences or outside the contest area. Spectators and others not involved in the Combat Contest must at all times stay behind the safety fences or at the designated places.

The organisers should provide special safety fences for the Scorers/Timekeepers. Judges and Team Managers should also use this safety measure as intended when flying is in progress.

The safety strap and shut offs must be used during practice flights.

It is strongly recommended that the Circle Marshal, the pilots and the mechanics use a protective helmet that includes a face guard (grid) and neck protector. It is also recommended that upper body protection in the form of a long-sleeved jacket or vest reinforced with "Kevlar" or a similar material is worn during the match.

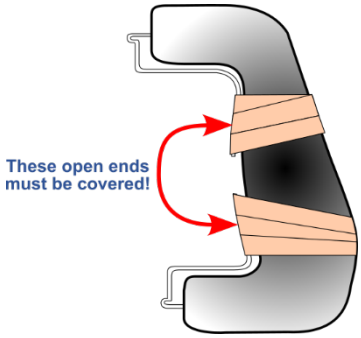
D.1.15. Rule F2D.4. Competitor

There is no rule saying that the mechanic(s) must be of the same nationality as the competitor. This means that a single competitor from a country can find and employ mechanics at World or Continental Championships. The only requirements are that they possess a valid Sporting Licence and are not registered for another National Team.

When the pilot is outside the centre circle for reasons other than picking up the handle or waiting for his model to be serviced, all rules that apply to mechanic(s) also apply to the pilot.

D.1.16. Rule F2D.6. Characteristics

b) All handle and line connections should be covered in such a way so as not to interfere with the opponent's lines but may not be longer than required to cover the connectors. More than one connector per line at the handle and at the model aircraft is not permitted. Note that open connection connectors are not allowed (see sketch). Pilots using this type of handle must tape the



handle before the heat.

f) There must always be a safety wire connection between the engines and the lines.

h) No sharp edges, abrasive or sticky areas that might assist the cutting of the streamers are allowed on the model.

k) When referring to the engine shut-off (engine stop) device this covers both the anti fly-away device (shut-off) and the system used to stop the engine at the pilots will.

D.1.17. Rule F2D.7. Technical Verification

d) Demonstrations of a working shut-off can be requested at random by an official.

e) When pull testing the safety wire it is recommended to ask the competitor (owner of the model) in which direction to pull.

D.1.18. Rule F2D.9 Streamer

The mechanic(s)/pilot may not ask for another streamer just to save time in a heat; for example, if it is wrapped around the lines or if a fly-away occurs. If a fly-away occurs and the model is stuck up in a tree or a net or is unable to be reached, the pilot may choose to continue with a new full-length streamer instead of having a re-flight (if granted be the Judges).

All parts of the opponent's streamer/string should be cleared from the pilot's own streamer/string before re-launching.

No matter that the competitor uses a metal ring or not to attach the streamer to the model, the string should have a single loop and one knot.

D.1.19. Rule F2D.10. The Heat from Start to Finish

f) When the model is launched, the pilot should walk directly into the centre circle. It is the responsibility of the competitor to make sure where the Circle Marshal is to avoid running into him.

h) At take-off and before the signal to start combat the models should fly level in an anticlockwise direction. The competitors are not allowed to do any loops or other manoeuvres unless asked to

i) do so by the Circle Marshal in order to separate the models. Take-off should take place in level

flight forward, not upwards or backwards. Any contravention of these rules will result in a disqualification.

k) In conditions of heavy wind, a grounded model which does not have a running engine may be moved to a safer launching position under supervision by the Judges. While doing this, the mechanics are not allowed to carry the model aircraft and lines over an opponent's grounded model aircraft and/or pitting crew. Parts of a crashed model aircraft are not considered a grounded model aircraft. It is a crashing/landing team's responsibility to maintain a safe distance. If two teams crash/land close to each other it is the rearmost team's responsibility to move backwards unless they are blocked by the other team's second model. This will be supervised by the Judges, and they will advise the teams if any unclear situation occurs.

l) The mechanic(s)/pilot may move around within their pitting area. A team's pitting area is considered to be the place where they have one or both of the models and a distance of approximately 2 metres on each side of the model(s). To assist in untangling lines, mechanics/pilots may be allowed to move around inside the flight circle.

n) The pilot will receive a yellow card if he uses a rough or unsafe flying style, causes a line tangle or if he shows unsportsmanlike behaviour. The Judges/Circle Marshal shall not hesitate to give a yellow card to keep the level of combat on an acceptable and fair level. A yellow card can be given during the heat or after the heat when the Judges/Circle Marshals have had a chance to confer about situations during the heat. The first yellow card is a 40-point penalty while the second and/or third yellow card is a disqualification from the heat. If the first yellow card incident is considered severe, the pilot shall also be disqualified for the offence.

o) The scorers must be observant and aware that the heat can be stopped.

p) If he chooses to bring the model back closer to the pitting circle, the model and remaining lines should be left at least three metres outside the pitting circle. If the model lands in the pitting circle, or close to it, the model and remaining lines must be collected and kept within the pitting area. The purpose of this is to make sure that there is a clear path for mechanics when running between pitting positions.

The landings shall be supervised and directed by the Circle Marshal to avoid dangerous situations.

C.2.3. Rule F2D.11. Scoring

b) No matter what part of the pilot's equipment (model, propeller, lines, streamer etc) makes the cut, it should be counted.

c) The scorers' times should be rounded down to the nearest whole second and then added together. The added result should be divided by the number of scorers and then rounded down to the nearest whole second. This result should be the competitor's official time in the heat. If any scorer's time shows a significant deviation from the average, it should be excluded (but still noted on the score sheet). If a fly-away occurs the scorers should stop the watches when the model lands. It is then the Judges' responsibility to measure and deduct the number of seconds that occurred between the fly-away and the landing. The same should be done if the pilot is asked to land due to streamer or silencer problems/replacement i.e. the scorers stop their watches when the model lands and the Judges deduct the measured time from the point of decision until the landing.

D.1.20. Rule F2D.12. Re-flights

c) A re-flight may be granted if, for instance, the model is stuck high up in a tree or in a safety net where it will take too long, or be impossible, to retrieve the streamer. The pilot may choose to continue with a new full-length streamer instead of accepting the granted re-flight. It is also possible for the Judges to grant a re-flight if an unsafe situation occurs and continuing the heat would cause risk to the competitors or others.

The Circle Marshal can also grant a re-flight if there is a line tangle where both models are grounded, and he considers the tangle impossible to clear. Before a re-flight is called, both pilots should be asked if they would agree to continue the match without clearing the tangle.

D.1.21. Rule F2D.13. Penalties and disqualifications

A. A competitor will receive a penalty of 40 points:

c) No penalties should be given to the pilot if he is pushed out of the circle. Instead, his opponent should receive a yellow card or be disqualified (F2D.13.C.e) unless the Circle Marshal considers it an accidental incident where neither of the pilots is to blame.

