



# **FAI SPORTING CODE**

## **Section 4 – Aeromodelling**



**Volume F9**  
**Drone Sports**

2026 Edition - Version 1.0  
Effective January 1st 2026

## In this volume:

DRONE RACING WORLD CUP RULES

F9A (Provisional class) - DRONE SOCCER RULES

F9U (Official class) - DRONE RACING RULES

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Link to [FAI Statutes and By Laws](#)

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## Revisions

This 2025 edition includes the following Amendments made to THE 2024 VOLUME

These amendments are marked by a double line in the right margin of this edition

Paragraph	Date of change	Brief description of change	Change incorporated by
<b>C. F9U rules</b>	Changes effective 1 <sup>st</sup> May 2025	F9U official class instead provisional class.	Bruno Delor S/C Chairman
C.1. General specifications for models		Introduction of requirement to get the models equipped with a pit mode. Additional improvements of the wording.	
C.1.5. Video system		Modification of the requirements: Mention that failure to comply the VTX 25 mW power emission may result in penalties up to and including disqualification from the event. Additional improvements of the wording.	
C.2. Racing circuit		Removal of the 'open loop' option for a racing circuit (Only 'close loop' with 3 laps to complete recognised). Adding in that paragraph of provisions regarding the start part of the circuit to replace those actually defined in the Annex C.1. Additional improvements of the wording.	
C.5. Track walk - Practice flights		Introduction of a track walk before the practice flight session, and of possibility to plan a practice flight round at the beginning of a competition day other than those for which qualification round(s) are planned. Additional improvements of the wording.	
C.6.1. Timekeeping		Deletion of possibility of manual timekeeping. Additional improvements of the wording.	
C.6.2. Start of the race		Interval of 3 s. to start the race after the starter announces "Pilots arm your quads" replaced by 2 to 4 seconds with possibility to be different for each race. Introduction of possibility for a restart in situation of a mid-air collision between models before the first gate. Clarification of the situation of a model leaving its start position before the start. Mention that failure to stop after being disqualified for a false start may conduct to a disqualification from the event.	

		Additional improvements of the wording.	
C.6.3. Qualification stage		Introduction of the obligation for the organiser to announce before the event how many qualifying rounds are expected to be held.  Additional improvements of the wording.	
C.6.4. Elimination stage		Clarification.	
C.6.5. Final stage		Clarification and improvement of the wording.	
C.6.6. Additional rounds optional sequence		Introduction of flexibility for the organiser to choose how to run an additional rounds sequence.	
C.7.3. Crash		Clarification resulting from the introduction in paragraph C.1. of the obligation to equip the models with a pit mode.	
C.8. Reflights		Introduction of possibility of a full race restart for the elimination stage; final stage and additional rounds sequence.  Additional improvements of the wording.	
C.9.2. Disqualification from the event		Mention of all situations defined in the class rules which may justify a disqualification from the event.	
C.10.2. Officials required to run the event		Removal of the note regarding timekeepers consequently to the deletion of the possibility of manual timekeeping.	
C.10.3. Judges		Removal of the requirement that a judge will not judge competitors from their own country by considering this is not realistic for CAT2 events.  Addition improvements of the wording.	
C.12. Competitors information		Clarification.	
Annex C.1 Racing circuit		Removal of the paragraph 3 consequently to the introduction in the C.2. Racing circuit of specifications regarding the starting part of the racing circuit. Renumbering of the following paragraphs of the Annex.  Correction of a typing error paragraph 3. Obstacles	



#### Four-Year Rolling Amendments for Reference

Paragraph	Date of change	Brief description of change	Change incorporated by
<b>B. F9A rules</b>	Changes effective 1 <sup>st</sup> January 2024	Rewording of the preamble describing what Drone Soccer is.	
B.1. Drone ball general specifications		Clarification of the software recovery modes permitted.  Mention that the checking of a drone ball to ensure it fits the specifications may be done to any time during the event.	
B.1.1. Weight and size		Requirement for the protective frame to be plastic or composite material, but not from metal.  Removal of the -2 cm tolerance for the diameter of the drone ball spherical protective frame with mention for each subclass of the diameter of the circle in which the protective frame must fit.	
B.1.2. Motorization		Mention that the voltage measurement of the battery pack may be done before each set, and not only before the beginning of the match.	
B.1.5. LED light devices		Clarification and specifications for the LED light devices to be installed on the drone balls.	
B.1.6. Scorer drone ball (Striker)		Introduction of the possibility to request to attach a ribbon at the bottom of the scorer drone ball.	
B.2.2. Flying zone - Protection cage		Redrafting to better take into consideration for the flying zone the two diameters of drone balls. Introduction of specifications for the protection cage.	
B.3. Goal rings		Rewording to better take into consideration the two diameters of drone balls.	
B.4. Players		Precisions regarding the number and role of the active players.  Restriction of the team to the players (coach no mote taken into account for the team). 2 players autorised in the team in addition to the number of active players defined.	
B.8.2 Start of a set		Clarification of an early start (drone ball leaving the ground before the start signal).	
B.8.4. Scoring		Replacement of the match referee by the scoring referee to decide if the goal may be scored.  Clarification how to proceed after a stiker scores a goal.	
B.8.6 Set and match result		Clarification that a team which wins two sets is the winner of the match.	

B.9.2. Warning		Adding of unintentional contact during a set of a flying drone ball on a drone ball which is on ground.	
B.9.3. Yellow card		Adding of intentional contact during a set of a flying drone ball on a drone ball which is on ground.	
B.12.2. Referees		Assistant referees changed as scoring referees. Mandatory appointment of scoring referees, and match referees appointed where appropriate.	
B.12.2.2. Match referee		Replacement of "main referee" by "match referee".	
B.12.2.3. Goal referee		Replacement of "assistant referee" by "scoring referee". Replacement of "main referee" by "match referee".	
<b>C. F9U rules</b>		Name of the class changed to 'Drone Racing' (Removal of 'RC Multi-rotor').	
C.1. General specifications for models		Clarification of the software recovery modes permitted.	
C.1.2. Motorization		Removal of the rule for the specific case of a tri-copter.	
C.1.3. Number of models		Clarification regarding the number of models which may be used during the entire event.	
C.1.5. Video system		Requirement that the video receiver system provided by the organiser must be compliant with analogic and digital video transmitters considering analogic and digital video devices may be used together in any event. Modification of the video transmitter requirements.	
C.1.6. LED light device (Optional)		Introduction of specifications for the LED light unit instead to require the organiser to define a list of authorised LED light devices.	
C.1.7. Identification mark		Requirement for the letters and numbers to be readable (unaided) at arm's length instead a 6 mm height which is difficult to check.	
C.4. Model registration and processing		Adding of a paint mark as a possible identification for the registered models.	

