FAI Sporting Code

Fédération Aéronautique Internationale

Section 4 – Aeromodelling

Volume F3
Radio Control Pylon Racing Model Aircraft

2014 Edition

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F3D – PYLON RACING MODEL AIRCRAFT

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ANNEX 5Q - GUIDELINES FOR AIRFIELD LAY-OUT,

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1 FAI Statutes, Chapter 1, para. 1.6

2 FAI Sporting Code, General Section, Chapter 3, para 3.1.3

3 FAI Statutes, Chapter 1, para 1.8.1

4 FAI Statutes, Chapter 2, para 2.1.1; 2.4.2; 2.5.2; 2.7.2

5 FAI Bylaws, Chapter 1, para 1.2.1

6 FAI Statutes, Chapter 2, para 2.4.2.2.5

7 FAI Bylaws, Chapter 1, para 1.2.3

8 FAI Statutes, Chapter 5, para 5.1.1; 5.5; 5.6

9 FAI Sporting Code, General Section, Chapter 3, para 3.1.7

10 FAI Sporting Code, General Section, Chapter 1, paras 1.2. and 1.4

11 FAI Statutes, Chapter 5, para 5.6.3

12 FAI Bylaws, Chapter 1, para 1.2.2

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VOLUME F3 PYLON RACING

Section 4C – Model Aircraft – F3 – Pylon Racing

Part Five – Technical Regulations for Radio Controlled Contests

5.2 Class - F3D Pylon Racing Model Aircraft

Annex 5P - Noise Rules

Annex 5Q - Guidelines for Airfield Lay-Out, Safe and Unsafe Areas, Potential Landing Areas

Annex 5R - Guidelines for Duties of FAI Jury, Contest Director, Judges and other Personnel

Annex 5S - Guidelines for Technical Equipment

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Annex 5X - Class F3T Semi-Scale Pylon Racing Model Aircraft with Controlled Technology (Provisional)

Annex 5X.A1 - Class F3T Approval Procedures

THIS 2014 EDITION INCLUDES THE FOLLOWING AMENDMENTS MADE TO THE 2013 CODE
These amendments are marked by a double line in the right margin of this edition

Paragraph	Plenary meeting approving change	Brief description of change	Change incorporated by
F3T - 5.X	2013	New Pylon Racing class with controlled technology.	Jo Halman Technical Secretary

FOUR-YEAR ROLLING AMENDMENTS FOR REFERENCE			
Paragraph	**Plenary meeting approving change**	**Brief description of change**	**Change incorporated by**
There were no changes at the 2012 Plenary Meeting.			
5.2.2.e	2011	New rule for the use of wing stickers and added sub-paragraph numbering	Rob Metkemeijer F3 Pylon S-C Chairman
5.2.6.3		New definition of wing taper requirement.	
5.2.12		Corrected the sub-paragraph numbering.	
5.2.16. a) & b)		New definition of the safety area for Starter, pilots and callers including change to the diagram.	
5.2.16), 5.2.17 d, 5.2.17 v), A.5R.4.j) & page 18		Consequential changes required by the new safety area above.	
5.2.16 c)		Corrected the reference to the Annex.	
5.2.17. o) & p)		Amendments to low flying and over-flying the sideline. Paragraphs o) & q) combined and subsequent paragraphs re-numbered. Correction of English in paragraph p).	
5.2.17. t)		Continuation of flight after end of race.	
5.2.18	n/a	Corrected the sub-paragraph numbering.	Jo Halman Technical Secretary
Throughout		Deleted "("on sub-paragraphs to being in line with Code policy.	
Annex 5T		Corrected grammar in the title.	
Annex 5Q, A.5Q.6	2011	Consequential change to the pilots' area in the suggested site layout. Added a note to refer back to 5.2.16.	
Annex 5V A.5V.3		Corrected the cost of fuel and the reference to ABR.	
Annex 5.W		Rules for a new class F3R Pylon Racing Models with Limited Technology.	
Annex 5.W.A1		Suggestions for multi-formula variations to F3R.	
There were no changes at the 2010 Plenary Meeting			
There were no changes at the 2009 Plenary Meeting			

RULE FREEZE FOR THIS VOLUME

With reference to paragraph A.13 of Volume ABR:

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 F3 Pylon Racing:

(a) changes can next be agreed at the Plenary meeting 2015 for application from January 2016.

(b) provisional classes are not subject to this restriction.

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

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VOLUME F3 PYLON RACING

PART FIVE – TECHNICAL REGULATIONS FOR RADIO CONTROL CONTESTS

5.2 CLASS F3D: PYLON RACING MODEL AIRCRAFT

Note: ***Intention:*** *The class is defined in such a way that it brings the highest level of development of aircraft aerodynamic design, aircraft construction, power plant, propellers etc and the highest level of piloting, with maximum safety.*

Speed control strategy: *The technical rules will be developed in such a way that the average course speed will be limited to 65 m/s (234 km/h) in order to maintain safety and controllability of model pylon racing aircraft currently and in the future.*

The average course speed to be defined as a nominal race distance (4000 metres) divided by the combined average times (ie final score in seconds divided by the number of flights that count for the individual classification) of the best five competitors of the previous World Championship.

5.2.1 Definition of Radio Control Pylon Racing Model Aircraft:

Model aircraft in which the propulsion energy is provided by a piston type engine and in which the lift is obtained by aerodynamic forces acting on the supporting surfaces, which, except for the control areas, must remain fixed in flight.

5.2.2. Technical Specifications of Pylon Racing Model Aircraft

a) The model aircraft must be of conventional design with forward wing and an aft empennage with the general lines of a full size aircraft.

b) ABR B.3.1a) (builder of the model aircraft) is not applicable to class F3D.

c) A model aircraft including engine and exhaust system may not be used by more than one race team.

d) Each competitor may process and use a maximum of three models during a contest.

e) For the identification of models, the contest director may supply coloured stickers to the competitors to be applied on the wing surfaces. These wing stickers shall have the following properties:

i) Width between 75 and 100 mm; length equal to local wing chord, but a minimum of100 mm.

.ii) Thickness maximum 0.1 mm.

iii) Total weight of stickers maximum 3 grams.

iv) Adhesive strength more than 0.5 N/mm2.

v) Water resistant.

vi) Sufficiently flexible to follow all wing shapes.

vii) Bright colour (fluorescent recommended); two highly different colours have to be available.

ix) The ability to be peeled off without damaging wing surfaces.

x) The stickers must be positioned at the outer half of either the left or the right wing on the top and bottom sides.

5.2.3 Noise rules

a) The engine(s) shall be fitted with an homologated exhaust system as described in Annex 5P.

b) The competitor is permitted to use a different secondary exhaust system. In that case a test will be carried out on his exhaust system or on the noise emission of his model aircraft during the processing and at the request of the Technical Officer after a race.

Note: *Annex 5P gives details of the noise rules and noise testing.*

5.2.4 Weight

Weight, less fuel but including all equipment necessary for flight, shall be at least 2250 g and not more than 3000 g. If ballast is used it must be permanently and safely affixed.

5.2.5 Fuselage

5.2.5.1. Cross-section

The fuselage shall have a minimum height of 175 mm and a minimum width of 85 mm, the measurements to be of the fuselage body and are to exclude any fins, attachments or spacers. Both minimum dimensions must occur at the same cross-section location. The fuselage at this point will

have a minimum cross sectional area of 100 cm^2 excluding fillets and competitors shall provide templates to prove this. Fillets are not considered part of the fuselage or lifting surfaces.

5.2.5.2 Cowls

The engine or engine(s) must be enclosed, with the exception of the silencer, cylinder head and controls that must be manipulated during operation of the engine. The cylinder head for this purpose is defined as the top (or outer) 1 cm of the engine, excluding ignition plug or compression screw.

5.2.5.3. Cockpit

A cockpit or canopy profile must be evident and capable of enclosing a dummy pilot's head 50 mm from the chin to the top of the head. The canopy need not be transparent and a dummy pilot's head need not be fitted.

5.2.6 Lifting Surfaces

5.2.6.1. Area of Surfaces

Total projected area of the lifting surfaces (wing and horizontal tail combined) shall be a minimum of 34 dm^2. With a biplane, the smaller of the two wings shall have at least 2/3 of the area of the larger wing. No delta or flying wing type aircraft are permitted.

5.2.6.2 Wing Span

Minimum wing span shall be 1150 mm for a monoplane and 750 mm for the largest wing of a biplane. Maximum wing span shall be 1800 mm.

5.2.6.3 Wing Thickness

Wing thickness of the root shall be at least 22 mm for a monoplane, and 18 mm for a biplane. On a biplane with different size wings, the smaller wing must be at least 13 mm thick at the root. Wing thickness at any position of the wing's span shall be equal to, or more than, that of a straight taper between the root and zero at the tip as viewed from the leading or trailing edge.

Note: *Root shall be defined as the innermost wing section, not counting fillets that may be measured without removing wing from fuselage.*

On a completely exposed wing, such as on a parasol monoplane or the top wing of most biplanes, the root is that section of the wing that is intersected by a projection of the outline of the fuselage as seen in the top view, ie the root section would be 50 mm from the centreline of an exposed wing on a model aircraft with a 100 mm wide fuselage.

5.2.7 Engine(s)

Engine(s) must be of the reciprocating piston type, with a maximum total swept volume of 6.6 cm^3. Propellers must rotate at the speed of the crankshaft. Total engine air intake cross sectional area is limited to a total of 114 mm^2.

5.2.8 Propellers and spinners

Only fixed propellers may be used. Two-bladed wooden or two or more bladed composite resin continuous fibre construction propellers may be used. A rounded nose spinner with a diameter of at least 25 mm and a nose radius of not less than 5 mm (ABR B.19.4) must be fitted.

5.2.9 Shut-off

The pilot must be able to shut off his engine, on the ground or in the air, by radio control within five seconds of command, irrespective of aircraft altitude.

The radio system used to control the aircraft shall be equipped with a fail safe. This fail safe shall be set to shut off the engine if radio signal is lost.

5.2.10 Undercarriage

The undercarriage may have a two or three wheel design with the main wheels having a minimum track of 150 mm. The minimum diameter of the main wheels shall be 57 mm. The competitor must give the organiser the opportunity to check that measurement. A tail skid may be used in lieu of a tail wheel. A positive means of steering on the ground shall be provided; rudder control is acceptable. Retracting gears are permitted.

5.2.11 Technical checks and safety requirements

a) At registration of the model aircraft, engines and exhaust systems before the competition, the Technical Officer may carry out technical checks either at his own discretion or at the request of the competitor to check if the models comply with the technical specifications. However, under all circumstances during the competition, it is the competitor's responsibility to ensure that entire model aircraft complies with the technical specifications in 5.2.1–5.2.11.

b) During the competition all measuring equipment will be at the disposal of competitors to check their model aircraft if they wish to.

c) After a race, the Technical Officer may take any model aircraft for inspection (ABR B.17.13). The Technical Officer may ask the competitor to empty the tank for weight checking and for analysis of the fuel. Where a fuel analysis is made, a sample of the contest fuel shall also be taken for comparison. If, after analysis of the fuel from the tank, this fuel appears to be different from the contest fuel, the competitor will be disqualified from the competition. If the fuel analysis result is not available during the competition then the disqualification may be applied retrospectively.

d) If the model aircraft is not according to the technical specifications in 5.2.2– 5.2.11, the competitor shall be disqualified from the competition.

e) The Contest Director has the right to request any competitor to make a flight to demonstrate the airworthiness of his model aircraft.

f) Safety inspections of all aircraft before or during registration and at random as a pre-flight check during the competition shall be conducted by the contestant under the supervision of the Technical Officer.

The list of safety checks should include the following:

i) Push/pull rods or cables, control horns, and servo leads shall be installed in such a way that they will not become disconnected in flight. Clevises shall be physically held closed by short pieces of fuel tubing or similar material. Metal clevises shall be protected from deterioration of the threads due to vibration by means of a lock nut, thread treatment such as Loctite ® or Vibra-tite ®, or a similar method. Ball links shall be tight.

ii) All screws holding the engine to the mount and the mount to the firewall shall be in place and secure.

iii) The radio receiver and battery pack shall be surrounded by soft foam rubber or other vibration dampening material and adequately protected against contamination by engine exhaust, raw fuel, or fuel residue.

iv) Batteries shall be of adequate capacity for the size and number of servos used. Minimum battery capacity shall be: 500 milliamp-hours (mAh).

v) Servos controlling the pitch and roll functions shall be of adequate strength for the weight and speed of the aircraft. Whenever a single servo is used to control one of these functions, it shall be designed and built to accommodate at least four mounting screws. When two or more servos are used together to control the same function, as in the case of dual aileron servos or the movable tail surfaces on a "v" tailed aircraft, each of said servos may be of the two-screw variety.

vi) Control surfaces shall be firm on the hinge line without excessive play. Safety officers shall be alert to the danger of excessive play whenever electronic servo throw reduction is used in combination with a mechanically inefficient linkage.

vii) All screws holding the servos to the servo rails or trays and holding any trays to the airframe shall be in place and secure. Rubber grommets shall be used on all servos designed to accept them. If the heads of the servo mounting screws are small enough to pull through the grommets, washers shall be used to prevent this.

viii) Pushrods shall have only one threaded end that is free to turn. The other end shall consist of a "Z" bend, an "l" bend with keeper or collar, a metal clevis that is soldered on, or a threaded ball-link that is glued or otherwise secured so that it cannot turn.

ix) Wings, if removable, shall be securely attached to the fuselage with bolts or machine screws.

x) Wheels shall be securely attached and shall turn freely.

xi) The aircraft shall be free of stress cracks and any other indications of structural damage.

cont/…

xii) Proper functioning of the engine shut-off by fail safe.

If a model aircraft does not comply with the safety items during a pre-flight check, the Technical Officer will not allow it to fly in the race.