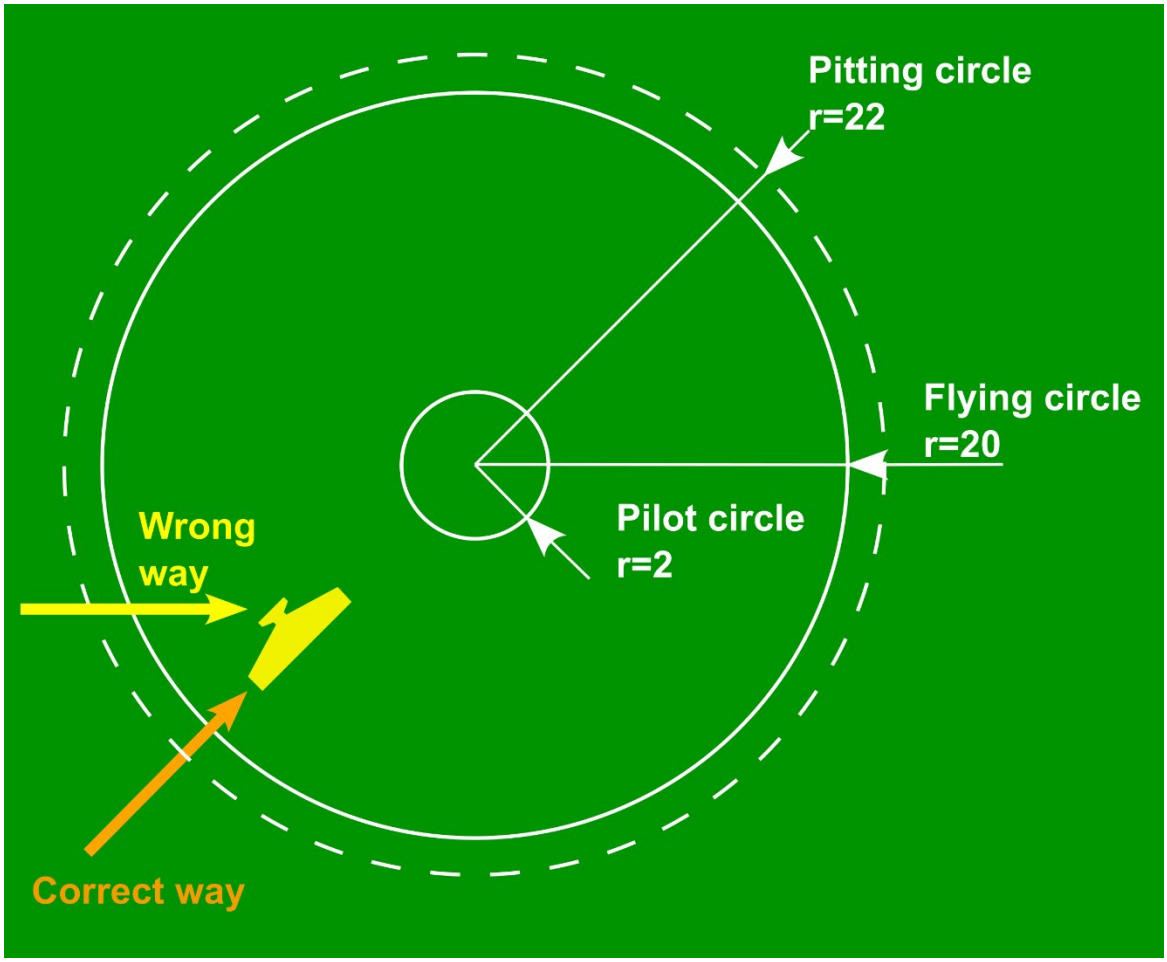
G.1.1.2. Illustration of meaning "step-in" and "step-out":

No step-in	Step-in
	
No step-out	**Step-out**
	

And equally the same feet position is valid for both feet in and out

d) In order to reach a grounded model, the mechanics are not allowed to cut across the flying or pitting circle (see sketch). If a model has crashed close to the centre circle, it is especially important that the mechanic(s) are observant regarding the point at which to enter the circle.

A penalty should be given if, for example, the pilot picks up the crashed model on one side of the centre circle and brings it out on the opposite side of the circle.



If a mechanic runs in the pitting area and jumps over the other team's model or lines, the pilot should be disqualified instead of getting minus 40 points as this is a safety issue.

c) Be observant that all line tangles must be cleared before the model is serviced or the streamer is moved to the spare model. (Except for the case where both pilots have the permission of the Circle Marshal to continue). This rule is also valid if the model is outside the flight circle, for example because of a fly-away.

When a model is withdrawn from the flight circle it must be placed within the pitting area. It must remain outside the flight circle and inside the pitting area otherwise the pilot will receive a penalty of 40 points. A fly-away model may be left where it has landed but lines crossing the pitting area must be cleared so as not to cause interference with the opponent.

f) See F2D.10.n.

j) This rule only applies when his opponent is still flying. However, when both models are grounded both pilots must be observant of their opponent thereby avoiding unsafe situations.

B. A competitor will receive a penalty of 100 points:

a), b), c) and d):

The situation when a model loses the streamer must be carefully watched by the Judges and if the streamer/string can be thought to have been hit or partly cut in a previous attack or mid-air collision then it should be counted as a cut for the opponent (no landing for replacing the streamer).

A part of the string must always be attached to the streamer retaining device. Having only the metal ring (if used) is not enough. If the streamer retaining device is bent or missing due to a mid-air collision, then the pilot should not be given the penalty. Also, if the string is missing and device is intact, but the

model is damaged close to the device, and it can be concluded that the string has been cut in the loop, no penalty should be given.

In all cases during the heat the missed string or streamer should be replaced with a new full-length streamer. In case of an unfurled streamer the pilot can choose to unfurl it or replace it with a new full-length streamer.

If the model lands after the heat and has no string, only the penalty should be given.

F2D.6. c):

A landed model without a silencer or with a damaged silencer must have the silencer replaced before the model can be used again.

C. A competitor will be disqualified from the heat:

a) This means that a model without a silencer, a working shut-off, a streamer hook etc cannot be used again until repaired.

c) For safety reasons, it is not allowed to attach tools, weights etc to a crashed model to compensate for a lost outer wing.

f) If lines or handles are dragged into the centre circle by accident, the Circle Marshal should order the pilots to cease combat and fly level until the circle is cleared and it is safe to continue.

h) It is the responsibility of each competitor, and his Team Manager, to be aware of when his flight is scheduled.

m) Crossed lines which do not interfere with the course of the heat are not a problem and is no reason for disqualification. If the spare model aircraft is needed to take-off and it is prohibited by the crossed lines of the opponent, then another situation is created and rule F2D.13.C.t is applied: Interference with his opponent's equipment.

o) When a pilot without a streamer chooses to fly level and combat still is going on, and his opponent flies in such a way to cause a crash or collision the opponent will be disqualified.

p) If his mechanic(s) enters the flying circle while both models are flying, or during a line tangle where at least one of the models remains airborne, or when a model is flying without the control of the pilot.

s) See F2D.10.n.

t) For example, any tampering with the streamer in any way, shape or form can result in a disqualification. This rule can also be used to disqualify a competitor for any other breach of the rules that is not covered in a separate paragraph.

If the mechanic picks up an opponent's model by mistake and immediately puts it back on the ground, then no penalty shall be given unless an unfair situation has been created that negatively affects the opponent.

D.1.22. Rule F2D.14 The Use of Video Equipment

Note that is only the Judges/Circle Marshal/FAI Jury that can decide whether to look at the video recording or not. A competitor may make a request, or his Team Manager may submit a protest after a heat but if the Judges/Circle Marshal feel certain, then they are not obliged to look at the video recording.

D.1.23. Rule F2D.15 Individual and Team Classification

f) Although this competitor will fly his heat in the following round, his score will count in the round where he was the odd one.

i) A junior fly-off follows the rules in F2D.15.h.

D.1.24. Rule F2D.16. Judges and Timekeepers

a) It is most important that the Judges have a good understanding of the rules and that they have a common language as this will reduce delays and possible errors. The Circle Marshal has the main responsibility for the centre circle and the pilots and their behaviour although all the Judges have the right to give penalties. Penalties may be given after a heat when the Judges/Circle Marshal have had a chance to discuss situations that occurred in the heat. In case of three Judges one should be assigned to each pilot and his mechanic(s) while the third Judge will have an overall function. The Judges must work together and watch any models landing/crashing close to them.

b) All scorers should count cuts as well as record airtime for the competitor. Every scorer should have a notepad where he can make records of the number of cuts as well as the airtime (after the heat). A good way is to divide the six scorers into three pairs and spread them around the circle. Each pair will consist of a scorer for each pilot, and they should be instructed to talk to each other during the scoring. If, after the heat, the scorers have a different cut count they must confer and try to come to a decision. They may also ask the Judges for advice.

   It is also recommended that three Scorers per competitor are used at World Cup contests.

ANNEX E – Control Line World Cup Rules

E.11. Classes

The following separate classes are recognised for World Cup competition in Control Line: F2A (Speed), F2B (Aerobatics), F2C (Team Racing), F2F (Team Racing), F2D (Combat) and F2G (Electric Speed).

E.12. Competitors

c) All competitors in the specified open international contests are eligible for the World Cup. See also rule 4.E.3 c).
d) In the F2C and F2F classes, a junior competitor is defined as a team consisting of both the pilot and the mechanic to comply with the General Section, C.5.1.

E.13. Contests

Contests included in the World Cup must appear on the FAI Contest Calendar and be run according to the FAI Sporting Code. The contests to be counted for a World Cup in a particular year are to be nominated at the CIAM Bureau Meeting at the end of the preceding year and are to be indicated on the FAI Contest Calendar. The selection of the contests for each class should be according to the following guidelines:

e) Any country may host two competitions in each class on its own behalf unless the particular country extends over three or more time zones, when it may host two competitions on its own behalf within each time zone.
f) Additionally, any country may host a maximum of one competition in each class on behalf of another organising country regardless of whether or not the host country extends over three or more time zones.
g) In the case of b), at least one competitor from the organising country must compete in the competition for the competition to be valid. The competitor(s) from the organising country must comply with the definitions in 4.E.4. Points Allocation.
h) Each competitor (team in F2C) may count only one competition from each organising country in Europe (taking the better score for any European organising country in which he has scored in two competitions). When two competitions per time zone have been organised and held within a time zone, the better score per time zone counts.