Paragraph	Date of change	Brief description of change	Change incorporated by
C.5. Practice flights	Changes effective 1 <sup>st</sup> January 2024	Removal of the last sentence relative to a practice session flown before the first race of the competitors considering this is not recommendable and no more applied.	

C.6. Event organisation	<i>(continued)</i>	Maximum 4 competitors per race mandatory instead to be recommended.  Races with 3 laps to complete and 3 minutes flight time defined as the standard way to proceed for the entire event.	
C.6.1. Timekeeping		Laps which are not finished will no more be considered and contribute to a result, placing or tie-breakers.  Timekeeping triggering more precisely detailed.	
C.6.2. Procedure for the start of the race		Allocation of 2 minutes maximum to be ready to start after the models have been placed on the start area.  Rewording of the last sentence concerning the situation of pilot(s) starting before the start signal.	
C.6.3. Qualification stage		Rewording of both options for the qualification stage taking into account that races are based on 3 laps to complete and 3 minutes flight time.	
C.6.4. Elimination stage		Competitors not finishing their flight ranked in the race considering their number of laps completed and the corresponding registered time.	
C.6.6. Additional rounds optional sequence		Rewording taking into account that races are based on 3 laps to complete and 3 minutes flight time.	
C.7.3. Disqualification from the race		Removal in order to include a new paragraph C.9. Disqualification.  Consequent renumbering of the paragraphs C.7.4 and C.7.5.	
C.7.3. Crash (ex C.7.4)		Deletion of the first sentence which is considered ambiguous and not necessary.	
C.8. Reflights		Deletion of the note which is no longer relevant.	
C.9. Disqualification		Inclusion of a new paragraph to resume cases for disqualification from the race mentioned before in C.7.3 and for disqualification from the event.	
Annex C.1 Racing circuit		Introduction of a note not to recommend small gates/obstacles.	

Paragraph	Date of change	Brief description of change	Change incorporated by
<b>A. Drone Racing World Cup rules</b>	Changes effective 1 <sup>st</sup> January 2023		Bruno Delor S/C Chairman
A.2.2. Masters World Cup Series		CIAM being now entirely responsible of Drone Sports, CIAM Bureau is the appropriate body to select the Masters events.	

A.3. Participants		Change to allow more flexibility for participation in Masters events.	
A.5. Classification		Correction to be coherent with the change introduced in the 2022 edition.	
A.9. Responsibilities of the event organiser		CIAM form is no more the reference for registration of the events which is now done with the AMS.	
A.10. World Cup Board		Clarification of the wording.	
<b>B. F9A rules</b>			
B.1. Drone ball general specifications		Removal of the 1 % tolerance for inaccuracy of the measurements devices.	
B1.2. Motorization		For F9A-B subclass, 3S extended to 4S.	
B1.4. Radio control (RC) equipment		Clarification of the wording.	
B.1.5. LED light device		Clarification of the wording.	
B.3.1. Shape and dimensions		Simplification for F9A-B to improve accessibility of this subclass.	
B.3.4. Detection sensor		To allow sensor technology development and to coincide with B.8.4.	
B.4.1. Active players		Clarification of the team captain role during the active play.	
B.8.4 Scoring		Clarification in order to facilitate the scoring of a goal.	
B.8.5. Safety occurrence		Clarification of the situation of a drone ball no more in situation to fly in safe condition.	

Paragraph	Date of change	Brief description of change	Change incorporated by
B.9. Penalties	Changes effective 1 <sup>st</sup> January 2023 (continued)	Introduction of the possibilities to stage the penalty shots(s) at the end of the set.	Bruno Delor S/C Chairman
B.9.3. Yellow card & B.9.4. Red card		Change in order to punish a player instead the complete team.	
B.11. Disqualification from the event		Clarification of the wording.	
B.12.1. Event director		Clarification of the wording.	
B.12.3. Jury		Correction for a FAI event and coverage of an event not included in the FAI Contest Calendar.	

C. F9U rules		
C.1. General specifications for models		Removal of the 1% tolerance for inaccuracy of the measurements devices.
C.1.2. Motorization		Removal of the note considering with the experience it does not look necessary to consider a maximum amount of energy which may be used for the race.
C.1.4. Radio control (RC) equipment		Simplification of the wording (not necessary to refer to the CIAM General Rules).
C.1.5. Video system		Clarification of the wording for the DVR to avoid restriction for the choice of a recording equipment by the organiser.  Mention of the possibility to allow analog and digital video devices in the same race. Specification for the digital video devices of a maximum 25 mW power emission and 25 Mbps.  Simplification of the wording (not necessary to refer to the CIAM General Rules).
C.1.6. LED light device (Optional)		Mention of the possibility for the organiser to define a list of authorised LED light devices with removal of recommended specifications.
C.3. Number of models		Limitation of the possibility to change a model for a race.
C.4. Model registration and processing		Limitation of the possibility to register an additional model.  Clarification of the wording.
C.5. Practice flights		Limitation to one one mandatory practice/warm up.
C.6 Event organisation		Removal of the reference to reflights for elimination and final stages.
C.6.1. Timekeeping		Mention in that paragraph of all provisions concerning timekeeping.
C.6.2 Procedure for the start of the race		Limitation of the situations in which the start must be stopped.
C.6.3 Qualification stage		Clarification of the wording.
C.6.5. Final stage		Replacement of the actual optional way to proceed which is too much sophisticated and difficult to understand.
C.6.6. Additional rounds optional sequence		Clarification of the wording due in particular to the introduction of a race director.