5.2.12 Competitors

a) A race team shall consist of a pilot and a caller. All pilots must be accompanied by a caller for reasons of safety. The caller may be the team manager, another competitor from the same national team or a third party. In all cases the caller must be the holder of an FAI licence, not necessarily issued by the NAC of the pilot, and must have paid an entry fee.

b) Each pilot and mechanic/caller shall be registered as a team from the beginning of the competition through to its end.

c) Not withstanding b) above, the pilot or caller of one race team may act as the caller in one or another of the maximum three race teams permitted in a national team. However, once registered, pilot/caller roles may not be interchanged in a race team nor may a caller registered with one national team act as a caller for any other national team.

d) In each race, the caller must release the model aircraft at the start and give the pilot verbal information regarding the flying course of his model aircraft and any official signals.

e) Electronic communication with the pilot shall be prohibited.

f) There will be no pilots' helpers at any of the pylons.

g) The Contest Director has the right to request any competitor to make a flight to demonstrate his ability to fly the aircraft around the course

5.2.13 Helmets

a) All officials, competitors and callers on the racecourse must wear a crash helmet with a properly fastened chin strap. Helmets must be worn during practice and during the competition.

b) During the competition, any pilot or caller not wearing an appropriate helmet will disqualify that team from the heat.

c) During practice, any pilot or caller not wearing an appropriate helmet will not be permitted to fly and if already flying will be instructed to land immediately and will not be permitted to fly again until both members of the team are wearing helmets.

5.2.14 Transmitter and frequency check

a) For transmitter and frequency checks see ABR B.11. Spread spectrum (2.4 GHz) technology may be used and if it is, then 5.2.14 b) & c) may not apply.

b) Heats shall be arranged in accordance with the radio frequencies in use to permit simultaneous flights, taking into account that frequency will not follow frequency.

c) Each competitor has to supply two different frequencies, separated by a minimum of 20 kHz, which he must be able to use on all his model aircraft entered in the competition.

5.2.15 Fuel

a) The organiser will supply fuel to a standard formula for glow plug and spark ignition engines. Its composition shall be 80% methanol, 20% first pressing castor oil by volume.

b) See also A.5V.5.3.

5.2.16 Race Course, Distance and Number of Rounds

a) The race course is a triangle with sides of 40 metres, 180 meters and 180 metres, marked by 3 pylons. In this triangle an area in the shape of, and to the dimensions and location as shown on the diagram at the end of 5.2.16, is specified, wherein, for reasons of safety, all pilots, callers and the Starter have to stay during a race. This area will be called the pilot's area.

b) For the race course lay-out, see the diagram on the next page. The race course specification may be modified in the interest of safety or to suit existing field conditions if as long as safety is not compromised and subject always to strict compliance with rule 5.2.16 a).

c) Annex 5Q gives guidelines for the lay-out and organisation of the flying site in order to achieve maximum safety for competitors, judges and spectators.

d) The pylons should have a minimum height of 4 m and should not exceed 5 m in height.

cont/…

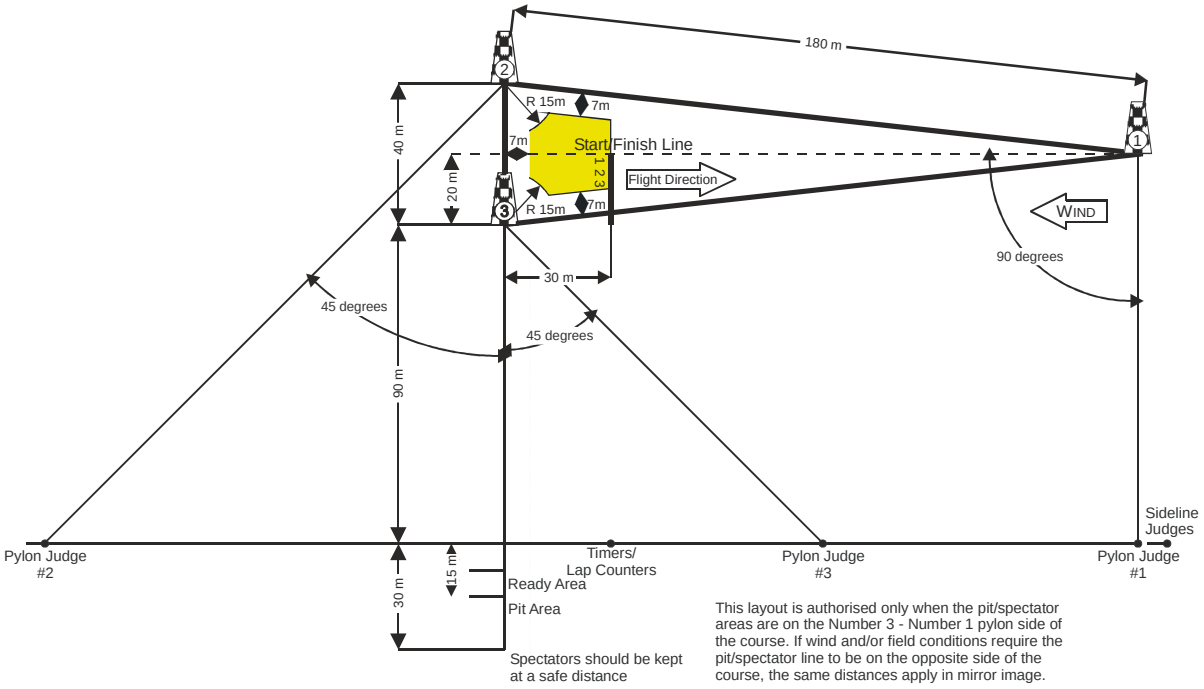
e) Pylons shall be made of a rigid material at least 70mm in diameter at any point. The pylons must be finished in a bright colour in order to enhance visibility.

f) The race is over 10 laps with an individual nominal length of 400 m and total nominal flying distance of 4000 m.

g) The race starts at the start-finish line. The race is terminated at the start -finish line 10 full laps later.

h) The number of rounds will be announced by the organiser before the start of the competition with a minimum of 3 and a maximum of 15. Because of weather conditions or other important reasons, the number of rounds may be reduced during the competition, but only after consultation with the team managers or the competitors in an early a stage as possible. See also A.5V.5 and A.5V.6.

F3D RACE COURSE LAYOUT (5.2.16 b))



5.2.17 Race from Start to Finish

a) Annex 5R describes the duties of the Contest Director, Starter, Judges and other personnel.

b) Annex 5T describes the draw of races.

c) A maximum of three model aircraft per heat will be allowed.

d) All pilots and callers (and the Starter) have to stay within the pilots' area (see race course layout in 5.2.7.16b). If the pilot or the caller intentionally steps out of this pilot's area with both feet (to be judged by the Starter) then this will be penalised as an infringement. The Starter will take care that pilots are sufficiently separated and will take preventive action if a collision between pilots or their transmitter antennas is likely to occur.

e) Starting positions in all races will be determined by draw with the No.1 position being closest to No 2 pylon. .

f) The Race Starter is in charge of each heat. The Starter will ensure that all competitors and race officials are ready to commence. Each Timekeeper and Pylon Judge will have a signal of a distinctive colour. The Starter will arrange for each model aircraft to be identified by the Timekeepers and Pylon Judges before the start of any heat. A radio operation check from each competitor, judged by the Starter will be made prior to starting engine(s).

g) A one-minute period will be allowed for starting and adjusting the engine(s). The race starts immediately after the one-minute period. A competitor whose model aircraft engine is not running at the end of the one-minute period will be disqualified from the heat. No competitor shall be permitted to take off once the first model aircraft has passed the start/finish line heading from N^{o}. 1 to N^{o}. 2 pylon on the first lap, and no time shall be given him for that heat.

cont/…

h) All take-offs will be “Rise Off Ground”. Model aircraft shall be released from the starting line on the starting signal (flag drop or light signal) at one-second intervals with timing commencing at the starting signal for that particular model aircraft. No mechanical device may be used to assist the aircraft to take-off, but hand pushing is permitted.

i) Each model aircraft’s undercarriage main wheels must remain behind the starting line until the starting signal otherwise it will be penalised as an infringement.

j) An early start will be penalised as an infringement.

k) If the take-off path of a model aircraft is not free then the Starter will not drop the flag for that competitor and the Contest Director will give that competitor a second opportunity to record a score in that round.

l) After the starting signal (flag drop or light signal) is given, any contact between model aircraft shall be considered a collision and the model aircraft involved must land immediately.

m) If l) above occurs, and the Contest Director is of the opinion that the aircraft is still airworthy, or the competitor has an airworthy reserve model aircraft, then the competitor shall be entitled to a second opportunity to record a score in that round.

n) All laps are to be flown counter-clockwise with turns to the left.

o) Over-flying the sideline shall be considered dangerous and will be penalised as an infringement (to be judged by the sideline judge).

p) Persistent flying below the top of the pylons shall be considered dangerous. After passing the first pylon on the first lap of the race, low flying is considered persistent when the model aircraft flies below the height of three consecutive pylons. Below a pylon height means that any part of the model is below the pylon height. This will be judged by the timekeeper and N^{o} 1 pylon judge. An infringement will be given after confirmation by both parties. A dedicated official may be used for this purpose.

q) Cutting a pylon (to be judged by the pylon judges or the sideline judge) be penalised as an infringement.

r) In the event of a malfunction of the timing, lap counting, signalling or other such equipment which is the responsibility of the organisers, any competitor(s) affected by such malfunction shall be given the opportunity to record a score for that round.

s) If during the race, the Starter or the sideline judge considers any model aircraft to be flying erratically, dangerously, or so uncontrolled as to endanger pilots, callers or course officials, the Starter shall instruct the pilot to land immediately. The pilot shall be disqualified from that heat or the Contest Director may disqualify him from the competition.

t) At the completion of the 10 laps, the Starter must immediately instruct the competitor to remove his aircraft from the course and to shut off his engine within 10 seconds. If the engine is not stopped within 10 seconds after the Starter’s command, the competitor shall be disqualified for that flight (to be judged by the Starter). In certain circumstances the Starter may allow a competitor to continue to fly for a short time. The need to continue to fly for a short time after the end of the race must be announced to the Starter before the race starts. Only two straight runs will be accepted.

u) At the completion of a heat, all aircraft must be landed in an area designated by the Contest Director. No pilots or callers may enter the designated landing area until all aircraft have completed landing to a full stop. Contravention of this rule, to be judged by the Starter, shall incur disqualification from the heat.

v) After all engines have stopped, the pilots and callers will leave the pilots’ area and move to positions (to be advised by the Starter before the race starts) close to, but not inside, the designated landing area from where they may land their models.

w) After the starting signal (flag drop or light signal) and before the engine stops, the loss of any part of the model aircraft, except as a result of a collision where 5.2.17 l) applies, disqualifies the competitor for that flight.

x) The race is finished, when all models have landed and have come to a full stop.

cont/…

5.2.18 Timekeeping and Judging

a) Annex 5R describes the duties of timekeepers and judges.

b) Flight timers and lap counters: Each competitor shall be assigned one officer during each heat. This officer will time the competitor's aircraft for the required ten laps. In doing so he will count the laps flown and advise the pilot when he has completed the necessary 10 laps. He will keep the recorded time on his timing device until he has entered the time on the score sheet under the supervision of the Starter.

c) On the start/finish line an electronic activated signal will be provided for each competitor. The No 1 pylon judges will operate these signals. These judges shall signal the competitor when the competitor's aircraft has passed the No 1 pylon. The pylon judges will be located on the course as described in the race course layout diagram (5.2.16 (b). Each pylon judge will have a distinctive colour allocated, and the Starter will arrange for each model aircraft to be identified by the allocated pylon judge before the start of every heat.

d) The judges' signals will be off as the aircraft reach midcourse between No. 3 and No. 1 pylons, or earlier. At the instant the model aircraft draws level with the No. 1 pylon the pylon judge will switch his signal on. When the model aircraft draws level with the No.1 pylon on the way back the signal is switched off. When a pylon cut has been made the signal will flash on and off 5 times or another signal will be activated to inform the competitor about the pylon cut.

e) At the No 2 and No 3 pylons, the pylon judges will place themselves in a position in accordance with the race course layout diagram (5.2.16 (b) to the pylon they are judging.

f) The judges at N^{o} 2 and N^{o} 3 pylons will record a cut pylon infringement.

g) Two sideline judges will be posted near the N^{o}1 pylon judges on the spectator side of the racing course. The sideline judges will record as an infringement any over-flight of the sideline and any flight below the height of the pylon.

h) A sideline judge will be posted in front of the pit area on the spectator side of the racing course. The sideline judges will record as an infringement, any over-flight of the pit or spectator areas.

i) At the end of each race the sideline and pylon judges will inform the Starter of any infringement by any competitor.

5.2.19 Infringements and Penalties

a) For reasons of clarity, all infringements that are mentioned in the rules, the judges that are judging them and the corresponding penalties are summarised in the table overleaf.

b) See paragraph 5.2.20 d) Scoring and Classification, for the effects of disqualification and infringements on a competitor's score.

c) Only the Contest Director may disqualify a competitor from the competition.

A table of infringements and penalties appears overleaf.

Table of Infringements & Penalties			
Paragraph	**Subject**	**Judged & Applied By**	**Penalty**
5.2.11 c)	At after-race processing, model aircraft is not according to technical specifications 5.2.1 – 5.2.11	Technical Officer, Contest Director	DQ from competition
5.2.11 e) 5.2.12 h)	Cannot prove airworthiness of model aircraft or capability of pilot	Contest Director	DQ from competition
5.2.2.11 f)	Model aircraft does not pass pre-flight safety check	Technical Officer, Contest Director	DQ from heat
5.2.1.13	Not wearing of helmets (pilot/caller)	Starter	DQ from heat
5.2.14 c)	Not having multiple frequencies (if not using 2.4GHx)	Contest Director	DQ from competition
5.2.15	Not using official contest fuel	Contest Director	DQ from competition (may be applied retrospectively)
5.2.16 a) 5.2.17 a)	Intentionally stepping out of the pilots' area with both feet	Starter	1 infringement
5.2.17 g)	Engine not running when flag drops or too late a start	Starter	DQ from heat
5.2.17 i)	Wheels not behind the start line	Starter	1 infringement
5.2.17 j)	Early start	Starter	1 infringement
5.2.17 o) 5.2.17 q)	Flying below pylon height	Sideline Judge Pylon Judge	1 infringement
5.2.17 q) 5.2.17 p)	Flying outside safety line	Sideline Judge	1 infringement
5.2.17 r)	Pylon cut	Pylon Judge	1 infringement
5.2.17 t)	Erratic, dangerous or uncontrolled flying	Starter, Sideline Judge,	DQ from heat
5.2.17 t)	Erratic, dangerous or uncontrolled flying	Contest Director	DQ from competition
5.2.17 u)	Failing to shut off engine within 10 seconds from Starter's command	Starter	DQ from heat
5.2.17 v)	Landing outside designated landing area	Starter	DQ from heat
5.2.17 v)	Pilot or caller entering the landing area before all model aircraft have landed and stopped	Starter	DQ from heat
5.2.17 x)	The loss of any part of model aircraft	Starter, Sideline Judge	DQ from heat

cont/…

5.2.20 Scoring and Classification

a) The flight of each model aircraft shall be timed by a lap counter/timekeeper with a timing device measuring to at least 1/100th of a second). Timing shall start when the starting signal is given to the individual competitor.

b) The lap counter/timekeeper stops his timing device after ten laps have been completed by the competitor and, supervised by the Starter, records the elapsed time from the timing device on the competitor's score sheet.

c) At the completion of each heat, the pylon and side-line judges shall notify the Starter as to which model aircraft, if any, have had infringements recorded against them. The Starter then advises the lap counters/timekeepers assigned to those aircraft who will record the total number of infringements for each competitor on his score sheet.

d) The score sheets are then processed by a scorekeeper who:

    i) for one infringement, will add 1/10th of the flyer's time for ten laps to give the corrected time;

    ii) for two or more infringements, will give a score of 200.

e) Points shall be awarded after each race as follows: The competitor's score shall be his corrected time in seconds and hundredths of a second. If the competitor fails to complete his flight or is disqualified his score shall be 200.

f) The winner of the event is the competitor who has accumulated the lowest score after the conclusion of all heats. If four or more rounds are flown, each competitor's worst (highest) score shall be discarded. If eight *or* more rounds are flown, each competitor's worst (highest) two scores shall be discarded. If twelve or more rounds are flown, each competitor's worst (highest) three scores shall be discarded.

g) If the time permits and there is no frequency conflict, ties shall be broken by a fly-off race. Otherwise, the best single race score shall be considered in resolving a tie.