E.14. Points Allocation

In each competition, points in a class will only be allocated if the competitors who have completed a flight in that class are from at least two different countries.

A competitor (team in -F2C) has completed a flight if:

- he registers a speed not equal to zero (0) in F2A or F2G.
- he registers a score not equal to zero (0) in F2B.
- he registers a time not equal to zero (0) in F2C.
- he flies in a heat in F2D

In F2A and F2G, the points allocated to each competitor will be the same as the achieved speed result in km/h.

In F2B, F2C and F2D, the points to be allocated to competitors (teams in F2C) will depend on the number (N) of competitors (teams in F2C) who will have completed at least one flight in the event.

Points are allocated to competitors (teams in F2C) who will have completed at least one flight according to their placing in the results given in the following tables:

c) N > 20

Placing	1	2	3	4	5	6	.....	20	21 and after
Points	20	19	18	17	16	15	.....	1	0

A bonus of 8 points is given to the first, 5 points to the second and 3 points to the third.

d) N < 20 or N = 20

Placing	1	2	3	4	5	6	.....	N-1	N
Points	N	N-1	N-2	N-3	N-4	N-5	.....	2	1

The bonus is defined as follows:

- for first: N/3 rounded up to the nearest whole number of points with a maximum of 7 points;
- for second: N/5 rounded up to the nearest whole number of points with a maximum of 4 points;
- for third: N/7 rounded up to the nearest whole number of points with a maximum of 3 points

In the event of a tie for any placings, the competitors (teams in F2C) with that placing will share the points which would have been awarded to the places covered had the tie been resolved (round up the score to the nearest whole number of points).

E.15. Classification

The World Cup results are determined by considering the total of points obtained by each competitor (team in F2C) in the World Cup events. Up to three events may be counted, selecting each competitor's (teams in F2C) best scores during the year. The winner of the World Cup is the competitor (team in F2C) with the greatest total.

In the event of a tie for first, second and third place, the place will be determined according to the following scheme. The number of events counted is increased from three, one at a time, until the place is obtained. If this does not separate the tied competitors, then the winner will be determined by considering in the best three events:

- in F2B and F2D the points obtained in each event multiplied by the number of competitors who will have completed at least one flight in the event; the winner is the one with the greatest total thus calculated.
- in F2A the best speed and in F2C the best time.

E.16. Awards

The winner is awarded the title of the winner of the World Cup. Medals and diplomas shall be awarded in accordance with CGR C.2.2.3. Further trophies may be awarded by the CIAM F2 Subcommittee as available.

a) Juniors

There will be a separate classification for juniors and females provided that 5 or more competitors compete in any World Cup class of the World Cup series. The winner is awarded the title of winner of the Junior World Cup. Medals and diplomas shall be awarded in accordance with CGR C.2.2.3. Further trophies may be awarded by the CIAM F2 Subcommittee as available.

E.17. Organisation

The F2 Subcommittee shall be responsible for organising the World Cup and may nominate a responsible person or special subcommittee to collect the results.

E.18. Communication

The F2 Subcommittee should receive the results from each contest in the World Cup and then calculate and publish the Current World Cup positions. These should be distributed to the news agencies and should also be available, by payment of a subscription, to any interested bodies or individuals. Final results of the World Cup are to be sent also to the FAI, National Airsports Controls and Model Aircraft press.

E.19. Responsibilities of Competition Organisers

Competition organisers must propose their event for inclusion in the World Cup when nominating events for the FAI International Sporting Calendar. The final selection of events from these proposals is

made by the CIAM Bureau as defined in paragraph 3. Immediately after the event, the competition organiser must send the results to the World Cup organiser, at least within one month as required in the Sporting Code B.5.5. Any failure to return results promptly will be reviewed by the CIAM Bureau when considering the competition calendar for the following year.

E.20. Board of Judges

A Board of three persons shall be nominated by the F2 Subcommittee Chairman in accordance with CIAM General Rules C.7.4 World Cup Board.

ANNEX F – CLASS F2F – CL DIESEL PROFILE TEAM RACING

The rules for F2F are the same as F2C except for the variations shown below.

The difference between F2C and F2F are the specifications of the aircraft/equipment used. The focus in this racing class is on flying, not on technical development/innovation.

The specifications of the equipment used, are set to make this class sustainable and affordable, and to offer competitors a platform for developing their flying skills.

F.1.15. Diesel Profile Team Racing Event.

c) See F2C.1
d) Race
   iii) The maximum time allowed for a qualifying race is 5 minutes.
   iv) The qualifying races are run over 100 laps corresponding to 10 kilometres. The final race is run over 200 laps corresponding to 20 km. Two pit stops (landings for refuelling) are mandatory for a qualifying race and five for a final race.

F.1.16. Team racing Site

See F2C.2

F.1.17. Team Racing Model, Engine and Control System

See F2C.3

F.1.18. Engine Characteristics

c) The engine maximum swept volume of motor: 2.5 cc.
d) The engine must be a diesel type with suction feed.

F.1.19. Model Characteristics

j) See F2C.3.2
k) Weight
   iii) Total maximum weight with empty tank is 700 g.
   iv) Total minimum weight with empty tank is 350g.
l) Profile fuselage: minimum height at the top of the cockpit: 100 mm, maximum width: 26 mm.
m) The propeller must be a commercially available plastic/glass composite type of 7” × 5.5” (177.8mm × 139.7mm) or larger. Moulded carbon and/or fibre glass propeller are forbidden. The minimum diameter of the propeller at the start of a race is 170 mm.
n) The maximum volume of fuel and oil permitted in the single tank shall be 15cc.
o) The use of multi fuel refuelling systems is not allowed.
p) The landing gear must be arranged to permit normal take-off and landing. The landing gear must be of the permanent fixed type. Retract landing gear is prohibited.
q) Engines of the front exhaust type may be fitted with a simple deflector shield preventing exhaust gasses being blown back into the exhaust port.
r) The engine must be side mounted and can only be covered by the maximum fuselage width; all other parts of the engine must be totally exposed. Any engine integral parts or the addition of any parts that form a cowl, ducting, cover or shield, whether attached to the engine or the model airframe, are forbidden.

F.1.20. Fuel

No fuel restrictions.

F.1.21. Technical Checks

See F2C.4

F.1.22. Organisation of Races

See F2C.5.

F.1.23. Race from Start to Finish

See F2C.6.

F.1.24. Definition of an Official Flight

An official flight is completed when the conditions in 4.H.7 are met.

F.1.25. Warnings Disqualifications and Penalties

See F2C.8

F.1.26. Classification

See F2C.9

F.1.27. Timekeepers

See F2C.12

F.1.28. F2F Panel of Judges

See F2C.13

Annex G - Control Line Organisers' Guide

Foreword

This guide is intended to give some helpful advice to organisers of international contests. The guide should be looked upon as a set of recommendations concerning contest organising, and the statements are in no way to be regarded as definite rules except in those cases when they quote the Sporting Code. This guide is written for World Championships but can be used for any international competition. If so, compare with the Sporting Code for deviations.

FIRST PART: PRE-CONTEST ARRANGEMENTS

Contents:

For the time schedule for organising World and European Championships and the information required by the CIAM Bureau, see General Organisation of a World Championship.

G.10. Information

G.1.12. The offer to organise will be given not later than at the CIAM Plenary meeting the year previous to the WCh/CCh.
G.1.13. First information can be given at the next Plenary meeting.
G.1.14. First information to intended judges and jury members should preferably be distributed not later than 1st January of the year of the WCh. This information is that approved by the CIAM Bureau at the previous December meeting.
G.1.15. The jury members must be chosen according to CIAM General Rule C.7.1.
G.1.16. The Judges must be chosen from the approved FAI list of judges and according to Sporting Code CIAM General Rule C.7.5 and Volume F2 Section 4C para. 4.2.11, F2C.13. and F2D.15.
G.1.17. Information to National Airsports Controls and entry forms must be dispatched in accordance with CIAM General Rule C.15.4. This information must contain date, place, time, schedule and name and address of contact person. It is possible to ask for a preliminary number of entrants at an early stage and have this figure completed with names at a later date but not later than one month before the competition.
G.1.18. Information to the CIAM Bureau shall be given by a delegate from the organising nation at the Bureau meeting in the December prior to the competition.
G.1.19. This information shall include jury and judges according to CIAM General Rules C.7.1 and C.7.5 and Volume F2 rules 4.2.11, F2C.13 and F2D.15.
G.1.20. An example of this information is given in General Organisation of World Championships.
G.1.21. The organiser must acknowledge receipt of the entry form and the entry fees (CIAM General Rule C.13.4 c)). This should be done in due time before the contest.