C.7.2. Faults and penalties		Simplification of the the wording and removal of the possibility of a reflight for a pilot whose model had been collided into.	
C.7.3. Disqualification from the race		Clarification of the wording.	
C.7.4. Crash		Clarification of the wording.	
C.7.5. Safety occurrence		Consideration of serious safety issue circumstances. Clarification of the wording.	
C.8. Reflights		Individual reflights restricted to the qualification stage.	
C.9.1. Jury		Correction for a FAI event and coverage of an event not included in the FAI Contest Calendar.	
C.9.2. Officials to run the event		Addition of a race director.	
C.9.3 Judges		Removal of the obligation of judges assigned to the pilots. Clarification of the wording.	
C.10. Interruption of the event		Clarification due to the introduction of a race director.	
C.11. Competitors information		Clarification of the wording.	

Paragraph	Date of change	Brief description of change	Change incorporated by
<b>A. Drone Racing World Cup rules</b>	Changes effective 1 <sup>st</sup> March 2022		Bruno Delor
A.5. Classification		Sum of the best 3 (instead 4) event results considered for the World Cup competitors' score.	S/C Chairman

Paragraph	Date of change	Brief description of change	Change incorporated by
<b>B. F9A rules</b>	Changes effective 1 <sup>st</sup> January 2021		Bruno Delor
B.1.1. Weight and size		Subclass F9A-B: Weight of the drone ball increased to 300 g (instead 200 g actually).	S/C Chairman

#### RULE FREEZE FOR THIS VOLUME

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

For official classes, a period of two years of no changes to model aircraft/space model specifications, manoeuvre schedules and rules will be strictly enforced. For an official class with championship status, changes may be proposed in the year of the World Championship.

Provisional classes are not subject to this two-year rule cycle.

This means that for the Volume F9:

- a) changes for F9U class can next be agreed at the Plenary meeting 2026 for application from January 2027;
- b) provisional class F9A is 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.

## A. DRONE RACING WORLD CUP RULES

### A.1 CLASS

*The FAI provisional class F9U is recognised for the Drone Racing World Cup.*

### A.2 EVENTS

*The Drone Racing World Cup is based on two series of events: Challenger and Masters.*

*All Drone Racing World Cup events will be considered as Second Category events as defined in FAI Sporting Code General Section.*

*Those events will be published on the FAI Calendar and must be run according to the FAI Sporting Code.*

#### A.2.1 CHALLENGER WORLD CUP SERIES

*Only Open International events may be considered for the Challenger World Cup Series.*

*The selection of the events for the Challenger World Cup Series is made by the Drone Sport Subcommittee Chairman. Wherever possible, the selection for a particular year will be made before the end of the preceding year. In duly justified cases, an event can be added after this date at the discretion of the Drone Sport Subcommittee Chairman.*

*A maximum of two events may be selected for any country on its own behalf unless the country extends over more than three time zones; in that case, one event may be selected within each time zone of the country with a maximum of four events for the country on its own behalf.*

*A country may choose to run a Challenger World Cup event at a venue in another country provided that the registration of the event on the FAI calendar is submitted by the organising country and the name of the organising country is included in the title of the event. Any country may host one event maximum on behalf of another organising country regardless of whether or not the host country extends over more than three time zones.*

#### A.2.2 MASTERS WORLD CUP SERIES

*The selection of the events for the Masters World Cup Series will be made by the CIAM Bureau.*

*Wherever possible, the selection for a particular year as Masters World Cup event will be made before the end of the preceding year.*

### A.3 PARTICIPANTS

*Any person holding a valid FAI Sporting Licence or FAI Drone Permission may participate in a World Cup event and so be eligible for the World Cup ranking.*

*Participation in the Masters World Cup events may be restricted to qualified competitors considering the current World Cup ranking. The current World Cup ranking will be based on a sliding 12 months period.*

## A.4 POINTS ALLOCATION

In any event, points for the World Cup will only be allocated if the competitors have flown from at least two different countries. For a country which extends over more than three time zones, every time zone will be considered as equivalent to a country.

Points allocated to each competitor depend of the placing in the event of the concerned competitor.

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

The points allocated to competitors will depend on the number (N) of competitors who have effectively flown in the event.

Points are allocated as follows to the competitors who have effectively flown in the event.

### a) $N > 40$

Placing	1	2	3	4	5	6	.....	40 and after
Points	40	39	38	37	36	35	.....	1

### b) $N = 40$ or $N < 40$

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

In addition, bonus in points will be awarded for the best placed competitors.

For any Challenger World Cup event, bonus in points is awarded to the three best placed competitors as follows:

- 1<sup>st</sup> place =  $N/5$  rounded up to the nearest whole number with a maximum of 8 points.
- 2<sup>nd</sup> place =  $N/8$  rounded up to the nearest whole number with a maximum of 5 points.
- 3<sup>rd</sup> place =  $N/13$  rounded up to the nearest whole number with a maximum of 3 points.

For a Masters World Cup event, bonus in points is awarded to the eight best placed competitors as follows:

- 1<sup>st</sup> place =  $N/2.5$  rounded up to the nearest whole number with a maximum of 16 points.
- 2<sup>nd</sup> place =  $N/3$  rounded up to the nearest whole number with a maximum of 14 points.
- 3<sup>rd</sup> place =  $N/3.5$  rounded up to the nearest whole number with a maximum of 12 points.
- 4<sup>th</sup> place =  $N/4$  rounded up to the nearest whole number with a maximum of 10 points.
- 5<sup>th</sup> place =  $N/5$  rounded up to the nearest whole number with a maximum of 8 points.
- 6<sup>th</sup> place =  $N/7$  rounded up to the nearest whole number with a maximum of 6 points.
- 7<sup>th</sup> place =  $N/10$  rounded up to the nearest whole number with a maximum of 4 points.
- 8<sup>th</sup> place =  $N/20$  rounded up to the nearest whole number with a maximum of 2 points.