5.2.20.1 Team Classification

To establish the scores for the international team classification, add the final individual scores of the members of the team. Teams are ranked according to the lowest numerical score to highest, with complete three-competitor teams ahead of two-competitor teams which in turn are ranked ahead one-competitor teams. In a case of a team tie, the team with the lower sum of place numbers, given in order from the top, wins. If still equal, the best individual placing decides.

5.2.20.2 Awards

Awards will be given in compliance with ABR B.16. Callers will be awarded with diplomas only.

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ANNEX 5P

NOISE RULES

A.5P.1 The engine(s) shall be fitted with a silencing system on the exhaust consisting of a primary and a secondary silencer. The primary silencer shall be not less than 30 mm diameter and 100mm length and shall have a total exhaust outlet area of not more than 80 mm^2. It may be of the expansion chamber (tuned pipe) type.

A standard secondary silencer of the side resonant/absorption type has to be added. This silencer may be of a standard type, approved by the F3 Pylon Racing Subcommittee according to the homologation procedure as described in paragraph A.5P.3. It is to be fitted to the exhaust outlet of the primary silencer or integrated with the primary silencer according to one of the principles shown in diagram. A.5P.1 (a) & (b).

Note: The drawn silencers may be slightly oversized and will certainly do the job, but these are only examples. The indicated sizes are general Guidelines.

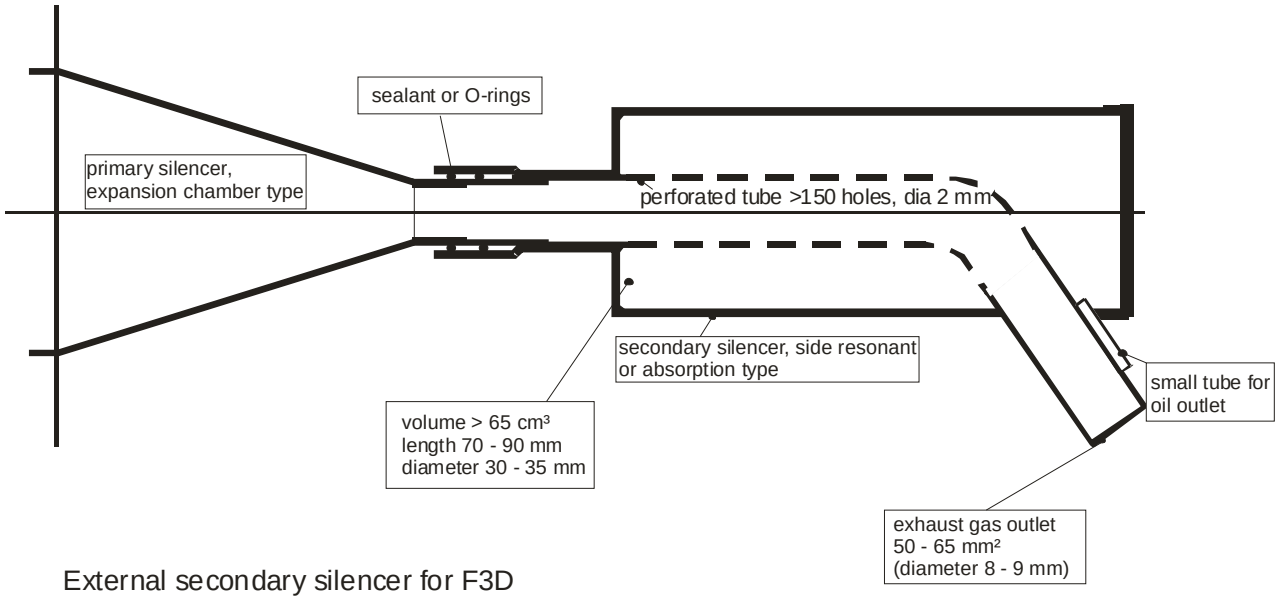
The way the inner pipe is perforated (it may also be made in metal mesh) could be varied. Also the way the inner pipe is bent and positioned (it does not necessarily have to be exactly centred) may be varied. However, a bend of minimal 30° in the perforated part inside the body of the secondary silencer is recommended for high frequency performance in order to reduce the "sharpness" of the sound.

There is usually no significant acoustic effect in bending or angling the pipe and silencer system to fit it into the model aircraft.

A list of approved commercially available secondary silencers (or combined primary and secondary silencers) will be made available annually by CIAM.

A.5P.1 (a) PRINCIPLE OF F3D EXTERNAL SILENCERS

All sizes indicated are internal sizes

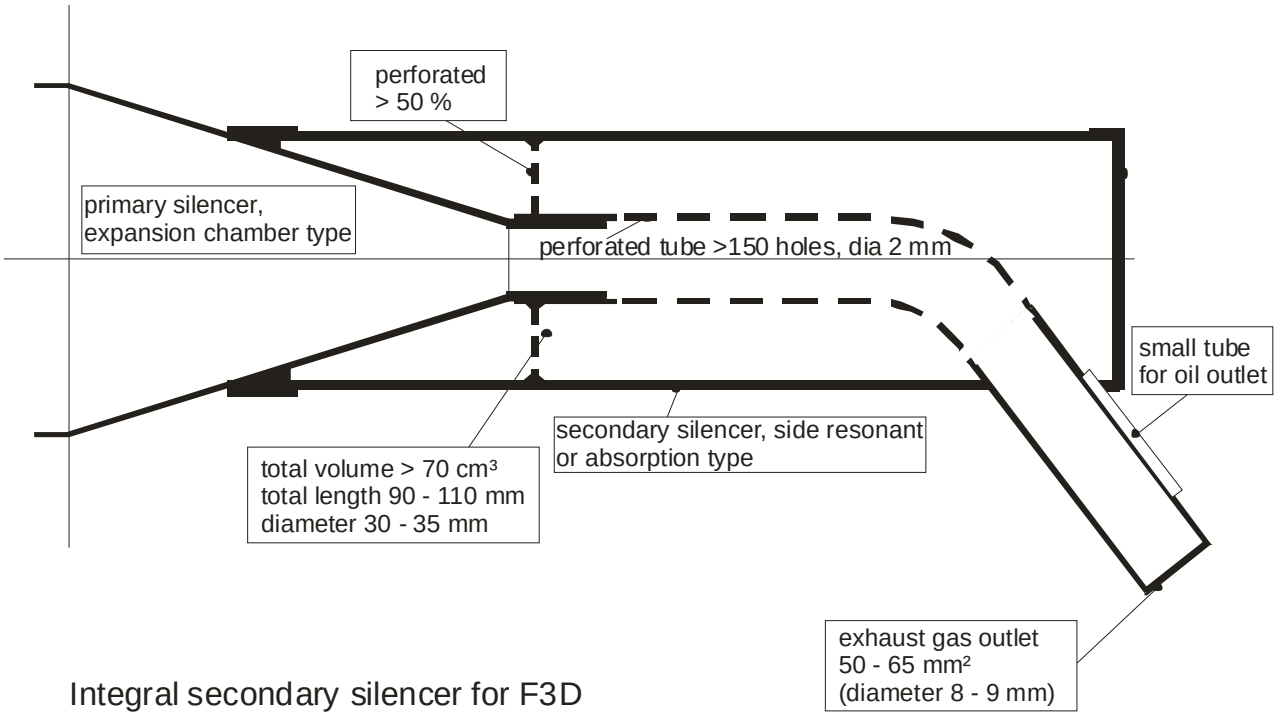


External secondary silencer for F3D

Figure A.1.1 (b) appears overleaf

A.5P.1 (b) PRINCIPLE OF F3D INTEGRAL SILENCERS

All sizes indicated are internal sizes



Integral secondary silencer for F3D

A.5P.2 The competitor may use a different exhaust system to that stated in A.5P.1. In that case a noise test shall be carried out during the model aircraft processing and at any request of the Technical Officer after a race. For this test two alternative methods are given in A.5P.2.1 and A.5P.2.2, either of which may be used by the Technical Officer.

The noise test has to be carried out with a calibrated sound level meter according to IEC61672 – 1:2002 Class 1 with a wind screen. The "A" frequency weighting shall be used in all cases.

A.5P.2.1 Noise test with running engine

The noise level shall not exceed 96 dB (A) at 3 m, with a tolerance of + 2 dB (A) for accuracy of measurement.

The noise test shall be conducted as follows:

a) The engine will be running at a piston speed of 12 ± 1 m/s (this is for the most common 6.6 cc engines with a stroke of 20±2 mm equivalent to 17.000 – 19.000 rpm). To achieve such piston speed a suitable propeller needs to be fitted by the competitor.

b) The model aircraft will be held at a height of 1.50 m ± 0.2m above grass ground with the wing horizontal and the model aircraft upright.

c) The sound level meter will be held at:

a distance of 3 m from the end of the exhaust pipe;

an angle of 45 degrees to the longitudinal (fore and aft) centre line of the model aircraft;

the back of the model aircraft;

a height of 1.50 ± 0.2 metres, with the exhaust outlet visible for the sound level meter's microphone.

d) There shall be no sound reflecting surfaces within 10 metres distance from the engine and/or the sound level meter.

e) If the wind speed is more than 5 m/s the wind direction has to be perpendicular to the line between the model aircraft and the sound level meter.

cont/…

Note: The noise levels measured with this method are only for comparison of the competitor-made exhaust system with the standard approved systems. The noise levels are not representative of the noise levels in flight with a normal racing propeller at normal racing rpm.

The reason for this method of measurement, which is based on common practice in motorcycle racing (www.fim.com) is to sufficiently reduce the contribution of propeller noise and not to overheat and overload the engine during the noise test.

A.5P.2.2 Test of exhaust system

a) The performance of an exhaust system can also be measured using an electro acoustic actuator (eg during the processing of models before or during a competition).

b) This actuator can be a 1" horn driver fitted with an adaptor to fit the intake side of the primary silencer. The actuator will be fed by white noise with a limited bandwidth of 500 – 4000 Hz and an electric power input of approximately 1 Watt.

c) The actuator will be placed vertically on a stand at a height of approximately 1.5 m and the exhaust system will be connected on top of it.

d) The measurements will be taken at a distance of 1 m at the same height as the gas outlet from the exhaust system.

e) The measurement will determine the sound level difference in dB (A) between a silencing system approved by the F3 Pylon Racing Subcommittee and the exhaust system presented by the competitor, both fitted in the same way to the actuator. The sound level measured with the competitor's exhaust system shall be equal to or less than the sound level measured with an approved system.

f) Alternatively a measurement can be carried out of the "insertion loss" of the secondary silencer in the case where the primary and the secondary silencer can be separated or a comparison can be made with an identical primary silencer without secondary silencer. In this case insertion loss is simply defined as the sound level reduction in dB (A) with and without the secondary silencer. The criterion for this method is a sound level reduction of 12 dB (A) at an ambient temperature of
10 – 35 °C.

Note: The insertion loss at an exhaust gas temperature of approximately 400°C will be generally
2 – 3 dB (A) less

A.5P.3 Homologation of exhaust systems will be carried out by the F3 Pylon Racing Subcommittee for any exhaust system that is presented by a manufacturer and that complies with the rules. A certificate, with a homologation code number unique to that system, will be sent back with the exhaust system. The manufacturer will mark the exhaust system with this code number. It is not permitted to then modify such a homologated system. Modified systems will have to follow the procedure in paragraph A.1.2.

Note: A list of homologated exhaust systems and more information can be found on the F3D Pylon Racing page of the CIAM website.

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ANNEX 5Q

GUIDELINES FOR AIRFIELD LAY-OUT, SAFE AND UNSAFE AREAS AND POTENTIAL LANDING AREAS

A.5Q.1 OBJECTIVE

a) This Guide is intended to specify guidelines for the organisation of F3D international contests, for the benefit of both the organisers and the competitors. It is emphasised that these are recommendations and they do not have the same status as the binding regulations in the FAI Sporting Code unless they concern any regulation in that Code.

b) Since this Guide will be widely distributed and should be regarded as the standard for F3D international competitions, organisers should avoid confusion by announcing in advance any changes from this Guide that may be necessary to suit local circumstances as long as those changes are not in contravention of the any of the regulations in the Sporting Code.

c) This Guide is primarily applicable to World and Continental Championships, but parts of it may be useful for open international competitions.

A.5Q.2 Diagrams 1 and 2 give the ideal competition site layout for F3D in order to attain maximum safety for competitors, race course personnel and spectators.

A.5Q.3 The local situation may require that a different, but as safe as possible, layout has to be applied subject always to strict compliance with F3D rule 5.2.16. Two orientations are drawn for the airfield lay-out, one with N^{o} 1 pylon at the right side as seen from the pits and the other one with N^{o} 1 pylon at the left side.

A.5Q.4 The diagrams are partly based on an assessment of ground impact in a number of major F3D competitions. Such assessment should continue as a standard routine to inform the F3 Pylon Racing Subcommittee, which, for safety reasons, may lead to modifications of the preferred airfield layout in the future.