G.11. Publicity

G.2.8. A first set of information to national press, radio and TV can be dispatched about half a year before the contest. It should contain common information about model flying and some basic information about the international contest which is to be run.
G.2.9. Simultaneously a set of information should be sent to the international model flying press.
G.2.10. About two months before the contest, an information meeting should be arranged with invited guests from the main national newspapers and radio and TV.
G.2.11. At this stage it should be possible to release detailed information about the contest, such as the number of entrants, etc.
G.2.12. A second set of information should be distributed as 2.1. and it should contain mainly the same information as given under 2.3. It should also be sent to the international model flying press.
G.2.13. Press conferences to be held during the contest should be prepared.
G.2.14. Posters about the contest should be distributed at least in the city where the contest area is located about one month prior to the contest.

G.12. Time Schedule

G.3.2. A common time schedule for Control Line WCh/CCh is as follows:

1st day	Arrival			
	F2A	F2B	F2C	F2D
2nd day	Processing, Official training, Opening ceremony			
3rd day	1st Round	1st Qualifying flights	1st Round	Eliminating round
4th day	2nd Round	1st / 2nd Qualifying flights	2nd Round	Eliminating round
5th day	3rd Round	2nd Qualifying flights	3rd Round	Eliminating round
6th day	Free training	2nd Qualifying flights		Eliminating round
7th day	4th Round	Fly off rounds	Semi-finals, and finals	Semi-finals, and finals
8th day	Departure			

F2A: The round start time should be set so that the round will finish at approximately 18.00. This time should be calculated to include 30% of the entry anticipated to make second attempts. Round four should be scheduled to finish immediately prior to the F2C final.

G.13. Practice Flights

G.8.2. The fact that some teams prefer to arrive several days in advance for practice flying should be considered. Accommodations should be arranged or at least advised prior to the contest, and the tracks or any suitable area in the neighbourhood must be open for flying.
G.8.3. During the contest it should be possible to perform practice flights within the contest area or in another suitable place close to it. The tracks should be open for test flights whenever they are not used for contest rounds, except for Combat.
G.8.4. If space permits an extra circle for test flying is recommended within the contest site.
G.8.5. If test flying only can be arranged far away from the contest site a transportation system of suitable frequency (e.g. mini-buses) must be available.

G.14. Awads

(CIAM General Rule C.21.)

5.3. The organiser should contact the FAI and the CIAM Secretary to confirm that perpetual trophies, diplomas and medals are delivered to the contest in due time.
5.4. If there is any intention to offer a new perpetual trophy, it should be approved by the CIAM Plenary Meeting the year before the contest.

G.15. Contest Grounds

G.8.6. General

The site should be chosen in such a way that the following are considered:

6.1.7. Distances between accommodation - meal places - contest ground should be kept to a minimum.
6.1.8. Easy transports for entrants and spectators. Bus tours should be organised.
6.1.9. Parking areas for entrants and spectators.
6.1.10. Noise problems (if any).
6.1.11. Windy places should be avoided, if possible.
6.1.12. Turbulence caused by trees or houses surrounding the circle (especially for Aerobatics) should be avoided.

G.9. Layout

G.9.1. The area should preferably contain three hard circles and if Combat is included two grass circles. The circles shall be horizontal.
G.9.2. The distances between the circles must permit safe passage of pedestrians while the model aircraft are flying.

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

For Combat, the circles should be laid out on grass.

G.10. Depots

G.10.1. 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- shades.
G.10.2. Avoid putting the depots so close to the tracks that motor testing interferes with the starting procedures.
G.10.3. The depots should be organised in such a way that spectators cannot obtain access to them. They should be easily entered by the competitors.
G.10.4. 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.

G.10.5. Tables and chairs in each depot are always appreciated.

G.11. Site

G.11.1. 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.
G.11.2. 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.
G.11.3. The Combat circles should be laid out on grass. The centre piloting circle may be laid out on grass or any other suitable (non-slippery) material having a radius of maximum 4 metres.
G.11.4. Except for Combat, 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.
G.11.5. Except for Combat, if the flying surface is shaped like a ring, then enough space must be left both inside and outside the 19.6 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.
G.11.6. For Combat a space of at least 5 metres should be left free around the pitting circle to position scorers/timekeepers, team managers and judges with their protective fences and to give space to the pitting crews (when running).
G.11.7. 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 take-offs and landings.

G.12. Tracks

G.12.1. Speed

6.5.2.1. The Speed circle must be surrounded by a fence (see rule 4.0.1). It should be placed as close to the track as possible, but the radius must not be less than 24 m. There should also be a place for timekeepers, officials and their equipment.
6.5.2.2. In case of a permanent installation (especially near the sea), checks must be made for any rust or corrosion reducing its strength.
6.5.2.3. On the fence, diametrically opposite to the timekeepers' place, there should be a mark on the fence, preferably a white board, 20 cm wide and at least 2 m high. It should be placed at the normal flight level at 1 - 3 m height.
6.5.2.4. At three evenly spread places there shall be T-marks showing the flight heights of 1 m, 3 m & 6 m.
6.5.2.5. The fence shall have one entrance and one exit opposite to each other.
6.5.2.6. Just outside the entrance there shall be a line control area, fenced off with a low fence or a rope. In this area the line length 17.69 m will be marked by marks firmly fixed to the ground. The marks should preferably be of the edge type, and the edges not wider than 2 mm.
6.5.2.7. In the centre of the circle there shall be a Speed pylon according to para. 4.1.7. The pylon must be firmly fixed to the ground.
6.5.2.8. Any protruding part which may engage the pilot’s clothes must be avoided on the lower (non-rotating) parts of the pylon.
6.5.2.9. The pylon must be checked for sufficient stiffness in the fully extended position. The pylon must reach a sufficient height to permit flying with the handle at shoulder level.
6.5.2.10. The device which holds the upper (rotating) part of the pylon at the height chosen by the pilot, must be built in such a way that it assures a positive positioning avoiding any displacement during the official flight. Checks are recommended in this respect, in case of an old pylon, after prolonged use and wear.
6.5.2.11. The swivel must be free from any appreciable friction or stiffness.
6.5.2.12. eventual bolts for fixing the pylon to its base or the ground must be under ground level or conveniently covered flush to the ground, so the pilot is allowed to run around the pylon with his feet close to it without hindrance. If the pylon has a flange for fixing it to the ground, the same aspects should be regarded.

6.5.2.13. The judges and the timekeepers should be placed in a special area with a safety fence between themselves and the flying models. The area must be chosen so the officials have the sun behind their backs, and so it does not interfere with the timekeeping.

6.5.2.14. A duplex electronic timing system is used, the sensors shall be placed in a shaded area facing away from the sun. Care should be taken to ensure that no moving shadows cross the sight path of the sensors.

6.5.3. Aerobatics

6.5.3.1. Contest organisers shall provide a site with one or more Contest Flight Circle/s that are, relative to the centre of the circle, horizontal within plus/minus 30 cm across the entire diameter of each circle. Contest Flight Circles shall also be flat and have smooth and ridge-free surfaces. If surfaced in asphalt, concrete, or similar hard material, the surface should be dust-free (that is: not packed gravel or sand, nor paved or tiled with openings between the paving material). Hard surfaces should, as a minimum, provide sufficient hard area to include at least the whole of the pilot's circle plus a "ring" for model aircraft to use during take-off and landing (see diagram). During contest flying all grass, soil, etc, lying between these 2 areas shall be kept short enough and level so as not to interfere with control lines when model aircraft are taking-off and landing.

6.5.3.2. If Contest Flight Circle/s are wholly grass (or similar), the same requirements as in paragraph a) above shall apply, and also, the centre (pilot's) circle and take-off and landing area should have an underlying surface which is free from any bumps and/or holes. The standard required shall be better than that of a typical local sports field (a football field for example), and should be as close as possible to a high quality, level, well-tended and well-drained domestic lawn. The length of grass shall be kept to a maximum of 2.5 cm over the complete Contest Flight Circle during contest flying.