## A.5 CLASSIFICATION

The World Cup results are determined by considering the points obtained by each competitor in the World Cup events.



*For each competitor, only one World Cup event result per organising country may be considered for the World Cup placing (greater number of points for any organising country in which the competitor has scored in two events). For a country which extends over more than three time zones, one event may be counted for this organising country within each time zone of the country.*

*The total World Cup score of the competitor is the sum of his/her best three event results (numbers of points) for all World Cup events (Challenger and Masters).*

*The winner of the World Cup is the competitor with the greatest total score for the concerned year, and so on for the placing.*

*In the situation of a tie for first, second or third place, placing will be determined by taking into account for the competitors in question, their best fourth result, then if necessary, their fifth best result, and so on. If this does not separate the tied competitors, then the placing will be determined by considering the sum of the points that they obtained in each of the three events considered for their World Cup score multiplied by the number of competitors who have flown in the event concerned; the winner is the one with the greatest total thus calculated.*

## **A.6 AWARDS**

*The winner is awarded the title of World Cup winner for the concerned calendar year.*

*Medals, trophies, prizes, or certificates may also be awarded as available.*

## **A.7 ORGANISATION**

*Administration, collection of the results, calculation of the placing and regular publication of the current World Cup positions are normally done by the Drone Sport Subcommittee Chairman.*

*A dedicated World Cup Coordinator may be nominated. Such a nomination is done by the CIAM Bureau on proposition of the Drone Sport Subcommittee Chairman.*

## **A.8 COMMUNICATION**

*The World Cup results and placing could be distributed to the news agencies and also be available, by payment of a subscription, to any interested bodies or individuals.*

*Final results of the World Cup must be sent also to the CIAM with the annual report to be done by the World Cup Coordinator.*

## **A.9 RESPONSIBILITIES OF THE EVENT ORGANISER**

*The organiser NAC or the event organisers will request the inclusion in the World Cup at the registration of the event in the FAI application.*

*The selection of the events eligible for inclusion in the World Cup will be done from those proposals as specified in paragraph A.2.1.*

*Immediately after the event, the organiser must send the results in electronic form to the World Cup coordinator, at least within one month as required by the CIAM rules. Any failure to return results promptly will be reviewed when considering the events for inclusion in the World Cup for the following year.*

## **A.10 WORLD CUP BOARD**

*According to CIAM General Rules Volume C.7.4, a Board of three persons shall be nominated by the Drone Sport Subcommittee Chairman to rule on any issue concerning the implementation of World Cup rules during a year. Any such issue must be submitted in writing to the Subcommittee Chairman and the Board. The World Cup Board is not entitled to deal with any kind of complaint or protest concerning a single event, which must be considered by the FAI Jury for that event.*

## B. F9A (PROVISIONAL CLASS) - DRONE SOCCER RULES

*Drone soccer is a class which combines radio controlled drone flying with soccer.*

*Drone soccer is a team sport in which two teams play against each other to score in their opponent's goal ring with a dedicated drone ball.*

*The match between the two teams is subdivided into three periods of time, each period being considered as a set.*

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### B.1. DRONE BALL GENERAL SPECIFICATIONS

*The drone ball must be equipped with a fail-safe device, the activation of which stops the motors.*

*The following are strictly forbidden:*

- *Pre-programmed manoeuvring device.*
- *System for automatic positioning and/or path rectification in longitude, latitude or height.*

**Note:** Software recovery modes such as 'Flip over after crash' (also known as 'Turtle mode') or 'Crash recovery' and automatic system which can be activated by the pilot in order to level back the drone ball after a crash are permitted.

*Any drone ball may be checked by the organiser at any time during the event to ensure it fits the specifications.*

#### B.1.1 WEIGHT AND SIZE

*A spherical protective frame shall surround the drone ball. All the components of the drone ball must be placed inside the spherical protective frame. Nothing should protrude from this frame.*

*The protective frame can be from plastic or composite materials, but not from metal.*

##### a) Subclass F9A-A

*The total weight of the drone ball including all equipment necessary for flight (including outer frame and batteries) shall not exceed 1.2 kg.*

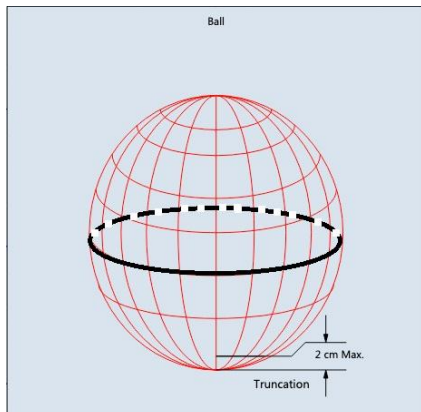
*The diameter of the protective frame at the point where the circumference is measured (see image below) must be 40 cm +2 cm. So, the protective frame must fit within a 42 cm diameter circle.*

##### b) Subclass F9A-B

*The total weight of the drone ball including all equipment necessary for flight (including outer frame and batteries) shall not exceed 300 g.*

*The diameter of the protective frame at the point where the circumference is measured (see image below) must be 20 cm +2 cm. So, the protective frame must fit within a 22 cm diameter circle.*

*For both subclasses, the frame may be flat at the bottom of the drone ball allowing the drone ball to remain steady on the ground. The flat section cannot be more than 2 cm high (See image below).*



Any individual open surface of the frame must be 150 cm<sup>2</sup> maximum.

**Note:** The above requirement is to the drone with an inadequate protective framework surrounding it. Although a lighter drone ball can offer better flying performance, a too light protective frame can adversely affect the game due to the damage of the drone ball resulting from collisions with other drone balls.

#### B.1.2 MOTORIZATION

Only electric motors are allowed.

The drone ball may be equipped with a maximum of four electric motors.

Battery pack allowed up to 6S for F9A-A subclass, and 4S for F9A-B subclass.

The voltage for each cell must not exceed 4.25 V when fully charged. This means a maximum voltage of 8.5 V for a 2S battery pack, 12.75 V for a 3S, 17 V for a 4S, and 25.5 volts for a 6S.