A.5Q.5 The Contest Director or Starter will designate the landing area. The competitors shall be informed of the landing area before the start of the competition and if necessary (eg by changing wind conditions) by the Starter before a race starts. The landing area should have in any case sufficient distance to the pits and the judges.

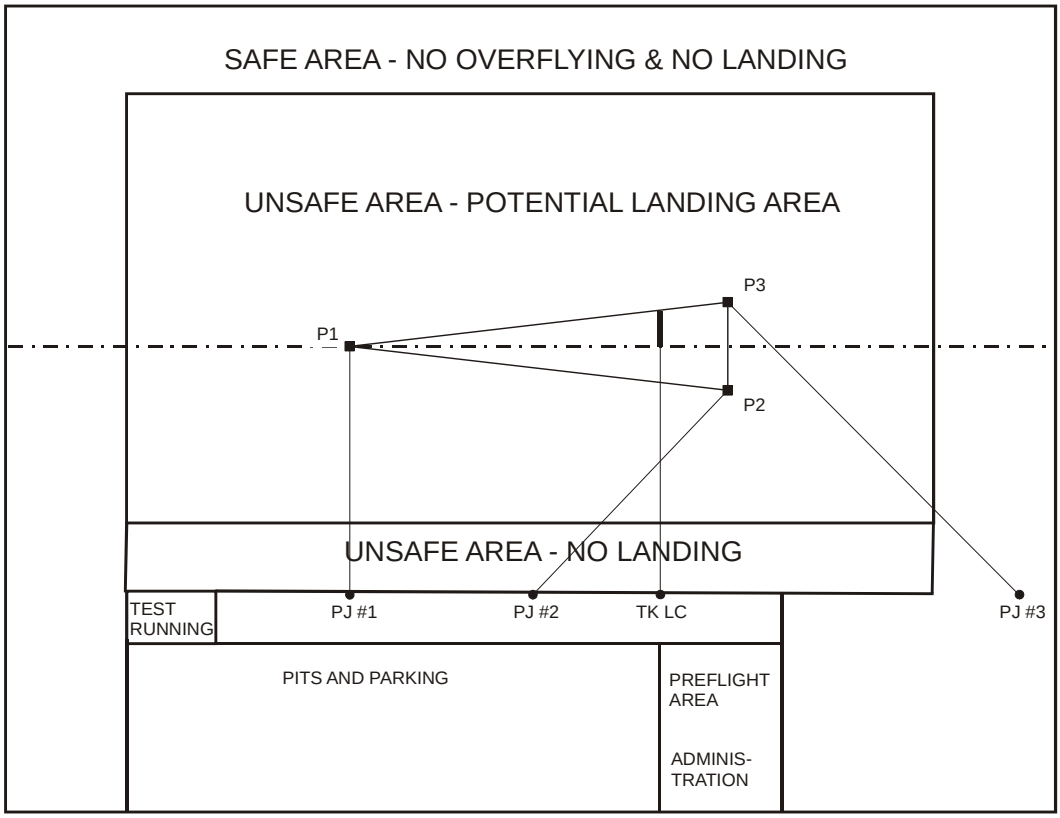
A.5Q.6 Diagrams 1 and 2 show how a landing area can be defined.

Note: refer to the diagram at 5.2.16 for the pilots' area.

In the case that the area around the race course is of poor quality for landing and there is a tarmac strip inside the triangular race course, landing may take place on this tarmac strip. In this case all pilots and callers must go to a safe position designated by the Starter, outside the triangle, before the first model aircraft lands.

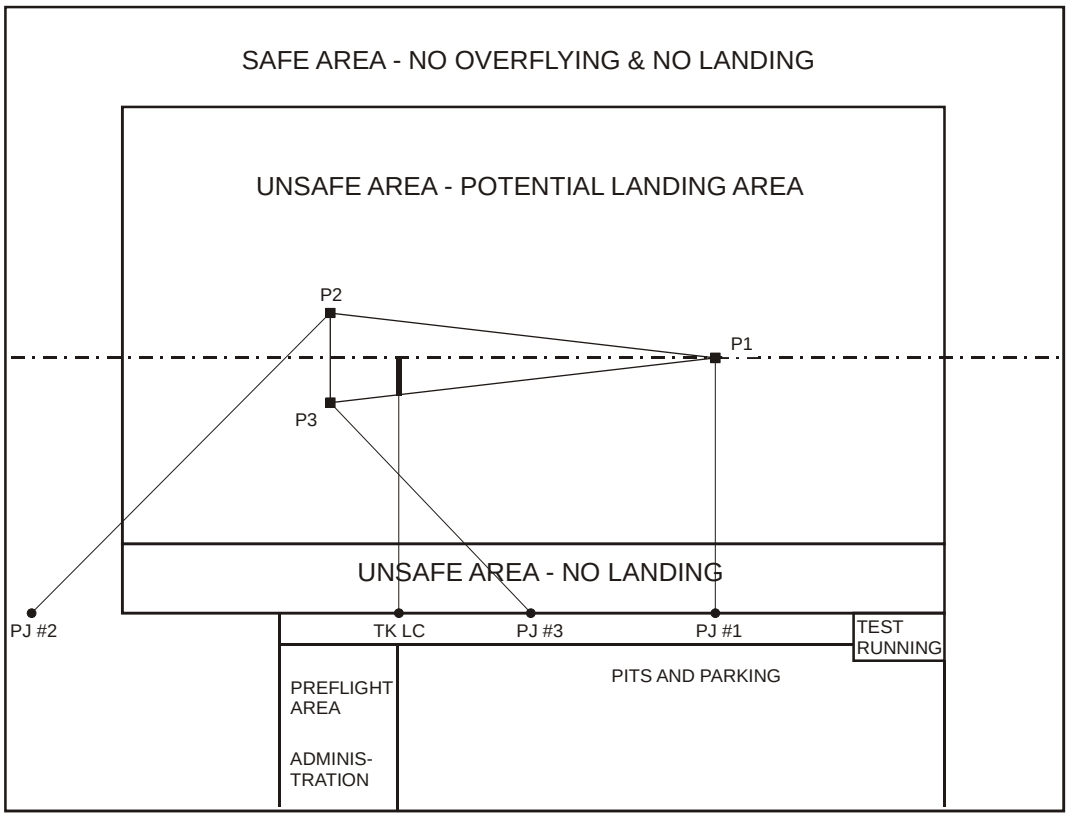
Diagrams 1 and 2 appear overleaf.

Diagram 1 - F3D Site Layout 1
N° 1 pylon at left side as seen from pits



F3D Competition Site Layout - Left

.Diagram 2: F3D Site Layout 2
N° 1 pylon at right side as seen from pits



F3D Competition Site Layout - Right

ANNEX 5R

GUIDELINES FOR THE DUTIES OF FAI JURY, CONTEST DIRECTOR, JUDGES AND OTHER OFFICERS

A.5R.1 OBJECTIVE

a) This Guide is intended to specify guidelines for the organisation of F3D international contests, for the benefit of both the organisers and the competitors. It is emphasised that these are recommendations and they do not have the same status as the binding regulations in the FAI Sporting Code unless they concern any regulation in that Code.

b) Since this Guide will be widely distributed and should be regarded as the standard for F3D international competitions, organisers should avoid confusion by announcing in advance any changes from this Guide that may be necessary to suit local circumstances as long as those changes are not in contravention of the any of the regulations in the Sporting Code.

c) This Guide is primarily applicable to World and Continental Championships, but parts of it may be useful for open international competitions.

A.5R.2 FAI International Jury

a) Observation of the competition in general including the standards of judging and handling of official protests.

b) For the appointment and specific duties of the FAI international Jury refer to ABR 4.1-4.3.

c) The members of the FAI Jury are invited to and, should be present at, each team managers' meeting, each briefing of the judges, the opening and awards ceremonies.

A.5R.3 Contest Director (CD) (1)

a) The Contest Director is the "general manager" of the competition. During a racing event, an unforeseen situation may arise that requires immediate action. Therefore, the CD is authorised to initiate any special procedure that he deems necessary to rectify a situation that may be considered unsafe.

b) Any protest shall be handed to the CD. Protest procedures are described in ABR B.18.

c) The CD will assign the landing area.

d) The CD is the person responsible for the draw for the heats. The FAI Jury or a member thereof will be present when the draw takes place.

A.5R.4 Starter (1) (+ Assistant Starter if necessary (1))

a) The Starter acts for the CD in all matters arising on the racecourse. Unless overruled by the CD, the Starter's actions and decisions concerning the start, finish, and operation of each heat are final.

b) The Starter's primary duties are to signal the start and finish of each heat, co-ordinate the efforts of the other racecourse workers, and to transmit the scores and times from each heat to the Assistant Starter or scorekeeper. The Starter should be equipped with the following:

   (i) a clipboard containing the draw of the heats;

   (ii) a signal flag, preferably one bearing the classic black-and-white chequerboard pattern;

   (iii) a walkie-talkie or headset radio.

c) A helpful accessory is a large starting clock with a clearly visible sweep hand.

d) The Starter should stand ahead and to the right of the starting line, as viewed from the pilots' standing area facing No 1 pylon. When the pilots have reached their assigned positions on the starting line, the Starter should direct the pilots or callers to hold up the aircraft one by one, so that all the racecourse workers can clearly see and identify them. The Starter should then communicate (via a coloured flag or a walkie-talkie) a unique identifying colour for each aircraft.

e) The Starter will check if all pilots and callers are wearing helmets.

cont/…

f) After identifying the aircraft, the Starter should ask the pilots to make sure their transmitters and receivers are turned on and functioning properly. He should ask to see a “wiggle” of confirmation from one of the control surfaces on each aircraft.

g) After that, the Starter announces the start of the one-minute period for starting and adjustment of the engines.

h) The closest model aircraft to be started first. The Starter shall give the starting signal (flag drop or light signal) at one second intervals pointing with his finger to the aircraft that is next to take-off. Timing commences at the starting signal for that particular model aircraft. Any model that is not ready to take-off at the starting signal will not affect the Starter’s sequence of actions.

i) The Starter will judge if the wheels of each model aircraft’s undercarriage are behind the starting line at the starting signal. If they are not, then contravention of that rule will be penalised as an infringement.

j) During the race the Starter will judge whether the pilots and callers stay inside the pilots’ area. If a pilot or caller intentionally steps out of this area the Starter will give a penalty.

k) The Starter will take care that pilots are sufficiently separated and will take preventive action if a collision between pilots or their transmitter antennas is likely to occur.

l) The Starter should call the competitor’s colour or racing number and “up and out” to any pilot who appears to have double-cut or who is otherwise disqualified.

m) After the finish of each aircraft, the Starter will inform each competitor that his race has finished. This means that the pilot has been given the command to shut off his engine and has 10 seconds in which to comply. If the pilot fails to shut off his engine within the 10 seconds and he has not been given express permission by the Starter to continue to fly, then he will be disqualified for that heat.

n) The Starter judges the landing procedures and will disqualify competitors that land outside the designated landing area and any pilots or callers that enter the landing area before the last model aircraft has stopped.

o) At the end of the race, the Starter will collect the scores, all infringements and race times from the officers and convey them to the Scorekeeper. Any disputes concerning the number of laps flown, times, cuts, etc, should be resolved promptly at the conclusion of the heat.

p) Since the Starter has many duties, an Assistant Starter may be necessary. The Assistant Starter will be under the full authority of the Starter. His duties will be allocated by the Starter.

A.5R.5 Timekeepers/Lap Counters (3)

a) The job of each time-keeper/lap counter is to follow one aircraft, to the exclusion of all others, for the duration of the heat and to accurately record the elapsed time and laps completed for that one aircraft. Ideally, the time-keeper/lap counter’s eyes should never leave his assigned aircraft between the time it is held up for identification on the starting line and the time the Starter gives it the chequered flag at the end of the heat.

b) Standard equipment for the time-keeper/lap counter consists of a stopwatch and a hand-held clicker or similar device for counting laps. At least one of the timekeepers/lap counters should also be provided with a walkie-talkie, headset radio, or other means of communication with the Starter on the racecourse.

d) Each timekeeper/lap counter should start his stopwatch for his assigned aircraft at the start signal from the Starter.

e) Each timer/lap counter should record a lap completed each time his assigned aircraft crosses the start/finish line.

f) On the pilot’s last lap, the timer/lap counter should watch for the aircraft to cross the start/finish line and stop the stopwatch at the instant it does so.

g) If the stopwatches are capable of a “split” function, it is a good idea to get all lap times. This may help in case of protests for timing errors.

h) If electronic timing and lap counting are available, they can be used instead of the manual system as described above.

A.5R.6 No1 Pylon Judges (3)

a_ Like the timekeepers/lap counters, the N°. 1 pylon judges each watch one assigned aircraft, to the exclusion of all others, for the duration of the heat.

b) The primary job of each N°. 1 pylon judge is to signal the pilot when his aircraft has completed the required distance to the N° 1 pylon and can, therefore. turn without cutting.

c) The secondary job of each N° 1 pylon judge is to notify the N° 1 pylon chief judge if the aircraft turns before getting to the pylon.

d) N° 1 pylon judges are stationed on the sideline, looking directly out (ie. perpendicular to the sideline) toward N° 1 pylon.

e) A N° 1 pylon judge's standard equipment consists of:

i) a colour-coded signal light and shutter, both of which have a sufficiently fast response time (< 0.05 s) or a flag with which to signal a turn;

ii) some form of indicator with which to signal a cut.

f) As viewed from the sideline, it is not possible for an aircraft to both complete the required distance to the N° 1 pylon and also to cut inside the N° 1 pylon on the same turn. Therefore, if a judge has signalled the pilot that he has completed the distance, then a cut should not be called.

g) When the aircraft are held up for identification before the beginning of the heat, the N° 1 pylon judge for each lane should flash or waggle the turn signal device to indicate recognition of his assigned aircraft.

h) After launch, and after his assigned aircraft crosses the start/finish line on each succeeding lap, each N° 1 pylon judge should do as follows:

i) If the signal device is a flag, hold the flag aloft so that it is clearly visible as the aircraft approaches, then drop it smartly the instant the aircraft intersects the imaginary vertical plane established between the positions of pylon judges N°s 1 and 2 on the sideline. (See F3D race course layout, 5.2.16(b).

ii) If the signal device is a shutter or light, activate it crisply at that same instant and hold it in the open or "on" position and close it or switch it to "off" again when the model aircraft crosses the imaginary vertical plane established between the positions of pylon judges N°s 1 and 2 in the other direction.

i) If the cut signal indicator is simply a continuous flashing or waving of the signal device then a N° 1 pylon judge must be sure to flash or wave, as appropriate, for at least several seconds and communicate the cut to the N° 1 pylon chief judge. If he agrees that it is indeed a cut, then the chief judge will notify the Starter. Signalling continues as before.

j) A turn is legitimate (ie there is no cut) if any part of the aircraft goes past the pylon. If there is any doubt about a possible cut, then the pilot should be given the benefit of the doubt.