6.5.3.3. The diagram at Appendix II shows the dimensions for contest **and practice** flight circles and the markers to be erected **at first category events** every 1/8th of a lap interval indicating the height of the horizontal base which lies 1.5 m above the centre of the circle. As a minimum standard, all contest flight circle/s shall have the centre (pilot's) circle and outer diameter circle clearly marked with lines of 10 cm width. The erection of a safety fence (or other suitable barrier) around the outside of all contest flight circles as shown below is also recommended.

6.5.3.4. The use of "Ready Box"/es is recommended at all contests. These should be clearly marked, segregated from general access by barriers, and be large enough to contain a model aircraft with full-length lines attached. Ideally three such Ready Boxes should be provided if the site is large enough. It is also recommended that one "Exit Box" is also provided. This should be positioned on the opposite side of the Contest Flight Circle to the Ready Box/es, of a similar size to the Ready Box/es, and similarly marked and segregated.

6.5.3.5. At World and Continental Championships and other limited international contests, organisers shall also provide Practice Circle/s. These shall be located at the contest site itself, but in any event shall not require more than 30 minutes of normal travelling time to reach from the contest site. Organisers should provide a minimum of one Practice Circle for every 50 registered contestants. All Practice Circles shall be freely open and available for use by all contestants for at least the duration of the contest, plus also for a suitable time before the start of the contest. All Practice Circles should be as close as possible to the standard and maintenance conditions set out at paragraphs a) and/or b) above; but except for the marking of the centre of the centre (pilots') circle and the outside diameter circle, the marking of circles as described at paragraph c) above shall not be required. However if the Practice Circle/s site is open to public access then organisers shall also erect suitable safety barrier/s and warning signs in the local language.

6.5.4. Team Racing

7.1.21.1. 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. F2C.2. The circle lines shall be 10 cm wide. The safety circle shall be a broken line consisting of dashes 25 cm long with 25 cm gaps, and a width of 2.5 cm. 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 I.

7.1.21.2. The Team Race circle must be surrounded by a fence 2,5 m high (see rule 4.0.1). It should be placed as close to the track as possible but the radius to the circle centre shall not be less than 24 meter.

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

7.1.21.4. 6.5.3.4. Wire fences 2 to 2,5 m height and 2 to 2.5 m wide must be provided to protect all staff who have to be inside the circle during races. These fences may also be used by pitmen and team managers. The judges must also be provided with a similar safety fence.

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

7.1.21.6. The fence shall have separate entrance and exit areas to allow a smooth flow of entrants at the end and beginning of each race.

7.1.21.7. 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.

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

7.1.21.9. 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.

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

7.1.22. Combat

6.5.4.8. The Combat track should consist of short cut grass.

6.5.4.9. The centre (piloting) circle (radius 2 m) the flight circle (radius 20 m) and the pitting circle (radius 22 m) must be clearly marked on the ground.

6.5.4.10. The centre piloting circle may be laid on grass or any other suitable non-slippery material that has a maximum radius of 4 metres.

6.5.4.11. The track should be fenced off with low fences or rope or by other means. A football ground or similar is ideal. A safety fence with a minimum height of 3 metres (5 metres preferred) should protect all spectator areas. If a stand is being used for spectators then the net should be of a corresponding height.
Fabric nets with meshes of around 12 cm are ideal. The meshes should not be so small as to impede the visibility of the model aircraft and streamers for the spectators.

6.5.4.12. A square for processing and line tests shall be arranged. It should contain two line length marks 15.92 m apart and protected by a meshed fence of 3 m height. For the administration and other officials their working area should be protected by a meshed fence of minimum 3 m high.

6.5.4.13. The judges, time-keepers/scorers and team managers should be protected by small mobile fences of 2 to 2.5 m height and 1.5 to 2 m width. Placing 6 of these around the pitting circle will be adequate.

6.5.4.14. In an attempt to stop fly-way models, even if they have a workable engine shut-off, from leaving the flying site in unwanted directions long posts with a safety net can be erected outside parts of the pitting circle. Only the competitor, his helpers and the officials are

allowed to stay inside the safety fences or safety circles. Persons who have fulfilled their mission must leave the flying area.

G.16. PA Systems

7.1. One system addressing the spectators.

7.2. One system addressing the entrants, calling them for flights, etc.

7.3. One system to be used by the Team Race jury addressing teams during their races.

7.4. Fixed devices are needed in Combat and are very useful in Speed and Aerobatics.

Note: 7.1. and 7.2. can be combined. 7.3. cannot be combined with any other use.

G.17. Equipment

G.17.1. Measuring Equipment Specification:

The contest organisers should procure the following minimum equipment for use at the Championships:

G.17.2. Line Measuring

8.2.3.1 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.)

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

8.2.3.3 Pin gauges of 0.35 mm for Team Race and 0.4 mm diameter for Speed and Combat to DIN 2269 standard to calibrate the micrometer and thickness gauge.

G.17.3. Engine Measuring

8.1.2.1. For measuring the bore a minimum of a self-centring (three-point) micrometer gauge with a minimum graduation of 0.005 mm and an accuracy of +- 0.002 mm should be used. A standard sizing ring appropriate to the instrument and manufactured to the appropriate DIN standard must also be supplied in order to calibrate the bore gauge prior to use.

8.1.2.2 For measuring the stroke a dial gauge with a minimum of 20 mm travel, a minimum graduation of 0.01 mm and an accuracy of +- 0.020 mm fitted with a suitable stop to rest on the top of the liner should be used. For measuring an engine which is close to top limit of capacity, a 0 to 25 mm depth micrometer with minimum graduations of 0.005 mm and an accuracy of +- 0.002 mm should be used. The dial gauge is the preferred instrument for stroke measurement because of its ease of use.

G.17.4. Measuring Equipment Method of Use

G.17.4.1. 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*.

G.17.4.2. Methodology for Engine Measuring Equipment

There are different problems associated with measuring Speed, Combat and Team Race engines. These problems are related to the fit and construction of Team Race engines.

G17.4.2.1 Speed & Combat Engines

On engines using removable heads, as commonly used in Speed and Combat and where it is possible to turn the engine over TDC easily, the bore should be measured at or near TDC as currently specified.

The stroke should be measured using the dial gauge supported on a suitable foot and mounted on the top of the crankcase or liner.

8.10.1.1Team 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

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.

8.11Speed

An optical electronic timing device in duplex or 3 stopwatches showing at least 1/100 sec for clocking the speeds.

1 stopwatch for clocking the attempt times

1 pair of field glasses, on a tripod, used to check the position of the handle in the pylon fork.

1 pylon (para 4.1.7.)

1 handle (para. 4.1.7.)

1 table and a sufficient number of chairs for the officials.

Sun- or rain-shades for the officials

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 $\pm$ 5 g accuracy

1 spring balance for pull tests 0 - 50 kef.

1 measuring tape 20 m

Fuel to the standard formula (para. 4.1.3.)

A number of plastic bottles about 200 cm^3 capacity for filling of tanks.

1 - 3 squeeze bottles or injection-syringes for rinsing the tanks.

8.12Aerobatics

1 or 2 stopwatch(es) for clocking time phases (paragraph 4.2.13)

1 or 2 device(s) for pull tests 0-35 kgf (paragraph 4.2.4)

1 2m x 2m outline (for checking maximum wingspan & overall length (paragraph 4.2.2))

1 balance minimum 4 kg capacity $\pm$ 10 g accuracy

1 or 2 measuring tapes minimum 25 m

1 voltmeter minimum up to 50 V dc

1 or 2 device(s) for visual signalling of the time phases (paragraph 4.2.13.)

3 or 6 chairs and 3 or 6 rain- or sunshades for the judges

3 or 6 blotting pads for the judges

8.13Team Racing

9 stopwatches registering at least 1/100 sec.

9 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 (para. F2C.13.b.)

2 sets of coloured pieces of cloth for each team. 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

Sun- or rain-shades if needed

1 table for the Panel of Judges

Cleaning equipment so the oil and fuel could quickly be removed from the starting positions.

8.14Combat

Venturi and silencer gauges.

Micrometer for line thickness measurements.

1 stopwatch to clock the heat time.

6 stopwatches with start/stop functions (accumulating) to clock the flight times

1 micrometer 1/100 mm resolution

1 depth micrometer 1/100mm resolution

1 internal diameter micrometer with its calibrating tool (0-15 mm)

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 spring balance for pull tests 0 - 50 kgf.

1 measuring tape 25 m

1 flag

1 starting pistol, whistle, etc.

2 sets of 6-9 vests of different colours to be used be the pilots and mechanics.