The voltage measurement of the battery pack may be performed before the beginning of each set.

#### B.1.3 PROPELLERS

Maximum diameter:

- 6 inches (15.2 cm) in F9A-A subclass.
- 3 inches (7.6 cm) in F9A-B subclass

Metal propellers are forbidden.

#### B.1.4 RADIO CONTROL (RC) EQUIPMENT

Every 2.4 GHz spread spectrum technology RC equipment may be used.

In order to limit risk of potential problems with unwanted interference during a match, the event director may define restrictions for use of RC systems equipment outside the playing field.

In case of use of non-authorized RC equipment, penalty going up to disqualification from the event of the concerned team may arise (See 0).

#### B.1.5 LED LIGHT DEVICES

In order the drone balls of each team could be clearly recognized during the match, red colour will be assigned to a team and blue colour to the other team. So, a LED strip must be installed on each drone ball, so it may be clearly visible from any angle.

#### Specifications for the LED strip:

- Minimum 40 individual LED elements for the 40 cm drone balls (F9A-A), and minimum 16 LEDs for the 20 cm drone balls (F9A-B).
- LED strip fixed on the circumference of the main frame which supports the motors,
- Capability to easily switch before the match to the colour assigned to the team concerned.

An additional LED light unit with a minimum of 6 LEDs will be installed on the rear part of each drone ball with capability to rapidly switch the colour.

The colour will be different for each drone ball to allow each active player to identify the position of his/her drone ball, and to permit differentiation of the different active players of the team.

Each team may choose their colours subject the colours are clearly distinguishable from one another, and not to consider the colour, red or blue, assigned to the team concerned. However, the colour for the drone ball of the Striker (scorer drone ball) will be blue for the red team, and red for the blue team.

#### B.1.6 SCORER DRONE BALL (STRIKER)

In order to increase recognition of the drone ball of the Striker (scorer drone ball) of each team, the organiser may request the Striker of each team to attach to the bottom of their drone ball a ribbon or thin material "flag" that will hang from the bottom.

## B.2 PLAYING FIELD

Drone soccer event may be organised indoor or outdoor.

The playing field is mainly composed of a flying zone and two pilots' areas (one for each team).

#### B.2.1 SURFACE

There are no precise specifications regarding the surface of an outdoor playing field, or the floor of an indoor arena or gymnasium.

The surface of an outdoor playing field must be sufficiently flat. In addition, an excessively hard surface, such as asphalt or concrete, should be avoided for the flying zone in order to minimize risk of damage to the drone ball when it touches the ground.

In case the surface of the flying zone is covered with a soft additional material, the organiser will take care a drone ball cannot sink in the coverage more than about one centimetre in order to avoid take-off problem. The organiser will also check that the 'spring effect' of the coverage will be limited.

#### B.2.2 FLYING ZONE - PROTECTION CAGE

The flying zone shall be a rectangle marked by continuous lines.

The flying zone must be protected with a cage. During the sets of a match, nobody may be inside the protection cage.

The following size for the flying zone and height of the protection cage are recommended:

- Subclass F9A-A: 14 meters for the longer side (A) and 7 meters for the shorter one (B) - 5 meters height (H) for the cage.
- Subclass F9A-B: 6 meters for the longer side (A) and 3 meters for the shorter one (B) - 3 meters height (H) for the cage.

If a different size is considered for the flying zone, the longer side of the flying zone must be twice the shorter one.

The flying zone is divided in two sides marked by a continuous centre line which joins the midpoints of the two longer sides. The centre of the flying zone (middle of the centre line) will be also marked.

Two areas for start and take-off of the drone balls (one for each team) will be marked inside the flying zone by continuous lines. Those areas will be positioned in the middle part of the baselines (shorter sides of the flying zone).

The length of the start area will be defined by taking in consideration the diameter of the drone balls for the subclass concerned, and the number of active players defined.

The width of the start area will be about 1.5 m for the subclass F9A-A, and no more than 1 m for the subclass F9A-B.

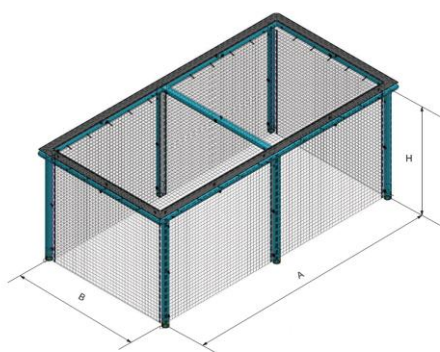
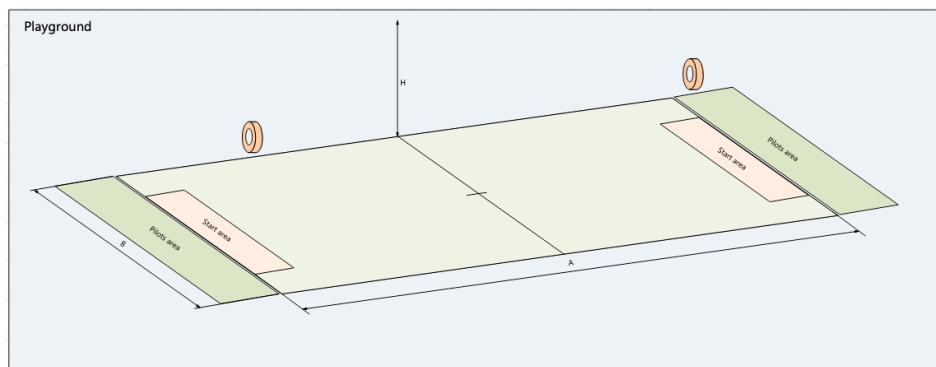
The location and size of the two start areas will be identical.

All marks on the ground shall be clearly visible using a colour distinguishable from the ground surface colour.

There shall be no obstacle(s) on the flying zone which may hinder the game.

Hard parts of the protection cage must be covered with a shock absorbing material to protect the drone balls.