A.5R.7 N° 1 Pylon Chief Judge (1)

a) The N° 1 pylon chief judge is stationed with the N° 1 pylon judges and should be equipped with a walkie-talkie or headset. The chief judge communicates aircraft identification information to the N° 1 pylon judges at the beginning of each heat, confirms any cuts called by the N° 1 pylon judges and relays cut information to the Starter.

b) Other than the Starter, the N° 1 pylon chief judge should be the most experienced worker on the racecourse.

A.5R.8 N°s 2 & 3 Pylon Cut Judges (3 + 3)

a) The primary job of the N°s 2 & 3 pylon cut judges is to watch their assigned aircraft in each heat and relay any cut information to the Starter.

b) Standard equipment for the cut judges includes a chair and sunshade; a walkie-talkie or headset; a notepad or dry-erase board on which to note colour schemes and other aircraft identification information for each heat.

c) Each of the cut judges may also be equipped with an ordinary transmitter antenna, fishing rod, or thin dowel mounted vertically on a stand or stake in front of his chair to help judge whether the aircraft are staying outside the imaginary vertical line extending above the pylon.

d) The N^{os} 2 & 3 pylon cut judges should be positioned on the sideline, looking out toward their respective pylons at an angle sufficient to see whether the aircraft are cutting the pylons. (See the F3D course layout, 5.2.16.(b).)

e) When the aircraft are held up for identification before the beginning of the heat, the N^{os} 2 & 3 pylon judges for each lane should indicate recognition of the assigned aircraft.

f) The judge may simply put a check mark his notebook or dry-erase board during the race, and then report to the Starter the total number of cuts recorded for his assigned aircraft at the end of the heat.

g) If electronic means are used for cut judging, this information will be recorded automatically by the computer system.

h) A turn is legitimate (ie. there is no cut) if any part of the aircraft goes outside and around the pylon.

i) If there is any doubt about a possible cut, then the pilot should be given the benefit of the doubt.

A.5R.9 Sideline Judges (3)

a) The sideline judges each follow their assigned model aircraft and are tasked to monitor low flying around the pylons and any flying over the sideline.

b) Additional to their task could be to judge whether a model aircraft is flying erratically or dangerously and to inform the Starter so that he may instruct the pilot to land the model aircraft.

c) Since this type of judging has strong subjective elements and the decisions of these judges will lead to penalties or disqualification it is necessary that these judges are trained and experienced people and that judging standards are established, and consensus about judging attained, before the start of the competition.

A.5R.10 Scorekeeper (1)

a) The scorekeeper collects recorded heat times, infringements and disqualifications. He calculates the scores and enters them on a master list, scoreboard or computer as the contest progresses.

b) The scorekeeper should be equipped with a walkie-talkie or other means with which to communicate with the Starter.

c) The scorekeeper may be the same person who assists the CD in making the draw for the heats.

A.5R.11 Technical and Noise Officer (1)

a) This officer (and his assistant(s)) is responsible for the duties described in paragraph 5.2.3.

b) If he finds that models do not conform to technical specifications he will report this to the CD who will decide if the competitor should be disqualified for the competition. If a model aircraft does not pass the pre-flight safety check, then it will not be permitted to fly in that race unless the necessary modifications are made to the Technical Officer's satisfaction before the next race. During the pre- or post-flight check, the Technical Officer will also check the FAI stickers and stamps on the models that will be, or were, flown in a heat. He will write the identification numbers on the starting list. He will also check the identification marks on engines and on the silencers. If numbers and marks are not present or they do not match the numbers and marks of the competitor, the competitor will not be permitted to fly in that heat and the Technical Officer will report these facts to the Contest Director.

A.5R.12 Safety Officer (1)

a) The duty of this officer is to monitor safety and record all race accidents, crashes and other situation that are potentially dangerous and report to the CIAM F3 Pylon Racing Subcommittee.

b) He may also assist the CD in safety matters.

A.5R.13 Pit Boss (1)

a) The Pit Boss calls up the pilots by heats to fuel and place their aircraft in the Ready Area. A public address system is helpful in this task. The Pit Boss should, if possible, be equipped with a walkie-talkie to communicate with the Starter.

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A.5R.14 Fuelling Station Supervisor (1)

This person runs the fuelling station. He should ensure that each pilot who brings an aircraft to the Ready Area drains it of fuel and then refuels it from the official fuel supply. After fuelling, the aircraft should be placed in the Ready Area and not taken back to the pits. To make the procedure of fuelling at the fuelling station possible, at least 5 metres of table should be provided. In order to speed up the fuelling process at the fuelling station, it is highly recommended that models are equipped with a tank filling system that can be operated without opening the model aircraft.

A.5R.15 Transmitter Impound Supervisor (1)

a) This person should be provided with a large rack or folding table, protected from the sun and rain, on which to collect and safeguard the contestants' transmitters.

b) Transmitters should only be handed back to those pilots who are on their way to the Ready Area. When returned to the Impound after each heat, the transmitters should be checked to ensure that they are switched off.

c) The Transmitter Impound supervisor shall operate a spectrum analyser or other adequate radio monitoring equipment for the purpose of detecting radio interference.

d) He must be equipped with a walkie-talkie or headset to enable him to communicate with the Starter and the Pit Boss...

e) In the case of detection of potential interference he shall immediately notify (by walkie-talkie or head set) both the Pit Boss and the Starter.

f) The Transmitter Impound Supervisor may also be one of the people who helped with registration, inspection, or setting up the matrix.

A.5R.16 Emergency - First Aid (1)

At least one qualified medical attendant should always be available on the site when flying is permitted. An ambulance & crew must be available.

A.5R.17 Combination of Functions

a) The complete set of officers as listed totals 29. For many organisations it will be hard to arrange this number of judges and helpers.

b) It is possible to combine some of the functions for smaller competitions. For example:

   i) One judge for each of the Nos 2 & 3 pylons is acceptable. In this case, these judges would need a notebook in which to write down pylon cuts and associated aircraft colours.

   ii) The number of sideline judges could be reduced to one who would observe the flying over the sideline and look out for any dangerous or erratic flying by any of the three competitors. Low flying near the pylons could be judged by the pylon judges.

   iii) The Technical Officer could also be the Safety Officer

   iv) The Scorekeeper could be one of the Timekeepers

   v) The N^{o} 1 Pylon Chief Judge could be one of the N^{o} 1 Pylon Judges

   vi) The Pit Boss could also be the Scorekeeper, Transmitter Impound Supervisor and/or Fuelling Station Supervisor.

c) The minimum number of personnel combining functions is 17-19.

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ANNEX 5S

TECHNICAL EQUIPMENT

A.5S.1 OBJECTIVE

a) This Guide is intended to specify guidelines for the organisation of F3D international contests, for the benefit of both the organisers and the competitors. It is emphasised that these are recommendations and they do not have the same status as the binding regulations in the FAI Sporting Code unless they concern any regulation in that Code.

b) Since this Guide will be widely distributed and should be regarded as the standard for F3D international competitions, organisers should avoid confusion by announcing in advance any changes from this Guide that may be necessary to suit local circumstances as long as those changes are not in contravention of the any of the regulations in the Sporting Code.

c) This Guide is primarily applicable to World and Continental Championships, but parts of it may be useful for open international competitions.

Other than the equipment specifically required by the FAI Sporting Code, it is strongly recommended that the following technical equipment is provided by organisers:

A.5S.2 Spectrum Analyser

a) See ABR B.11.4 for the equipment to detect radio interference.

b) During the competition the spectrum analyser shall be operated by the Impound Supervisor and during any practice sessions by the Safety Officer.

A.5S.3 Public Address (PA) Systems

A PA system that may be used for addressing both the competitors (calling them for flights, etc) and spectators.

A.5S.4 Model Processing.

a) A means of effectively marking registered models, engines and exhaust systems.

b) Spare FAI model aircraft specification certificates and stickers.

c) Template for checking:

i) fuselage dimensions, 175 mm and 85mm

ii) wing thickness, 22 mm,

iii) wheel dimension, 57 mm

iv) spinner nose radius 5 mm

d) Ruler for checking the linearity of wing taper.

e) Equipment to accurately weigh models, measure models and compute the projected area, both on and off the flying site. A computer running an appropriate program for the latter measurements is recommended.

A.5S.5 Engine Processing

a) Measuring Equipment - Engine

i) 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.

ii) For measuring the stroke, a dial gauge with a minimum of 25 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 cylinder should be used.

iii) For measuring the stroke of an engine which is close to top limit of capacity, a 0 to 30 mm depth micrometer with minimum graduations of 0.005 mm and an accuracy of ± 0.002 mm should be used.

Note: The dial gauge is the preferred instrument for stroke measurement because of its ease of use.

b) Method of Use

i) Engines with removable cylinder heads:

The bore should be measured at or near TDC.

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

ii) Engines with integral cylinder heads:

The bore diameter must be measured from the bottom of the cylinder. 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 3, 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, the piston diameter may be measured instead. The piston should be measured at its maximum diameter point.

For the stroke measurement, the competitor must provide tooling to allow the piston connecting rod & shaft assembly to be rotated through 360 degrees, using a dummy cylinder if necessary. The dial gauge can then be used in a fashion similar to that used on engines with removable cylinder heads.

c) Measuring Equipment – Air Intake

For measurement of the air intake area of a circular venture, the organiser will supply a plug gauge of 50 mm long, 12.00 mm (-0, + 0.05mm tolerance) wide and 1 mm thick. If this plug gauge will not go through the venturi under any angle, then the air intake is taken to be correct. If a different section for the venturi is used that fails this test, or a multiple air intake system is used, then the competitor shall bring templates, drawings, own tools or other means, together with an appropriate calculation of the total air intake area, in order to allow the total air intake to be checked using a normal calliper or micrometer.

A.5S.6 Noise Measurements

A calibrated sound level meter as specified in A.5P.2

A.5S.7 Race Equipment

1 starting flag.

1 stopwatch for the Starter.

A 1 minute clock clearly visible for pilots and callers, and preferably also for the timekeepers, for indication of the one-minute engine start period.

Flags or some other means of identifying the individual prior to the race at the starting position and at the timekeepers' and pylon judges' positions.

A system to provide the competitors with information of the number of laps flown and which can be easily identified by the teams and the spectators.

3 sets of pylon cut indicators, clearly visible for competitors and the Starter, and preferably also for timekeepers, pylon and sideline judges.

A.5S.8 Time-keeping and Judging

3 stopwatches + 2 reserve stopwatches registering at least 1/100 sec.

3 manually operated lap counters + 2 reserve lap counters

Score sheets

The complete time-keeping, lap counting and judging equipment may be replaced by a computer-based electronic system with multiple displays as have been used in the 2003 (Melnik, Czech republic), 2005 (Tours, France), and 2007 (Muncie, USA) to the great benefit of the competitors and the public.

cont/…

A.5S.9 Secretariat

The Secretariat should be housed in a building or caravan, but preferably not in a tent.

Computer with scoring program and printing equipment or electronic calculators.

Spare stopwatches.

Scoreboard with felt pens or means of displaying the competition results to the competitors and the public.

Valid Sporting Code for the year in question.

Rules displayed in the FAI language (English) and in the national language.

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ANNEX 5T

GUIDELINES FOR THE DRAW FOR RACES

A.5T.1 OBJECTIVE

a) This Guide is intended to specify guidelines for the organisation of F3D international contests, for the benefit of both the organisers and the competitors. It is emphasised that these are recommendations and they do not have the same status as the binding regulations in the FAI Sporting Code unless they concern any regulation in that Code.

b) Since this Guide will be widely distributed and should be regarded as the standard for F3D international competitions, organisers should avoid confusion by announcing in advance any changes from this Guide that may be necessary to suit local circumstances as long as those changes are not in contravention of the any of the regulations in the Sporting Code.

c) This Guide is primarily applicable to World and Continental Championships, but parts of it may be useful for open international competitions.

A.5T.2 The main principles of the draw are specified in ABR B.11.4.

A.5T.3 The draw has to take into account that a pilot or caller may act as a caller in more than one race team.

It is convenient if a computer program is used to make the random draw, taking into account, in this order:

(a) The required frequency distance of 20 kHz.

(b) That one person may act in two national race teams. In case this cannot be avoided in a specific heat, a pilot may be permitted to use a different caller for that heat, but only if that caller has been registered as part of that national team before the competition began.

(c) That a heat should comprise different nationalities in one heat (unless impossible).

(d) The maximum of difference in the composition of the heats. This means that a competitor will have the technically maximum number of other pilots he flies with in the competition. The NMPRA matrix computer-aided system provides such a draw.

(e) That a single or two-up heat gives a certain advantage to a competitor; therefore single or two-up heats should be kept to a minimum and equally distributed amongst the competitors. The system of draw shall have sufficient flexibility to fill up races with reflights, so that a minimum number of single or two-up races need be flown.

(f) If the number of competitors is not divisible by 3, then the draw needs to be made in such a way that, the last race will have one or two open places. Reflights can be used as a fill in as long as frequencies allow this. If the last race is a single race and there are no reflights to fill up, then the last two races shall be flown as two-up races.

(g) A reasonable time between heats has to be allowed for each competitor.

A.5T.4 The complete draw (except modifications due to reflights) shall be done before the competition starts (ABR B.11.4). If the Contest Director has reasons to make substantial changes in the draw, this shall be reported in a team managers' meeting.

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ANNEX 5U

GUIDELINES FOR PRACTICE FLYING

A.5U.1 OBJECTIVE

a) This Guide is intended to specify guidelines for the organisation of F3D international contests, for the benefit of both the organisers and the competitors. It is emphasised that these are recommendations and they do not have the same status as the binding regulations in the FAI Sporting Code unless they concern any regulation in that Code.

b) Since this Guide will be widely distributed and should be regarded as the standard for F3D international competitions, organisers should avoid confusion by announcing in advance any changes from this Guide that may be necessary to suit local circumstances as long as those changes are not in contravention of the any of the regulations in the Sporting Code.

c) This Guide is primarily applicable to World and Continental Championships, but parts of it may be useful for open international competitions.