Audible signal horn to be used by the circle marshal.

Streamers

6 chairs for the timekeepers and 3 for the judges in case they require them.

1 table for the judges and administration

6 blotting pads for the jury and the timekeepers

Aspirin for all the officials

8.15Secretariat

The Secretariat should be kept in a house or a caravan, or a suitable tent or office container.

- Computer
- Desk calculators
- Spare stopwatches
- Combat streamers
- Scoreboard
- Felt pens
- Printing equipment

For processing:

- Slide rules
- Contest numbers
- Contest portfolios
- Stamps
- Table of nationality markings
- Sporting Code

Rules displayed, FAI language

Rules displayed, national language

In the Secretariat there should be a sufficient number of officials to serve the different classes such as: calculating personnel, messenger persons, recording personnel etc.

Aerobatic results should be checked twice, by two different officials, before they are released.

Timekeepers and other officials must have sufficient experience.

Special education and training courses for officials must be arranged if there is any lack of experience from international contests.

8.16Recording of Results

It is recommended that the organisers use software programmes which are approved by the F2 subcommittee to record the Championships results. Where possible results shall be transferred electronically between the contest directors and the Championship secretariat.

G.18. Officials and Judges:

The number of officials needed varies between the different classes. The numbers given are those officials needed for each separately, and the fact that officials sometimes can have doubled duties has not been taken into account.

G.20.1. Contest management:

1 Contest manager
1 Treasurer
1 Quartermaster
1 Secretary
1 PR officer
1 Official in charge of each class
1 Official in charge of transport
1 Official in charge of PA systems

G.20.2. FAI Jury

3 jury members (CIAM General Rules C.7.1 and C.7.2)

G.20.3. Speed:

3 timekeepers (para. 4.1.16.a)
2 judges (para. 4.1.16.b)
1 senior judge (para 4.1.16.c)
2 officials for line tests
1 circle marshal, could be main timekeeper or one of the judges

G.20.4. AErobatics

For Single-Circle Format Contests:
5 judges (para. 4.2.11.)
1 timekeeper (para. 4.2.13.)
1 official for line and pull tests
Tabulating personnel in the Secretariat

For Double-Circle Format Contests:
6 judges (para. 4.2.11.)
2 timekeeper (para. 4.2.13.)
2 officials for line and pull tests
Tabulating personnel in the Secretariat

G.20.5. Team Racing

3 Judges (para. F2C.12.a)
9 timekeepers (para. F2C.12.b)
1 circle marshal (para. F2C.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

G.20.6. Combat:

3 judges
1 circle marshall
6 timekeepers/score counters
2 officials in charge of pull tests
1 official in charge of distribution of official fuel, collection of empty bottles and coloured vests.

G.21. Emergency - First Aid

At least one medical attendant should always be available on the site when flying is permitted. One ambulance, on request.

G.22. Insurance

The organiser must take measures so every entrant is insured against public liability during the contest and during the organised practice flights.

G.23. Accommodation

Accommodation should be of a satisfactory standard. Special attention must be paid to the hygienic problem. Showers should be available. There must be a sufficient number of toilets for all the entrants.

If possible there should be family accommodations as well as separate lodgings for men and women.

Camping facilities are always requested.

G.24. Food

The menu should not be too locally composed, but should rather be of an international kind.

The fact that some entrants' religions could limit the choice of food must be considered.

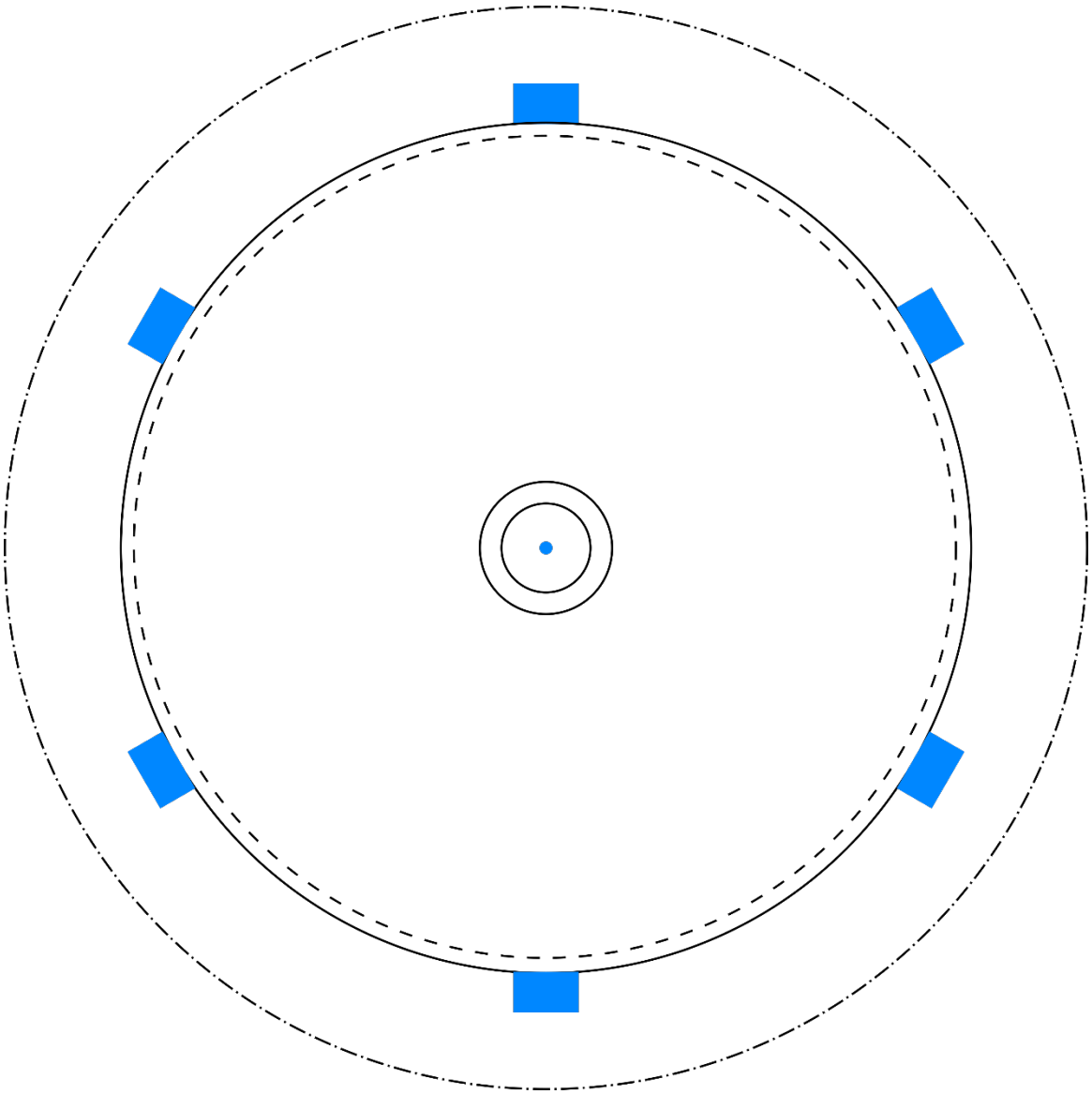
G.25. Fuel

World Championships: The organisers shall provide, 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.

Note: For time schedule, see General Organisation of a World Championship.

Appendixes begin overleaf.