When more than one playing field is used in a tournament, the size of the different playing fields and dimensions of the protection cage will be identical.



### B.2.3 PILOT'S AREA

The pilot's areas (one for each team) will be located outside the protection cage on its shorter sides as defined on the following image.

The location and size of the two pilot's area in each side will be identical.

Each pilots' area will be marked.

During the sets of a match, only the players who are effectively flying (active players) may be in the pilot's area.

### B.3 GOAL RINGS

The flying zone will be equipped with two goal rings (one for each team).

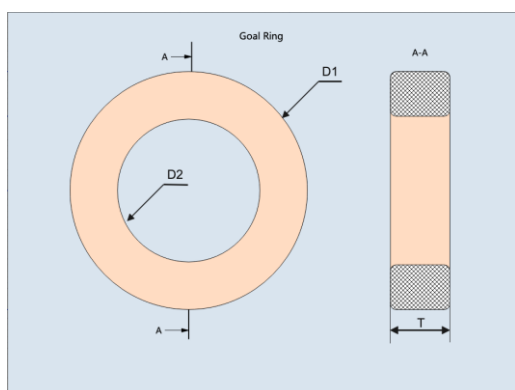
#### B.3.1 SHAPE AND DIMENSIONS

The goal ring will be circular

The goal ring must be stable. The shape and dimensions of the goal rings must be identical for both teams competing.

The following dimensions are recommended:

- Subclass F9A-A: External diameter (D1) 100 cm - Internal diameter (D2) 60 cm - 20 cm maximum thickness (T)
- Subclass F9A-B: External diameter (D1) 70 cm - Internal diameter (D2) 40 cm - 10 cm maximum thickness (T)



For each subclass, when more than one playing field is used in a tournament, the goal rings of the different playing fields must be identical.

#### B.3.2 POSITION

The goal ring will be positioned at 1.5 m inside the baseline (shorter sides of the flying zone) for the subclass F9A-A, and 1 m for the subclass F9A-B.

The goal rings must face the centre of the flying zone and be parallel to each other. They will be fixed on the ceiling of the protection cage taking care to ensure a secure fixation to avoid oscillation of the goal ring and that they may fall down.

The location and positioning of the two goal rings will be the same in both sides of the playing field.

#### B.3.3 MATERIAL AND STRUCTURE

The material must be strong enough to minimize risk of damage or deformation that may affect the game, but sufficiently flexible to avoid damages on the drone balls.

One goal ring will be red and the other one blue in order to be compliant with the colours assigned to the teams. It is also possible to use lighting units on the goal rings to increase their visibility.

### B.3.4 GOAL DETECTION SENSOR

*For electronic scoring, a detection sensor may be installed on each goal ring provided this does not interfere with the scorer drone ball crossing the goal ring.*

**Note:** *In case of electronic scoring being used, teams shall be informed about position of the goal detection sensors before the match begins.*

## B.4 PLAYERS

### B.4.1 ACTIVE PLAYERS

*Drone soccer is played with 3 to 5 active players in both subclasses. There will be the same number of active players for each team at the beginning of the match.*

**Note:** *The number of active players must be defined by the organiser when announcement of the event is made.*

*Every active player is flying a drone ball. One active player is designated as the Striker who is the only player who may score with his/her drone ball going through the opponents' goal ring. The other active players may act with their drone ball as a guide for the Striker and/or as a defender for their own goal.*

*Any active player may only control one drone ball. So, the number of drone balls in flight for each team cannot be higher than the authorised number of active players.*

*Substitution of an active player is only possible during a break between two sets and can only be considered from the players declared on the players' list for the concerned team.*

*For each match, one of the active players will be appointed team captain and as spokesperson to communicate with the match referee, and where applicable the scoring referees.*

### B.4.2 PLAYER'S LIST

*The total number of players authorised to be registered in a team will be the number of active players defined by the organiser plus 2 (two) additional players.*

**Note:** *The other participants, such as coaches, helpers or supporters will not be considered as members of the team.*

*The player's list for each team must be submitted before the beginning of the event as required by the organiser, but in any case no later than 30 minutes before the first match.*

*The list may not be changed once the event begins.*

**Note:** *Declaration of the Strikers and team captains will not be requested for submission of the player's list, as they may change between sets and for each match.*

## B.5 NUMBER OF DRONE BALLS

*Each active player may have up to 2 (two) drone balls ready for a match. The spare drone ball cannot carry the battery pack when it is not used for flight.*

*The player may only change the drone ball or the battery pack during the break between two sets.*

## B.6 PRACTICE FLIGHTS

*Practice sessions may be organised. The event director has the responsibility to define the conditions of the practice sessions which must be the same for all teams.*

*Flights other than those authorised by the organiser are strictly forbidden. In case of a violation of that rule, penalty going up to disqualification from the event of the entire team may arise (See 0).*

## B.7 FORMAT OF THE EVENT

*The organiser defines the format of the event. The format must be announced early as possible and no later than one month before the event.*

*There are two main formats that may be considered:*

- *Group stage followed by knockout and final stages.*
- *Successive rounds.*

**Note:** *The event may be a single match, a competition or contest, a tournament, etc.*

### B.7.1 FORMAT WITH GROUP STAGE FOLLOWED BY KNOCKOUT AND FINAL STAGES

*The event begins with a group stage followed by a knockout stage (round of 16, and/or quarter-finals, semi-finals), and then by the final stage with the play-off for the third place and the final.*

*In the group stage, every team plays a match against every other team in the group.*

**Note:** *It is recommended to consider 3 to 5 teams for each group taking care of a similar number of teams for all groups wherever possible.*

*The groups will be determined with a blind draw.*

#### B.7.1.1 GROUP STAGE RANKING

*For each match, points will be awarded as follows:*

- *3 points for a win.*
- *1 point for each team in case of a tie between the two teams.*
- *0 point for a defeat.*

*In each group, the two highest placed teams will be selected for the first knockout stage round.*

*The ranking of each team in their group will be determined by the following criteria:*

- Total number of points obtained in all matches of the group.*
- Goals difference in all matches of the group.*
- Greatest number of goals scored in all matches of the group.*