A.5U.2 In accordance with ABR B.8.4, a practice day prior to the competition must be scheduled. During any practice, no more than four aircraft and eight or sometimes nine people (pilots, callers plus, sometimes, the practice Safety Officer) may be on the race course for safety reasons. Two aircraft may be in the air at any given time.

A.5U.3 It is strongly recommended, that unofficial practice sessions are supervised by the Safety Officer.

A.5U.4 This officer may apply a system for assigning practice flights to assure a fair distribution of the available practice time to all pilots present. He can do this by using a list where the pilot can add his name. Only after the pilot has returned from his practice flight may he add his name again at the end of the list.

A.5U.5 The Safety Officer will ensure that not more, but preferably not less, than 4 pilots and 4 callers go on the race course at the same time to speed up the rate of practice flying. He shall permit only two aircraft to be in the air at the same time.

A.5U.6 See also A.5V.4.

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ANNEX 5V

GUIDELINES FOR ORGANISERS

A.5V.1 OBJECTIVE

a) This Guide is intended to specify guidelines for the organisation of F3D international contests, for the benefit of both the organisers and the competitors. It is emphasised that these are recommendations and they do not have the same status as the binding regulations in the FAI Sporting Code unless they concern any regulation in that Code.

b) Since this Guide will be widely distributed and should be regarded as the standard for F3D international competitions, organisers should avoid confusion by announcing in advance any changes from this Guide that may be necessary to suit local circumstances as long as those changes are not in contravention of the any of the regulations in the Sporting Code.

c) This Guide is primarily applicable to World and Continental Championships, but parts of it may be useful for open international competitions.

A.5V.2 SITE

a) For race course lay-out see 5.2.7.2; for site lay-out see Annex 5Q.

b) Other aspects affecting the suitability of a site include (not in order of priority):

   a) The ease of access for competitors arriving by road, public transport or international ports and airports.

   b) The availability of adequate official accommodation for all competitors, team managers, officials, and at least some supporters and helpers.

   c) The time taken to travel between this official accommodation and the flying site (ideally this should be less than 30 minutes in normal (for the area) traffic conditions).

   d) The availability of local hotels and camp sites for additional supporters.

   e) The possibility of parking vehicles at the flying site.

   f) Local practice facilities if the flying site is unavailable prior to the start of official practice.

   g) The organiser must survey the site of any competition scheduled to be held in order to determine possible cases of radio interference that would affect any competitors. Any such possibilities must be reported as early as practicable to CIAM and the National Airsport Controls (NACs). Frequency bands or specific frequencies which have been shown to be reasonably free from interference at the site of the competition need also be reported.

c) When proposing a site in a Championships bid to CIAM, the National Airsport Control must give a detailed description of all the aspects discussed above.

d) It should be arranged for a CIAM representative from another country to visit the flying site and facilities (preferably at the same time of year as the Championships are scheduled to be held). This person may be a member of the CIAM Bureau, the Chairman or a member of the F3 Pylon Racing Subcommittee, a CIAM Delegate, or a member of the FAI Jury at a recent F3D Championship. In the case of CIAM Delegates or CIAM Bureau members, the chosen representative should have recent F3D knowledge. The CIAM representative should discuss the site with internationally known and respected modellers who fly the F3D class and may have regularly used the proposed site.

e) The accommodation facilities must be described and the entry fee stated, split into an obligatory part and a part for food and accommodation (ABR B.7.2 & B.7.4). These fees should be justified to CIAM by including an estimated income and expenditure budget for the Championship ABR Annex A1).

f) CIAM should be given a detailed summary of weather conditions at the time and place of the proposed event, compiled by the official meteorological organisation of the host country and covering such aspects as the wind speed and direction throughout the day, the range of temperatures, sunshine and rainfall. Note that the decision on a submission of a bid to host a Championship is normally decided at the CIAM Plenary Meeting two years in advance of the event (ABR B.6).

cont/…

g) Well in advance of the event, **but not before agreement at the CIAM Bureau meeting in the November/December prior to the championship**, information (Bulletin 1) should be sent by the organisers to the FAI office with a request for distribution to the National Airsport Controls and members of the CIAM Bureau. Bulletin 1 should be sent by the Organisers direct to the FAI Jury of that Championship. The information should include a description of the site and any special features, with maps showing the location of the flying field, the accommodation and arrival registration point relative to roads and local towns plus a detailed map of the flying field with its entrances and any restricted access areas.

A.5V.3 FUEL (ABR B.5.6 & F3D, 5.2.15)

a) The organisers shall provide the FAI standard fuel for use in competitions, and additionally, at cost, up to 20 litres of fuel per competitor for practice flying. The practice fuel must be requested in advance by the competitor (at the time of entry and by the appropriate order form provided by the organiser with the entry form in the appropriate Bulletin) and must be available to competitors several days before the official day of arrival in case of early arrival by the competitors. This information is to be communicated to the competitors via the Bulletins.

b) Fuel supplied by the organisers shall be mixed from top quality material. Methanol shall be at least commercial grade without additives. The castor oil shall be at least equivalent in quality to Castrol M.

A.5V.4 PRACTICE (ABR B.8.4, Annex B.3)

a) The fact that some teams prefer to arrive several days in advance for practice flying should be taken into account. It is highly recommended that the competition site or any suitable area in the neighbourhood is open for practice flying and ordered practice fuel available.

b) During the contest it should be possible to perform practice flights on the competition site contest area or on another suitable place close to it. Whenever the site is not used for the competition rounds, the competition site should be open for test flights under the supervision of the Safety Officer.

c) See also Annex 5U.

A.5V.5 TIMETABLE

a) The time of year for the contest should be chosen so that the flying conditions, temperature and weather may be expected to be agreeable for the majority of competitors.

b) It is highly desirable that two unofficial practice days in addition to the official practice day is provided before the competition begins.

c) A suggested schedule for World and Continental Championships is as follows:

(i) Before the official day of registration, 1 – 3 days of unofficial practice, controlled by an officer to ensure safe flying and fair use of the race course (See also Annexes 5Q and 5U). This practice should be used to train the pylon judges, the sideline judges (to attain consensus over criteria for judgement of dangerous or erratic flying) and the timekeepers. These practice days should also be used to bring the flying site into full operation, which may cause the unofficial or free practice to be interrupted.

(ii) The first official day of championships is for arrival and registration of the teams by the team managers. On this day unofficial practice may be continued. The location of the registration office should signposted and also be indicated on a map included in one of the bulletins. At registration the team manager should be given all relevant information for his team members, such as competitors' numbers, ID cards, meal tickets, banquet tickets, accommodation details & maps, schedules including the team slots for processing and official practice, lists of participants and souvenir bags and any other information that may be available.

(iii) The second day is for official practice and model aircraft processing. During the official practice it is recommended that the full race organisation, including all officials, all racing and timing equipment is present and in use. The Starter and Safety Officer will be in charge of the safety of the official practice session. The official practice schedule showing the team slots will facilitate the smooth running of the official practice.

(iv) 3 days of competition then follow, with 3 – 6 rounds per day, with the closing ceremony and banquet on the last day.

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(v) It is recommended that the number of rounds for a World or European Championship should not be more than 15. For international competitions the number of rounds should be not less than 6. The number of rounds shall be announced by the organiser at the team managers' meeting before the start of the competition. If weather conditions or other reasons require a reduction in the number of rounds per day, then an extra day of competition may be added or a team manager meeting will be held to agree the reduced number of rounds. Such a decision has to be taken as early as possible, but with a minimum of five more rounds still to be flown after the decision, since a late decision may affect the fairness of the competition.

vi) The published timetable should include the expected start & finish times of the rounds. As well as the schedule for flying, the timetable should also include the time and place of:

- the meeting of the organisers with the team managers (known as the team managers meeting) after arrival:
- the opening ceremony, at a time not infringing upon model aircraft processing or practice periods;
- the ceremony for the presentation of FAI or CIAM medals, appropriate trophies, FAI diplomas and any organiser trophies to the winners.

(vii) Copies of the timetable included in a Bulletin (distributed at least 2 months in advance in the process outlined in A.5V.2 (g)) should be supplied as hand-outs via the team manager, to all participants upon arrival at the event.

A.5V.6 TEAM MANAGERS MEETINGS

a) Usually on the evening of the official registration there will be a meeting of the team managers with the organisers, the FAI Jury and the Judges with the following (minimum) agenda:

i) Welcome of teams by the Contest Director.

ii) Introduction of FAI Jury, Starter, Judges and other officials.

iii) Urgent problems involving lodgings, transport or feeding of competitors

iv) Draw for the flying order.

v) Local rules.

vi) Comments from the FAI Jury President on any new rules or flight procedures that the Jury feels should be emphasised.

vii) Comments from other Judges or Jury members about interpretation of rules or general competition procedure

viii) Time table

ix Questions from team managers.

b) At the request of the FAI Jury, the organiser or at least three team managers, additional team managers meetings may be held as requested or in the evening before each competition day.

A.5V.7 INTERPRETERS

It is advisable that interpreters are available at all stages of World and Continental Championships to allow communication between the main officials, team managers and the FAI Jury. An essential minimum is to ensure that these three categories of personnel are able to communicate with each other in English or the second official language specified for the Championships. The smooth running of the event is aided by also supplying interpreters for teams who are unable to converse in either of the official languages.

A.5V.8 CEREMONIES

a) It is desirable to keep all ceremonies short and readily understood.

b) Opening Ceremony

i) The key elements of an opening ceremony are the introduction of the teams and welcoming remarks by the organisers and the President of the FAI Jury. Depending on the number of teams it may not be desirable to play the anthem of each country. If requested to do so, the team managers should have brought recordings of their national anthem. For any country that does not bring an anthem and for competitors from countries that are only temporary members of the FAI, then the FAI anthem should be played.

ii) At the beginning of the opening ceremony, as soon as the teams are in their places, the FAI anthem is played and the FAI flag raised. At the end of the ceremony, the President of the

FAI Jury will declare the Championship open, and the national anthem of the organising country is played.

c) Awards Ceremony (B.16.4)

i) The award ceremony should be separate from any closing banquet, so that it may be attended by all participants regardless of whether or not they attend the banquet.

ii) The key preparation for the prize giving is to have all the trophies, medals and diplomas available for presentation, with the diplomas completed with the winners' names.

iii) There should be a rostrum or other central area or stage for presentations to the individual and team winners which allows suitable views for photographers.

d) Closing Ceremony

i) The award ceremony is followed by the closing ceremony which will include closing remarks by the organisers and the President of the FAI Jury.

ii) At the end of this ceremony, the FAI anthem is played, and the FAI flag presented, as a symbol, to the team manager or representative of the next organising country.

e) Closing Banquet

In planning any closing banquet it should be remembered that the main enjoyment of participants is meeting one another and talking together. To assist in this, it is not desirable to provide major special performers or speeches or loud music for the dinner.

A.5V.9 PROCEDURES FOR MODEL AIRCRAFT PROCESSING

a) Model aircraft processing must be carried out according to ABR B.16.

b) There are three phases to processing:

first phase - before the competition begins;
second phase - random checks during the competition;
third phase - after the provisional results.

c) First phase processing – before the competition begins:

Checks for:

Specification certificate
Wing, tail & surface areas
Wing root thickness
Wingspan
Fuselage height, width & cross-section
Cowling
Spinner nose radius
Weight of model aircraft (dry)
Fail-safe
Fuel shut-off
Venturi
Exhaust system
Mark the exhaust
Swept volume of engine
Mark the engines
Check the Olympic identification mark
Check the model aircraft identification code
Check the FAI sticker

cont/…

Notes:

i) Confirmation of the FAI sticker check should be shown by marking across the edge of the sticker and the model aircraft with an indelible special symbol or stamp of the organisation. If a stamp is used it is essential that it is with permanent ink which does not wipe off under the effect of rain, model aircraft fuel or lubricants.

ii) The identifying letters or number (unique code) on the models of each competitor should be identified in each race and recorded with the race times for that competitor. Note that if a competitor is from a country that is a temporary member of the FAI, then on all entry, flying and results listings, "FAI" should be used as his three-character identification mark and not those of his nation.

iii) All engines and silencers which might be used during the contest must be marked with an easily visible identification mark. Engines which have been checked and recorded in this way may not be exchanged with other competitors. (B.16.11)

d) To facilitate the smooth running of the first phase processing, a schedule should be established with equal slots for each competitor.

e) If a competitor wishes to register a further model aircraft, (ABR rules B.16.1 and B.16.12) then he must present to the organiser the corresponding specification certificate for the new model aircraft. The time and place for any additional model aircraft checking that a competitor may request should be clearly communicated via the team managers.

f) Second phase: random checking of models during the competition.

i) The models to be checked should be chosen at random and it should be done in such a manner so as not to inconvenience or hinder competitors. Models should be impounded immediately after a flight and should be checked as soon as possible thereafter. The results of these checks should be recorded. Advance notice of the check should not be given.

ii) Note that these checks are in addition to the model aircraft identification checks that the Technical Officer makes before each flight.

g) Third & final phase - after the provisional results

i) For the check of the characteristics of all the model aircraft used by the competitors placing first, second and third (ABR B.16.14), it is prudent to impound at least the fourth place model aircraft as well, for processing in the case of any disqualification in the first three.

ii) It may be that the re-checking can be carried out at the flying site if good facilities are available there for accurate measurements, otherwise the models should be impounded at the flying site and taken to an alternative site for processing. In this case the pilot may accompany his model aircraft as long as he is not, at any time, left unattended with the model aircraft.

iii) Engine(s) total swept volume

1. To determine an engine(s) total swept volume, the stroke and bore of the engine(s) must be measured accurately with precision engineering tools in accordance with A.5S.5.

2. The swept volume is found by multiplying the swept piston area by the stroke. The calculations to determine the swept volume must use the full accuracy of the measured dimensions. If more than one engine is used, the measured total swept volume will be calculated by addition of the measured swept volume of all engines at full accuracy. Then the calculated swept volume shall be truncated to two decimal places. This means that the figures in third and later decimal places are deleted and the result is compared to the permitted maximum of 6.6 cc.

3. The following examples are given to clarify the procedure:

Calculated volume	6.596	6.604	6.608	6.612
Truncated volume	6.59	6.60	6.60	6.61
Within specification?	yes	yes	yes	no

h) Exhaust systems

The procedure for checking and approving of exhaust systems is given in Annex 5P.