APPENDIX I Team Racing Circle Dimensions



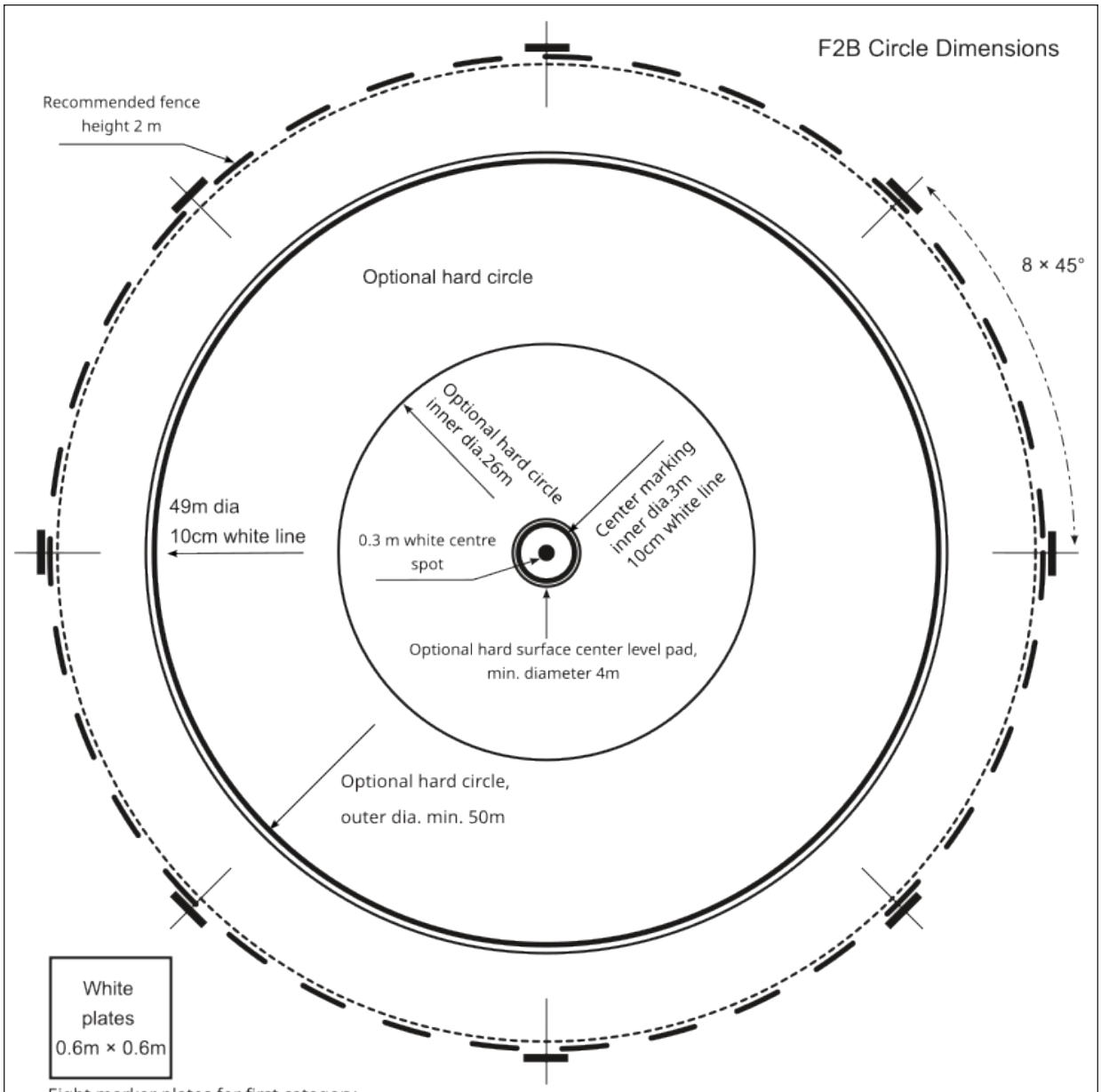
The inner circle, centre circle, safety circle and flight circles shall be marked (painted) on the ground in a colour having a high contrast to the ground, according to Sporting Code Volume F2 para. F2C.2. The circle lines shall be 10 cm wide. The safety circle shall be a broken line consisting of dashes 25 cm long with 25 cm gaps, and a width of 2.5 cm. 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

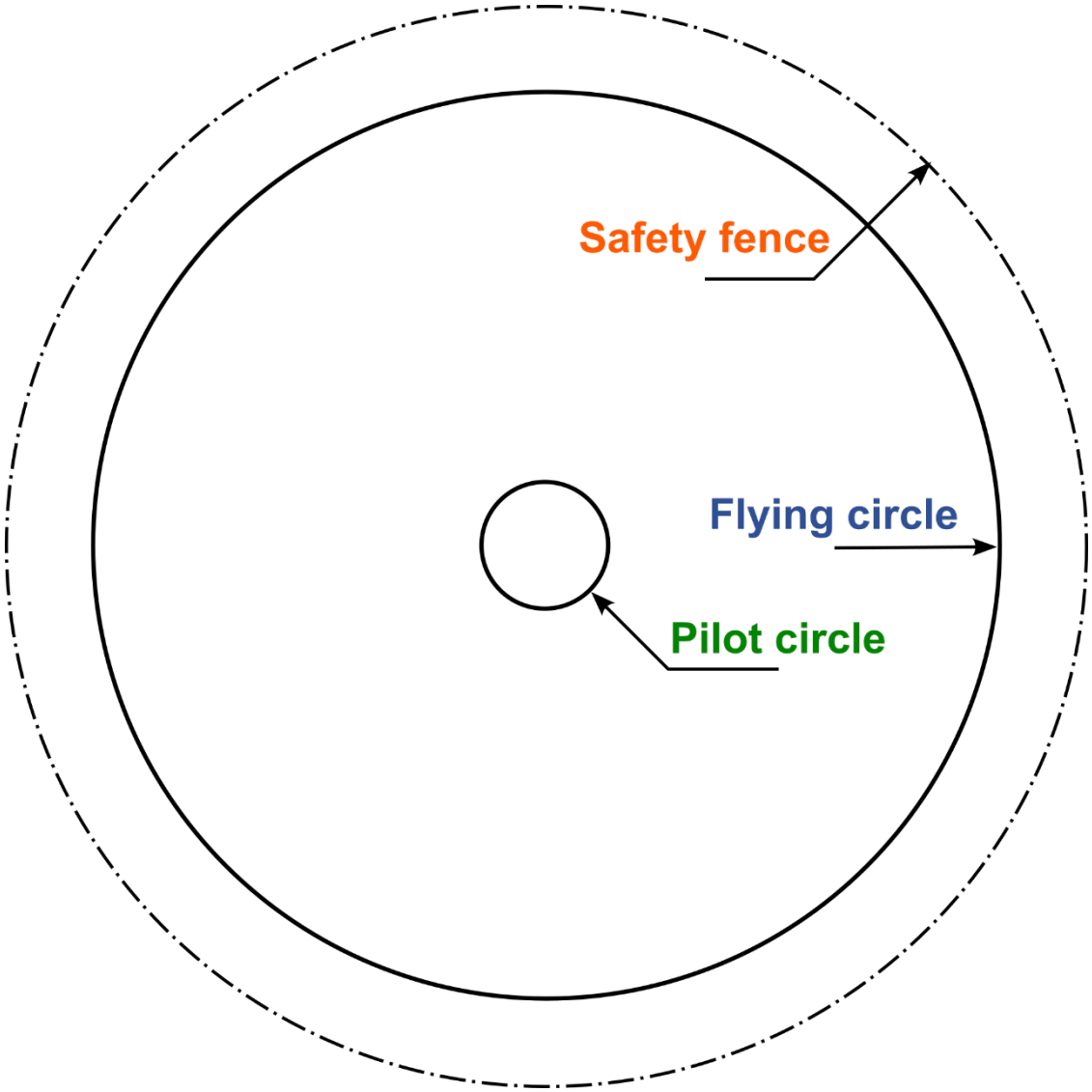
The middle of the centre circle shall be marked with a spot of 0,3 m diameter in the same colour as the circles.

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.

APPENDIX II - Aerobatics Circle Dimensions


F2B Circle Dimensions
Recommended fence height 2 m
8 × 45°
Optional hard circle
Optional hard circle inner dia.26m
Center marking inner dia.3m 10cm white line
49m dia
10cm white line
0.3 m white centre spot
Optional hard surface center level pad, min. diameter 4m
Optional hard circle,
outer dia. min. 50m
White plates 0.6m × 0.6m
Eight marker plates for first category events practice and contest circles. Recommended for second category events.
Marker plates centerline on horizontal base of flight hemisphere
r = 31m
Side view not to scale
max. Terrain Height
1.5m
Centre
0.3m
0.3m
min. Terrain Height
F2B Working Group 1: 350 Oct. 12 2022

APPENDIX III - Speed Circle Dimensions



	Radius:	Height:
Pilot circle:	3 m	**N.A.**
Flying circle:	21 m	
Safety fence:	Min. 25 m	2,5 m
Temporary circles:	Min. 25 m	Min. 2 m

Second Part: Contest Arrangements begins overleaf.

G.26. SECOND PART: CONTEST ARRANGEMENTS

Contents:

G.16.1. Reception

Reception should be laid out in such a manner so as to allow the quick handling of arriving teams (or part teams). The name of the team manager should be known in advance so that he may be given details of team managers' meetings, processing times, practice times, need to inspect teams' sporting licences, etc.

As soon as the participants or supporters arrive, they should be given their food vouchers (if applicable) and the place and details (map if necessary) of their sleeping and lodging arrangements. It is of course advisable to have several persons working in parallel to deal with the inevitable sudden influx of competitors.