*If, on the basis of the above criteria, there is still a tie for the first or the second place in the group, a penalty shootout will be organised to break the tie between the concerned teams.*

#### B.7.1.2 KNOCKOUT STAGE

*The knockout stages are done with direct elimination of the teams who have lost their matches.*

#### B.7.1.3 SCENARIOS FOR ILLUSTRATION

*See below two examples of scenarios, one corresponding to a scenario for 24 teams and the other to a scenario for 16 teams.*

##### **a) Scenario for 24 teams**

- *Group stage: 8 groups (A to H) with 3 teams in each group. Each team plays 2 matches which means 3 matches for each group and so a total of 24 matches for the group stage.*
- *First knockout stage round (round of 16) - 8 matches (16 teams)*
  - . *Winner A & Runner-up B = 1*
  - . *Winner B & Runner-up A = 2*



- . Winner C & Runner-up D = 3
- . Winner D & Runner-up C = 4
- . Winner E & Runner-up F = 5
- . Winner F & Runner-up E = 6
- . Winner G and Runner-up H = 7
- . Winner H and Runner-up G = 8
- Second knockout stage round (quarter-finals) - 4 matches (8 teams)
  - . Winner 1 & Winner 3 = A
  - . Winner 2 & Winner 4 = B
  - . Winner 5 & Winner 7 = C
  - . Winner 6 & Winner 8 = D
- Third knockout stage round (semi-finals) - 2 matches (4 teams)
  - . Winner A & Winner C
  - . Winner B & Winner D
- Play-off for third place - 2 teams & 1 match: Semi-finals losers.
- Final - 2 teams & 1 match: Semi-finals winners.

40 matches in total: 24 for the group stage, 14 for knockout stage and 2 for the final stage.

#### **b) Scenario for 16 teams**

- Group stage: 4 groups (A to D) with 4 teams in each group. Each team plays 3 matches which means 6 matches for each group and so a total of 24 matches for the group stage.
- First knockout stage (quarter-finals) - 4 matches (8 teams)
  - . Winner A & Runner-up B = 1
  - . Winner B & Runner-up A = 2
  - . Winner C & Runner-up D = 3
  - . Winner D & Runner-up C = 4
- Second knockout stage (semi-finals) - 2 matches (4 teams)
  - . Winner 1 & Winner 3
  - . Winner 2 & Winner 4
- Play-off for third place - 2 teams & 1 match: Losers of the semi-finals.
- Final - 2 teams & 1 match: Winners of the semi-finals.

32 matches in total: 24 for the group stage, 6 for knockout stage and 2 for the final stage.

#### **B.7.2 FORMAT WITH SUCCESSIVE ROUNDS**

This format may be run with direct elimination or with double elimination.

**Note:** In this format, a lower total of matches is played compared to the other format, which means less time is necessary to run the event for a given total number of teams.

A blind draw will be done for each round. Wherever possible, it is recommended to avoid a same pair of teams in two different rounds.

*In a situation of an odd number of teams in a round, the last team which has been drawn will not play in the round. This team will play twice in the following round: in the first match, and then in the last match if the number of teams permits it and if the team is not eliminated after the first match.*

*For each match, the winning team is selected for the next round.*

*For the direct elimination option, each team losing its match in the first round is eliminated, and so on for the following rounds.*

*For the double elimination option, a team will be eliminated after losing two matches.*

## **B.8 ORGANISATION OF A MATCH**

*A match is subdivided into three sets. Time allocated for each set is 3 (three) minutes.*

*Another than in exceptional circumstances, the break between two sets will be limited to about two to three minutes, which is normally sufficient to retrieve the drone balls, change the battery pack and place them again on the start areas.*

**Note:** *It is recommended to provide an electronic timer or equivalent to display the remaining playing time. This will be useful for the teams, the officials and the audience.*

### **B.8.1 POSITION OF THE TEAMS ON THE PLAYING FIELD**

*The match referee performs a coin toss in order to determine position of the teams on the playing field (left or right side).*

*The team that wins the coin toss chooses their side, which defines the pilots' area. The teams keep the same side for the entire match and so will stay in the same pilot's area for all three sets.*

*Nevertheless, if the match referee considers that an external factor, such as wind for an outdoor match, may significantly affect the result of the match, he/she may instruct the teams to swap sides. A team cannot complain or protest against such a decision of the match referee and cannot request a side change between two sets not instructed by the match referee.*

*After the allocation of the pilots' areas is decided, the captain of each team may check the goal ring in which the team must score.*

### **B.8.2 START OF A SET**

*The start of each set will be done as follows:*

- *After the drone balls have been placed in their respective start areas, the match referee will request the two team captains if their team are ready to start.*
- *When the match referee considers that the teams are ready, he/she will announce clearly 'Arm your quads'.*
- *About 3 to 5 seconds after this announcement, a brief and intelligible sound signal will announce the start of the set.*

*The match referee must stop the match and request a new start when he/she considers that:*

- *the start procedure has not been done properly;*
- *a player starts (drone ball leaving the ground) before the start signal.*

*In case of an early start of a player, a penalty shot will be granted against the concerned team.*

### **B.8.3 END OF A SET**

*The match referee is responsible to define the end of the set.*

*He/she will take to consider when necessary additional time taking into account that time consumed for a penalty shot must not be considered as a part of the period of time of the set (see 0).*

*The end of the set will be announced with a brief and intelligible sound signal.*

#### **B.8.4 SCORING**

*A team scores a goal when the drone ball of the Striker crosses the goal ring of the opponent's team, provided that:*

- *the goal ring has been crossed in the direction of the opponents' baseline,*
- *and when entire drone ball has passed through the entire opponent goal ring.*

*The scoring referee concerned is responsible to decide if the goal may be scored. This also applied when an electronic scoring system is used.*

*Scoring by crossing the opponent's goal ring with the drone ball of an active player who is not the Striker will not be recognized as a goal. There will be no penalty for doing that.*