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ANNEX 5W

CLASS F3R – PYLON RACING MODELS WITH LIMITED TECHNOLOGY

5.W ***Intention:*** *This class is defined for pylon racing at a limited level of technology in aircraft aerodynamic design, aircraft construction and power plant with maximum safety.*

Rules strategy: *The technical rules have the intention that speeds will not increase substantially over the years in order to maintain safety and controllability of model pylon racing aircraft. This is achieved by a simple and strict model formula, definition of propeller dimension and limitation of exhaust systems. The technical rules will be developed in such a way that the average course speed (nominal race distance divided by race time) will be limited to 200 km/h. The criterion will be applied to the average times made by the best half of the competitors in all international competitions over a year that have been flown under the standard F3R rules below.*

Within the F3R rule strategy is it possible to define locally or nationally different definitions for the engine, fuel, propeller and exhaust systems (rules 5.W.6 – 10), but not for the model. Annex 5.W.A1 gives examples of formulas based on current practice in some countries. Organisers have to make clear whether a competition is flown according to the standard rules as given in 5.W.6 - 10 or to a different formula for the engine, propeller, exhaust system and fuel,.

The F3R rules and Annexes are basically identical to the F3D rules and Annexes (FAI Sporting Code section 4 – Aeromodelling Volume F3D Radio Controlled Pylon Racing) except for the technical specification of the models (5.W.3 – 5.W.10 and Annex 5.W.A1).

5.W.1 Definition of Radio Control Pylon Racing Model Aircraft:

See 5.2.1

5.W.2 Technical Specifications of Pylon Racing Model Aircraft

See 5.2.2

5.W.3 Weight

Weight, less fuel but including all equipment necessary for flight, shall be at least 1700 g and not more than 2200 g. If ballast is used it must be permanently and safely affixed.

5.W.4 Fuselage

5.W.4.1. Depth and width

The fuselage shall have a minimum height of 89.0 mm and a minimum width of 73.0 mm. Both dimensions must occur within the wing chord. The fuselage shall have a rectangular cross section over the whole length and the side wall shall be parallel to the vertical axis of the model aircraft (rectangular box cross-section). A maximum radius of 6.5 mm is permitted for the corners of the fuselage.

5.W.4.2 Fairing

Fillets or fairings between the fuselage and wing are not permitted.

5.W.5 Lifting Surfaces

5.W.5.1. Area of Surfaces

Total projected area of the main wing, must be at least 32.0 dm2.

5.W.5.2 Chord

The main wing must have a constant chord over at least 1200 mm of span.

5.W.5.2 Wing Span

a) Minimum wing span shall be 1270 mm

b) Maximum wing span shall be 1320 mm.

5.W.5.3 Wing Thickness

Wing thickness must be at least 30.0 mm over a wingspan of at least 1200 mm.

5.W.6 Engine(s)

Engine(s) must be of the single cylinder reciprocating piston type, with a maximum total swept volume of 6.60 cm^3. Propellers must rotate at the speed of the crankshaft. Engine shall have only one front intake and one side exhaust. Only commercially available engines are allowed of which a

minimum number of 25 were built. No modifications are allowed to crankcase, cylinder, cylinder head, piston, con rod or crankshaft or to the technology of the bearings.

Engine air intake cross sectional area is limited to 114.0 mm^2 (12.05 mm diameter).

Engine installation

The engine including silencer and the engine mount shall be fully exposed. The front firewall shall be a rectangular, flat plate measuring at least 57.0 mm by 57.0 mm. Corners and edges of the engine mount may be rounded to a maximum of 6.5 mm

5.W.7 Exhaust system:

a) General description: The engine shall be equipped with an expansion chamber muffler, zero-boost muffler, or tuned muffler as provided by the manufacturer for the engine being used, and having a single exhaust outlet with a maximum outlet area of 40.2 square millimetres (equivalent to the area of a round hole measuring 7.15 mm diameter).

b) Inner configuration or tuned mufflers: A tuned muffler used in this event shall have only one internal part, a straight tube or extractor of the type commonly known as a “mini-pipe”. The mini-pipe shall have a constant, circular cross section and constant inside and outside diameter, with the following exception: the sidewall of the tube may be thickened not to exceed 2 mm wall thickness, within 12.7 mm of the front end of the mini-pipe where it attaches to the header.

c) Outside dimensions: The distance from the centre of the piston to the centreline of the muffler shall not exceed 70 mm. The overall length of the muffler shall not exceed 185 mm, measured from the front of the header to the back of the exhaust outlet. The outside diameter shall not exceed 45 mm and both the inside and outside diameter of the outside shell of the muffler shall remain constant for at least 75 mm.

d) Modifications: No modifications to the muffler, as provided by the manufacturer, are permitted except that the muffler may be tapped for a pressure fitting to supply pressure to the fuel system.

5.W.8 Fuel pressure

If the tank is pressurised, only the pressure from the silencer is permitted.

5.W.9 Propellers and spinners

a) Only fixed propellers which are commercially available shall be used.

b) The propeller shall either be of a chopped fibre filled injection moulded type or wood.

c) Composite resin continuous fibre construction propellers are not allowed.

d) The propeller shall have a minimum diameter of 222 mm.

e) Wood propellers may be modified from a commercial product or can be home made .

f) For injection moulded propellers the type and dimensions must be indicated on the propeller by the manufacturer. The recommended rpm limit for this type as given by the manufacturer must not be exceeded during flights.

g) For injection moulded propellers changes to the propeller blades are not permitted, except for:

i) One blade may be sanded on the top (front) side only for balancing.

ii) One side of the hub may be sanded for balancing.

iii) The shaft hole may be enlarged, but only as much as necessary to fit the engine crankshaft. The enlarged hole shall be concentric with the original hole.

iv) Edges and tips may be sanded, but only as much as necessary to remove sharp moulding flash.

h) A rounded nose spinner with a maximum diameter of 38.0 mm and a nose radius of not less than 5 mm (ABR B.19.4) must be fitted. The spinner shall be made of metal only.

5.W.10 Undercarriage

The undercarriage may have a two or three wheel design with the two main wheels having a minimum track of 177.0 mm, fixed on the outside of the fuselage or main wing. The diameter of the two main wheels shall be not less than 57.0 mm. Only non retractable landing gears are permitted. Wheel fairings or fairing between landing gear and fuselage, i.e. Fillets, wheel pants or similar, are not permitted. Nose or tail wheels, if used, may be streamlined.

5.W.11 Shut-off

See 5.2.9

5.W.12 Fuel

See 5.2.15

5.W.13 Technical checks and safety requirements

See 5.2.11

5.W.14 Competitors

See 5.2.12

5.W.15 Helmets

See 5.2.13

5.W.16 Transmitter and frequency check

See 5.2.14

5.W.17 Race Course, Distance and Number of Rounds

See 5.2.16

5.W.18 Race from Start to Finish

See 5.2.17

5.W.19 Timekeeping and Judging

See 5.2.18

5.W.20 Infringements and Penalties

See 5.2.19

5.W.21 Scoring and Classification

See 5.2.20

Note: *5.2.20.2 does not apply to F3R.*

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ANNEX 5W.A1

F3R AS A MULTI-FORMULA CLASS

F3R is defined here by a standardised model and the way a competition is held. The power plant including its silencer, propeller, fuel (5.W.6 – 12) can be specified differently from the standard rules by the organiser of a competition if he wishes to do so.

This makes it possible to make the class flexible for local preference, different requirements in pilots' ability, airfield or noise constraints etc. The organiser shall publish these rules, either by specification or by the class identification code (see below) or by publishing the deviation of the standard F3R rules in the invitation to the contest.

A few examples are given here which could be used independently or in combination:

1. A requirement to use only (unmodified) engines from a selected list with their standard exhaust system and an appropriate propeller definition.

2. New pilots may be attracted by adding a price limit in order to create a local or national class which uses cheaper engines that are easily available locally, even with a slightly different cubic capacity.

3. Replace the 114.0 mm^2 (12.05mm diameter) venturi - 80/20 fuel combination by a 64.0 mm^2 (9 mm diameter) venturi - 15% Nitro fuel combination for easier engine characteristics.

4. An internal tube in the exhaust system is not allowed, in order to reduce the tuning effect in order to reduce engine power.

5. A different propeller definition, eg a minimum diameter of 250 mm or only certain propellers to be selected from a list of commercially available propellers may be chosen in order to limit speed/rpm and/or noise.

6. An electric powered class with electric motors allowed from a list of commercially available motors in combination with a type of limiter or a governor for rpm control (eg 14.000 rpm) in combination with some standard propeller.

7. Composite wings and/or fuselages not allowed in order to reduce cost and to avoid high technology model aircraft. This may help to create a national class that attracts young pilots.

8. Add a noise limit .

Deviation from the standard rules should not compromise safety.

Since variations to the standard formula are usually for national competitions to create a "beginner friendly" or locally popular racing class, it is recommended to give a such a national class a unique code consisting of F3R, the national identification and a class identification, for example F3R-GER-E1, for a German F3R class for a formula with electric motors or F3R-NED-86dB for a Dutch class with a noise limit of 86 dB(A) at 3 metres.

For classes that have formulae that give substantially lower speeds than the standard F3R class, the distance between the pylons from the base pylons to the top pylon, and the distance between the safety line and the course may be reduced accordingly.

Note that the following F3D annexes also apply to F3R:

ANNEX 5Q - GUIDELINES FOR AIRFIELD LAY-OUT,
ANNEX 5R - GUIDELINES FOR DUTIES OF PERSONNEL
ANNEX 5S - GUIDELINES FOR TECHNICAL EQUIPMENT
ANNEX 5T - GUIDELINES FOR DRAW OF RACES
ANNEX 5U - GUIDELINES FOR PRACTICE FLYING
ANNEX 5V - GUIDELINES FOR ORGANISERS

Note that within the Annexes, references to World and Continental Championships do not apply to F3R.

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ANNEX 5X

CLASS F3T – SEMI SCALE PYLON RACING MODEL AIRCRAFT WITH CONTROLLED TECHNOLOGY

5.X ***Intention:*** *This class is defined for semi scale pylon racing at a controlled level of technology in aircraft aerodynamic design, aircraft construction, propeller and power plant, with maximum safety.*

Rules strategy*: The technical rules have the intention that speeds will not increase substantially over the years in order to maintain safety and controllability of model pylon racing aircraft. This is achieved by a limitation to approved models of a semi scale type, approved and unmodified engines plus exhaust systems and approved , propeller dimensions and materials.*

The class is controlled by a special CIAM F3T Approvals Committee (F3T ApsCom) with a minimum of 5 experts from different countries, nominated by their NACs, which will advise on:

- *Approval of F3T models*
- *Approval of F3T engines*
- *Approval of F3T propellers*

The names of the members of the F3T ApsCom will be published on the F3 Pylon Racing page of the CIAM web site.

The F3T ApsCom works under the responsibility of the CIAM F3 Pylon Racing Subcommittee.

Approved models, engines and propellers will be published on the F3 Pylon Racing page of the CIAM web site.

The F3T rules and Annexes are similar to the F3D rules and Annexes (FAI Sporting Code section 4 – Aeromodelling Volume F3 Radio Controlled Pylon Racing) except for the technical specification of the models

5.X.1 Definition of Radio Control Pylon Racing Model Aircraft:

See 5.2.1

5.X.2 Technical Specifications of Pylon Racing Model Aircraft

See 5.2.2

The model aircraft must be a recognisable replica of a full-scale, human-carrying, propeller-driven aircraft, that either raced in, or was built for, close course or cross country racing or a speed record attempt. Delta or flying wing type aircraft are not permitted

Only models that have been approved by the F3T ApsCom are permitted.

For details of the approval procedure and criteria see Annex 5.X.A1.

5.X.3 Weight

Weight, less fuel but including all equipment necessary for flight, shall be at least 1800 g and not more than 2200 g. If ballast is used it must be permanently and safely affixed.

5.X.4 Fuselage

5.X.4.1 Depth and width

The fuselage depth shall be a minimum of 127.0 mm at its deepest point; except model aircraft from full-scale prototypes with belly-mounted radiators shall have a fuselage depth of at least 152.4 mm. Depth includes the radiator or belly scoop (if any) and the windshield canopy, pilot's head, or headrest, but does not include tail surfaces, dorsal or sub fins, tail skids, or non-scale protuberances.

The fuselage shall have a minimum width of 76.2 mm, the measurement to be that of the fuselage body and to exclude any fins, fillets, attachments or spacers. Width and depth points do not need to coincide.

5.X.4.2 Cross-sectional shape and features:

At some point the fuselage will have a minimum cross sectional area of 80.7 cm² excluding fillets and cheek cowls and competitors shall provide templates to prove this. Fillets are not considered part of the fuselage or lifting surfaces.

(a) Profile representations of any significant feature of the full-scale prototype are prohibited. Cross-sectional contours at the height and width measurements and at stations determining the likeness to the full-scale prototype shall maintain the integrity of the contours in the full-scale prototype. The only exception permitted shall be in the engine compartment for maintenance purposes.

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(b) Cockpit, cheek cowls, canopy, and belly scoop, if any, shall have at least a 15.9 mm radius at their widest point so that a 31.7 mm diameter ball (pilot head in the cockpit) would fit inside, tangent to the outer surface. A cockpit, cowl, canopy, or scoop with an oval or rectangular cross-section and corners of less than 15.9 mm radius satisfies this requirement if the hypothetical 31 diameter ball would be fully enclosed. The cockpit need not be transparent and a dummy pilot's head need not be fitted.

(c) The front end of the fuselage shall be configured so that the engine head and cylinder protrude and are fully exposed for at least 19.0 mm, not including the glow plug, and the exhaust system which is fully exposed for its entire length. However, the fuselage may incorporate a shallow channel, dimple or trough to provide clearance for the exhaust system. In addition, the access hole for the engine crankcase and mounting lugs may be covered with a piece of fibreglass, Mylar, or other stiff material that restores the original contours of the fuselage in that area.

5.X.5 Lifting Surfaces

5.X.5.1. Area of wing

The total projected area of the wing surface shall be a minimum of 25.8 dm².

5.X.5.2 Wing Span

The maximum wing span shall be 1422.4 mm.

5.X.5.3 Wing Thickness

The wing thickness at 75 mm from the wing centre shall be at least 22.2 mm. The thickness shall progress uniformly in a straight line or convex taper from root to tip; except that, if the full-scale prototype has a different progression, the progression on the model must be similar. The wing taper, in addition to other distinctive design features, is subject to the design approval requirements.

5.X.6 Engine

The engine must be of the single cylinder reciprocating piston type, with a maximum total swept volume of 6.60 cm^3. Propellers must rotate at the speed of the crankshaft. The engine shall have only one front air intake and one side exhaust.