In addition to the personnel dealing with the above, two other officials should be available at the reception area. One to deal with financial arrangements - late entry fees, etc. and one prepared to

answer any questions of a general nature about the competition timetable, transport, practice times and places, etc.

Some competitors at this time are understandably tense and nervous and are likely to have problems with language and general procedure in a foreign country. Every effort should be made to assist them to join smoothly into a previously prepared scheme.

Verification of sporting licences can often cause a bottle-neck at reception. A possible alternative is to insist that the team managers bring their teams' sporting licences to the team managers' meeting for inspection.

Where transport is available, reception should enquire if arrivals need transportation and make a note of those teams that will require daily transport throughout the contest.

G.16.2. Transport

If the placement of the participants' lodgings are further than a reasonable walking distance to the competition site, the organisers should be in a position to offer transport (to and from the site) to those teams requiring it.

G.16.3. Team Managers Meeting

It is important to hold the first of these meetings as soon as conveniently possible after the arrival of all teams. This information could well be published in the pre-contest material together with a time and place (if known in advance).

A suggested agenda for the TMs meeting is as follows:

h) Welcome of teams by Contest Director
i) Urgent problems involving lodgings, transport or feeding of competitors
j) Introduction of members of juries, judges, etc.
k) Draw for any necessary flying order
l) Comments from FAI Jury on any new rules or flight procedures they feel should be emphasised
m) Comments from other judges or jury members about interpretation of rules or general competition procedure
n) Questions from T/Ms.

Team managers meetings may be held at other times during the contest if the organisers or judges/juries feel that they are necessary.

G.16.4. Opening Ceremony

Where a formal opening ceremony is envisaged, it is suggested that an explanation and a clear order of march and/or standing position of the teams, be given to each team manager at their arrival at reception. Many opening ceremonies have suffered through foreign teams not fully understanding what was expected of them.

G.16.5. Spectators

Understandably at world championships and other major international events, large groups of spectators can be expected. This is often of financial benefit to the organising Airsport Control and indirectly to the competitor (lower entry fees, etc.). Two points must however be considered:

a) In the interest of attracting the spectators to run on other days of the contest, some form of commentary or easily seen, up to the minute, results should be available, in addition to reasonable viewing areas at all circles.

b) The layout of the circles and spectators' enclosures *must* allow for *spectator-free* access to all circles for the competitors and officials.

If spectators are required for financial reasons, then pre-contest publicity must of course be aimed at attracting "the man in the street" in addition to interested aeromodellers.

G.16.6. Secretariat

During the contest the Secretariat should have sufficient personnel to cope with:

a) General queries from competitors and officials
b) Collation and recording of all results
c) Immediate presentation of all results on clearly visible scoreboards adjacent to the Secretariat
d) On a day-to-day basis, the organiser must provide the team managers with copies of the results of each round for each class.

G.16.7. Scoreboards

Scoreboards should be of a type whereby the name, country and placing of each competitor is clearly visible. They should be continuously staffed so as to publish the results as soon as possible after they have been verified and recorded by the Secretariat.

G.16.8. Prizegiving

The possibility of "on the field" recognition of the winners should be considered from the point of view of spectator appeal. The Olympic system of three different height platforms has proved popular. (For team events, two-person platforms might be required).

The official prizegiving usually takes place after all the competitors have finished and before, at or after an official prizegiving banquet. The actual process of prizegiving is up to the host Airsports Control ingenuity, but it is felt that this should not be too prolonged a procedure, bearing in mind that relaxation in tension and naturally festive inclination amongst the competitors.

G.16.9. 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 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, the Panel of Judges, and the team and team manager of the team whose model aircraft are undergoing processing.

G.16.10. Practice

In the interest of giving the competitor the opportunity of performing at his best, provision of practice circles is required. One day prior to the start of the contest is usually set aside for practice (CIAM General Rule C.16.1 d). 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.

G.16.11. Pull Tests

Pull tests on CL models' lines should be carried out as recommended by the Sporting Code or the Safety Rules promulgated by the F2 Subcommittee.

The personnel conducting these tests must be experienced in the use of the equipment recommended and fully understand the safety hazard of an incorrectly performed pull test.

G.16.12. Timekeepers

The organising Airsport control is responsible for supplying the appropriate number of timekeepers for each event as stated in the para. 4.1.16 (F2A), para. 4.2.13 (F2B), para. F2C.12. (F2C), para. F2D.18 (F2D).

The organisers must ensure that the timekeepers are familiar with the class of model to be timed and if any doubt exists, practice sessions before the contest should be arranged. It is particularly important that the timers for class F2A - Speed, should have previous experience in timing these models.

G.16.13. Field Processing

To forestall any infringement of the rules, the organisers should have the facilities and personnel for running spot checks on models throughout the contest.

A random selection of 20% must be processed during the contests (CIAM General Rule C.12 d).) in addition to any models suspected of having characteristics different from those recorded when processed prior to the start of the contest. For F2A, the organisers and FAI Jury must ensure that the potential 1-2-3 placing models are processed immediately after the appropriate flight. In order to do this, they must establish what the likely winning speed might be and the model of any pilot who is within 5 km/h of this speed must be processed after each appropriate flight.

Note: This affects both the individual and team classifications.

G.16.14. Processing of Winners

CIAM General Rule C.12 e) states that all results are subject to the rechecking of the declared characteristics of the first, second and third place models. The organisers must be prepared to impound and process T/R models immediately after the finals.

G.16.15. Ranking - International Team Classification

Complete three competitor teams are ranked ahead of two competitor teams, which are in turn ranked ahead of single competitor teams.

F2D - Individual and team standings will be based solely on the number of matches won. Losses will not be subtracted. Complete 3 competitor teams are ranked ahead of 2 competitor teams, which are in turn ranked ahead of single competitor teams.

G.27. Third Part: Post-contest arrangements

Contents:

5. Results

d) The official results should be released and given to all entrants and the team managers not later than at the banquet on the last day of the event. (General Section 4.16.2.2.)
e) Result information should be given to radio/TV and press agencies continuously during the competition, but also the official results must be given to them as soon as possible when the contest is finished.
f) The official results must be sent to the FAI in accordance with CIAM General Rule C.13.6 c).

6. Reports

c) The international modelling press in some cases have their own reporters present at the competition, at least if it a W/Ch contest. In these cases where the contest is not so well covered by the press the organiser is advised to send reports to those magazines which are not represented at the contest. These reports should also contain a complete list of the official results for all the entrants and, if possible, some snapshots from the competition.
d) Reports must usually be given to the local newspapers together with the results, unless they have had their own journalists covering the event. It is important that these reports are well prepared in advance so that they can be released as soon as possible after the flights.

7. Correspondence

c) The organiser is advised to thank the local authorities which have contributed to the arrangements, by official letters.
d) In some cases the organisers feel that a letter to the National Airsports Control or government authorities of a special team can help the sport in that particular country. In other cases it might be necessary to write a letter of complaint about the behaviour of a special team. The decision to send these kind of letters is, however, entirely up to the judgement of the organiser.

8. Equipment

Any equipment, flags, etc. which have been borrowed from the FAI should be returned as soon as possible after the contest, and not later than one month after the termination of the competition unless anything else is agreed upon by the FAI Secretariat.

G.28. FOURTH PART: SAFETY RULES FOR CONTROL LINE

4. The following safety rules can be enforced by:

- the FAI Jury
- the judges
- the contest director
- the circle marshal
- the processing officials
- pull test officials

The highest authority regarding safety questions is the FAI Jury.

5. 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

6. Safety Precautions

Immediately before each attempt for an official flight the model aircraft, the lines and the control handle shall be pull-tested with a load as specified in the individual sections of the Sporting Code Section 4 Volume F2.

Crash-proof safety helmets with a chin strap should be worn by mechanics in F2C and by mechanics and pilots in F2D. For F2D, all officials and personnel within the flying area should also wear protective headgear.

G.29. Conduct

G.17. During flights, the following is forbidden:

- to deliberately release the control handle while the model aircraft is moving (penalty: disqualification from the contest).
- jettisoning.
- for F2D, the handle with the strap should never be released during combat.

  all safety rules in the Sporting Code Section 4 Volume F2 must be obeyed.

G.30. 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 rule 4.0.1.

This fence should be placed as close to the track as possible but the radius to the track centre should not be less than 24 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 27 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.

G.31. Insurance

The organiser is responsible for ensuring that all competitors are insured against public liability.