Only engines approved by the F3T ApsCom are allowed. See annex 5.X.A1 for engine approval procedures and criteria.

Engine air intake shall be circular with a maximum diameter of 9 mm.

No modifications to the following parts of the engine are allowed other than as specified in 5.X.A1.3.

- crankshaft
- crankcase;
- cylinder,
- piston, conrod, piston pin
- cylinder head,
- technology of the bearings. (Only standard size, single row, full steel ball bearings allowed for the crankshaft and only plain bearings allowed in the con rod).
- crankcase back plate.

5.X.7 Exhaust system:

(a) General description: The engine shall be equipped with an expansion chamber muffler, zero-boost muffler, or tuned muffler as provided by the manufacturer for the engine being used, and having a single exhaust outlet with a maximum outlet area of 40.2 square millimetres (equivalent to the area of a round hole measuring 7.15 mm diameter).

(b) Inner configuration or tuned mufflers: A tuned muffler used in this event shall have only one internal part, a straight tube or extractor of the type commonly known as a "mini-pipe". The mini-pipe shall have a constant, circular cross section and constant inside and outside diameter, with the following exception: the sidewall of the tube may be thickened not to exceed 2 mm wall thickness, within 12.7 mm of the front end of the mini-pipe where it attaches to the header.

(c) Outside dimensions: The distance from the centre of the piston to the centreline of the muffler shall not exceed 70 mm. The overall length of the muffler shall not exceed 185 mm, measured from the front of the header to the back of the exhaust outlet. The outside diameter shall not exceed 45 mm and both the inside and outside diameter of the outside shell of the muffler shall remain constant for at least 75 mm.

(d) Modifications: No modifications to the muffler, as provided by the manufacturer, are permitted except that the muffler may be tapped for a pressure fitting to supply pressure to the fuel system.

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5.X.8 Fuel pressure

If the tank is pressurised, only pressure from the exhaust system is permitted.

5.X.9 Propellers and spinners

5.X.9.1 Propellers must be two-bladed with fixed blades. The blades must be of equal length, area, and shape. Composite resin continuous fibre construction propellers and metal propellers are not allowed.

Material:

Either wood or a chopped carbon fibre filled injection-moulded compound.

The material of injection moulded propellers needs approval of the F3T ApsCom,

Wood propellers may be modified from a commercial product or may be home made. A wood propeller shall be made from a single piece of wood and may be finished with a clear coating for the purposes of waterproofing or balancing only.

Dimensions:

Wooden propellers: no limits.

Injection moulded propellers: only commercially available stock carbon filled injection moulded propellers are permitted.

The propeller shall have a minimum diameter of 7.4" (188 mm).

Only propellers approved by the F3T ApsCom may be used. A propeller once approved shall be eligible for competition so long as it remains commercially available.

When the production of an approved propeller type is terminated, this will be marked on the web site by adding the date of production termination. Such propeller type can be used for two more years after this date.

Only propellers that carry the manufacturer's type and dimension are permitted. The recommended rpm limit for this type as given by the manufacturer must not be exceeded during flights.

See annex 5.X.A1 for propeller approval procedures and criteria.

Note: The approval of a propeller refers only to the manufacturer and type. Under no circumstances can the F3T ApsCom be held responsible for the safety of an individual propeller.

In all cases, it is the competitor's responsibility to ensure that any propeller he uses is safe..

Damaged propellers must not be used.

Changes to the propeller blades are not permitted, except for:

a. One blade may be sanded on the top (front) side only for balancing.
b. One side of the hub may be sanded for balancing.
c. The shaft hole may be enlarged, but only as much as necessary to fit the engine crankshaft. The enlarged hole shall be concentric with the original hole.
d. Edges and tips may be sanded, but only as much as necessary to remove sharp moulding flash.

5.X.9.2 A rounded nose spinner of at least 25 mm diameter, with a nose radius of not less than 5 mm (ABR B.19.4) must be fitted. The spinner shall be made of metal only.

5.X.10 Landing gear.

a) Location and size: the landing gear shall be fixed and shall resemble that of the full-scale prototype aircraft as to location on the airframe and the number of wheels used. At least two (2) of the wheels shall have a diameter of at least 2¼ inches.

b) Streamlining: wheel spats, or strut fairings are not required and are permitted only if they were used on the full-scale prototype.

Only non retractable landing gears are permitted.

A tail skid may be used in lieu of a tail wheel.

A positive means of steering on the ground shall be provided; rudder control is acceptable.

5.X.11 Shut-off

See 5.2.9

5.X.12 Fuel .

The fuel will consist of 60-80% methanol, a minimum of 18% oil, (wherein a minimum of 3% is castor oil) and will contain not more than 15% nitromethane. All percentages by volume. The fuel

composition (or commercially available type of the fuel) shall be announced in the invitation of the competition and will be supplied and dispensed by the organizer.

In case an organizer supplies fuel without nitromethane, see 5.W.6 for air intake diameter.

**Note:* *Synthetic oils must have a sufficient high temperature resistance and have to be of a type with a flash point >200 degrees C and a flame point >270 Degrees C.*

Reference products: Ucon MA 731, Aerosynth3, Klotz types 100, 104 (R50), 200.

Adding 3-5% of Castor oil is recommended for maintaining lubrication at very high temperatures (during lean runs) and also to make it possible to "read" the setting of the engine from the colour of the glow plug after a run.

5.X.13 Technical checks and safety requirements
See 5.2.11

5.X.14 Competitors
See 5.2.12

5.X.15 Helmets
See 5.2.13

5.X.16 Transmitter and frequency check
See 5.2.14

5.X.17 Race Course, Distance and Number of Rounds
See 5.2.16

5.X.18 Race from Start to Finish
See 5.2.17

5.X.19 Timekeeping and Judging
See 5.2.18

5.X.20 Infringements and Penalties
5.2.19

5.X.21 Scoring and Classification
See 5.2.20

Note: 5.2.20.2 does not apply to F3T.

Annexes

The following F3D annexes also apply to F3T:

ANNEX 5Q - GUIDELINES FOR AIRFIELD LAY-OUT,

ANNEX 5R - GUIDELINES FOR DUTIES OF PERSONNEL

ANNEX 5S - GUIDELINES FOR TECHNICAL EQUIPMENT

ANNEX 5T - GUIDELINES FOR DRAW OF RACES

ANNEX 5U - GUIDELINES FOR PRACTICE FLYING

ANNEX 5V - GUIDELINES FOR ORGANISERS

Note: Within the annexes, references to World and Continental Championships do not apply to F3T.

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ANNEX 5.X.A1

APPROVAL PROCEDURES AND GUIDELINES FOR F3T MODEL AIRCRAFT, ENGINES AND PROPELLERS

5.X.A1.1 F3T Approvals Committee Procedures

The F3T Approvals Committee shall be appointed by the Chairman of the CIAM F3 Pylon Racing Subcommittee after consultation with the members of the CIAM Pylon Racing Subcommittee. The names of the members of the F3T ApsCom will be published at the F3 Pylon Racing page of the CIAM web site.

The task of the F3T ApsCom is to approve models, engines and propellers for F3T Pylon Racing. It is also responsible for the publication of data on the F3 Pylon Racing page of the CIAM web site.

The procedure for approval is as follows:

a) All technical documentation of a model, engine or propeller must be sent to the chairman of the F3T ApsCom at the address published on the F3 Pylon Racing page of the CIAM web site.. In the case of engine and propeller, a sample must be sent together with this documentation.

b) The Chairman of the F3T ApsCom will judge whether the information given by the manufacturer is sufficient and shall, within a period 30 days, inform him if any additional information is necessary.

c) After receipt of all information, the Chairman of the F3T ApsCom shall distribute all relevant technical information to all the F3T ApsCom members.

d) The F3T ApsCom will, within a period of 60 days after receipt of the complete documentation, make a decision for approval or not, as the case may be. This decision will be made by simple majority. In the case of a tie, the F3T ApsCom Chairman will have a casting vote.

e) All approved models, engines and propellers will be published on the F3 Pylon Racing page of the CIAM web site.

f) Only approved models, engines and propellers may be used in competition.

5.X.A1.2 Approval of Models:

All designs, past and future inclusive, shall be submitted, with three (3) accurate views or photographs of the model aircraft and the full-scale prototype aircraft and photographs of the parts, or a finished model aircraft, to verify that the model satisfactorily reflects the supplied drawings.

In the case of unusual or little known designs, the designer must produce documentation to confirm that such a design did exist. A model shall be approved if it meets all the dimensional requirements of these rules and, in addition, does not vary significantly from the approved three views or photographs of the prototype.

Models will be approved with a two-step process:

a) The first step will be to review drawings of the model aircraft and to decide whether the drawn model design can be accepted as a recognisable replica of the full size aircraft.

b) The second step of the approval process, will be to review photographs of the parts or a finished model may be supplied for the F3T ApsCom to verify that the model aircraft satisfactorily reflects the previously approved drawings.

Dimensions which are not easily inspected at a contest event will be verified to meet the requirements of the rules. These dimensions are the cross section area and the wing area if a complex outline shape is used eg an elliptical plan form, etc.

The judgement of whether a model aircraft can be recognised as a replica of the full scale aircraft upon which it is based is in the similarity of the below listed features when the model aircraft is compared to the full scale aircraft. By “similar” it is meant that if the full scale aircraft has a convex curve on a particular feature, the model aircraft should not be flat or concave. The model aircraft and documentation of the full scale aircraft should be able to be compared side by side and for the model aircraft to be recognised as a replica of the full scale aircraft.

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Wing:

Plan form outline shape is similar to full scale.

Leading edge and trailing edge taper (sweep) angle.

Tip leading edge and trailing edge corner radii.

Tip Angle.

Landing Gear:

Mounts to airframe are in similar locations to those on the full scale aircraft (ie mounts to wing or mounts to fuselage, etc.).

Horizontal or Vertical-Stabiliser:

Plan form outline shape is similar to full scale.

Leading edge and trailing edge taper (sweep) angle.

Tip leading edge and trailing edge corner radii.

Tip Angle.

Vertical Stabiliser:

Outline shape is similar to full scale.

Leading edge and trailing edge taper (sweep) angle.

Tip leading edge and trailing edge corner radii.

Tip Angle.

Horizontal or Vertical -Stabiliser Position:

Fore - aft position is relative to the vertical stabiliser.

Side View

Overall outline of fuselage.

Wing and stabiliser location is relative to the thrust line.

Cockpit area shape and position.

Fuselage top view, nose area:

Forward fuselage plan view form should replicate the shape of the full scale aircraft for a recognisable distance.

Prior approval:

See the F3 Pylon Racing page of the CIAM website.

5.X.A1.3 Approval of Engines

The F3T ApsCom will approve engines according to the criteria listed below.

All future engines must be approved by the F3T ApsCom and a sample of each approved engine and replacement part (or combination thereof) will be retained by the F3T ApsCom Chairman for reference.

One of the fundamental principles of F3T racing is that the engines that are used do not differ significantly in performance and technology that significantly increases the price of engines (reference year 2013) is not permitted.

Note: For more information see the F3 Pylon Racing page of the CIAM website.

Design features

Engines for F3T can only be approved if they show the following design features:

a) Single cylinder reciprocating piston type, with a maximum total swept volume of 6.60 cm^3. (Rule 5.X.6)
b) Propeller must rotate at the speed of the crankshaft.(5.X.6)
c) Only one front air intake and one side exhaust.(5.X.6)
d) A removable cylinder sleeve. The outside diameter of the cylinder sleeve shall be less than 26 mm over more than 0.875 of its length.
e) Crankshaft passage diameter not more than 12.7 mm.
f) Standard size, full steel, single row ball bearings for the shaft.
g) Plain bearings for the con rod.
h) Materials to be used: only steel alloys, aluminium alloys, copper, brass and plastic. No Beryllium content over 5% allowed in any of the alloys.

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i) Only the following surface coatings are allowed:
j) Chrome or nickel coating types on the cylinder sleeve.
k) Anodising of aluminium parts.

An engine manufacturer is only permitted one approved engine in any 36 month period.

Incremental upgrades during this approved period are permitted but restricted to a maximum of two items from the list below and must be made at the beginning of any 12 month phase of the approved 36 month period.

Incremental upgrades must be approved by the F3T ApsCom.

Upgrade parts

a) Crankshaft
b) Crankcase
c) Cylinder
d) Piston and connecting rod
e) Cylinder head
f) Bearings
g) Crankcase back plate

It is necessary that new engines and replacement parts are commercially available.

For approval to be granted, engines must be produced in quantities of at least 25 complete engines within the first year of production. Approval shall be withheld or withdrawn if this production quantity cannot be substantiated to the F3T ApsCom.

If an approved engine is not replaced after the 36 month period, then the 12 month incremental upgrade period may continue. The manufacturer may submit an engine for approval at any time after the 36 month period expires and if approval is granted then the 36 month period starts again for the new engine.

All previously approved engine combinations remain eligible, unless prohibited by a subsequent rule change.

In exceptional circumstances such as matters relating to safety, additional upgrades maybe submitted to the F3T ApsCom for approval at any time.

Prior approval:

See the F3 Pylon Racing page of the CIAM website.

5.X.A1.4 Approval of propellers.

Only propellers of the carbon filled injection moulded type shall be approved.

The propeller manufacturer must certify that the propeller is fit for purpose.

The safe working rpm must be at least 30,000 and declared as such by the manufacturer.

Approval is considered temporary and continued approval is dependant on the manufacturer informing the F3T ApsCom if propeller material or dimensional specifications change that will cause potential changes in performance. The F3T ApsCom is then required to determine if the propeller still conforms to the rules. If it does then it will inform the manufacturer of the continued approval. The F3T ApsCom shall have 60 days to make this determination and notification.

The F3T ApsCom shall require 3 sample propellers from the manufacturer for testing under flying conditions.

The type and dimensions must be indicated on the propeller by the manufacturer.

Note: The approval of a propeller refers only to manufacturer and type.

The F3T ApsCom or CIAM shall not accept any responsibility or liability related to the safety of an individual propeller. The competitor is in all cases responsible that a propeller can be used safely. The use of propellers with even small damage may be of high risk.

Prior approval:

APC propellers with part numbers in the family LP07xxxC, where "x" signifies the three numbers indicating diameter and pitch, are already approved.

Guideline for Manufacturers

Moulding materials shall have physical properties (including tensile strength and other industry standard properties) equivalent to or exceeding that of Ticona Celstran PA6-CF35-15 for temperatures ranging from 0 to 60 degrees Celsius.

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