*When a team scores a goal, all active players of the concerned team must immediately return to their side of the flying zone, as marked by the centre line, before attempting to score again. The scoring referee concerned is responsible for ensuring this is done properly. In case of an infringement, a penalty shot will be granted against the concerned team (see 0). In addition, a following goal which will be considered by the scoring referee as resulting from the violation of the rule will not be validated.*

*It is recommended that when a Striker scores a goal, the scoring referee concerned raises a flag until the scorer drone ball had returned to its side of the flying zone and becomes eligible again to score.*

*A drone ball on the ground being unable to fly and so to return to its side of the flying zone will be considered as being excluded from the remaining of the set.*

*Attempts to prevent the still active drone balls from returning to their side of the flying zone (and therefore delay the scoring of the next point) is permitted.*

**Note:** *In case of a temporary loss of control on a drone ball, the concerned player must do its best to return on his/her half of the flying zone after recovering control. When the player considers that the drone ball becomes unable to fly, see 0.*

*The Striker may pass or remain in his/her own goal ring for defence purposes.*

*Another player of the team may pass through his/her own goal ring subject doing so it does not block the opponents' team from scoring. When a player, other than the Striker, passes or stays inside his/her own goal ring for defence purposes, a penalty shot is granted against the concerned team (see 0).*

#### **B.8.5 SAFETY OCCURRENCE**

*When a drone ball becomes unable to fly (loss of control, damage,...) or cannot be flown in a safe condition, the active player concerned must activate the drone ball fail-safe and notify the match referee as soon as the drone ball is on the ground. The player concerned must leave the pilots' area. The team concerned will play shorthanded for the remainder of the set.*

**Note:** *An active player can be requested by the match referee to stop flying if it is considered the drone ball no longer meets acceptable safety standards. It could be for example the case when the drone ball is damaged after a collision or after a crash, or when the battery pack is dangling.*

*When this concerns the Striker, the team captain may call a time out to the match referee. The match referee will stop the clock, and will request all players to immediately land their drone ball. After all drone balls have landed, the Striker must disarm his/her drone ball, and then leave the pilots' area.*

*A different active player of the team concerned will be appointed Striker and his/her drone will be placed in the start area of the team concerned. The team captain will declare the new Striker to the match referee.*

*The appointment of a new Striker may be done only once in a set for the team concerned.*

## B.8.6 SET AND MATCH RESULT

*For each set, the team that scores more goals in the set wins the set. If both teams score the same number of goals, or neither team scores a goal, the set will end with a tie between the two teams.*

*The team that wins two sets is the winner of the match.*

*If situation the match ends with a tie between the two teams, the main referee must define how to proceed to decide the winning team when this is necessary (for example, in situation of a direct elimination round): coin toss, overtime period, penalty shoot-out, ... This must be clearly announced before the beginning of the event.*

**Overtime period:** *This will be run in the same way as a standard set except the first goal determines the winning team (sudden death/golden goal).*

**Penalty shootout:** *This will be played in the same way as the penalty shot (see 0). A minimum number of penalty shots (for example 5) will be defined. Whenever possible, penalty shots must be taken by different players of the team. All teams will be informed of the penalty shootout procedure that will be applied before the beginning of the event.*

*If a team withdraws from a match (or for the rest of event), the match(es) concerned will be considered as being lost by the team. The same applies for a team that has been disqualified from the event.*

*If a match is definitively stopped before its end, the current result based on the number of sets won determines the winner of the match except when the match is stopped because a team receives a red card (see 0). If both teams are equal and when it is necessary to decide between the two teams (for example for an event with direct elimination rounds), the match referee organises a coin toss to determine the winner.*

*If the event cannot go on to the end, the last available provisional ranking will be considered for the final ranking.*

## B.8.7 VIDEO RECORDER

*In case a video recorder to monitor the match is in use, this "official" video recording cannot be used by the match referee to make decisions or to evaluate a decision during the match.*

*It may only be used by the concerned official(s) to manage a complaint or protest.*

## B.9 PENALTIES

*All penalties (penalty shot, warning, yellow and red card) are granted by the match referee.*

*Penalties expire once the match is finished and do not carry over into subsequent matches.*

### B.9.1 PENALTY SHOT

*A penalty shot will be granted against a team in the following situations:*

- *Start of a drone ball before the start signal (see 0).*
- *When the player(s) do not return properly to their side of the flying zone after their team has scored a goal (see 0).*
- *When an active player other than the Striker crosses or remains steady inside his/her team goal ring for defence purposes (see 0).*

*The penalty shot is taken by the Striker (scorer drone ball) against one defender of the opposite team. A 10 second period is given for the penalty shot attempt after the signal of the match referee.*

*The time consumed for the penalty shot will not be considered as a part of the period of time of the set.*

*Penalty shots may be staged at the end of the set with remaining battery. This must be announced by the event director before the beginning of the event.*

### B.9.2 WARNING

A warning may be given to a team in the following situations:

- Non authorised person (reserve player, coach,...) in the pilots' area during a set.
- Minor uncivilized conduct of a player or a coach towards a referee, an opponent player or coach, or a spectator.
- Delay of the start of the match or of a set caused by a team without acceptance of the match referee.
- Simple movement of a drone ball before the start signal which will not be considered as an early start.
- Unintentional contact during a set of a flying drone ball on a done ball which is on ground.
- Unintentional contact during a set of a drone ball on a person.

### B.9.3 YELLOW CARD

When two warnings are given for the same reason during a match to a team, a yellow card is given to the team.

In addition, a yellow card may be directly given to a team in the following situations:

- Change of an active player during a set.
- Major uncivilized conduct of a player or a coach towards a referee, an opponent player or coach, or a spectator.
- Intentional manipulation of a drone ball during a set.
- Intentional contact during a set of a flying drone ball on a done ball which is on ground.
- Intentional contact during a set of a drone ball on a person.

The active player responsible receiving the yellow card will be ejected from the rest of the set, and the team concerned will continue with the remaining active players.

When the yellow card does not concern a particular active player, the team captain decides the active player to be ejected from the rest of the set.

### B.9.4 RED CARD

When two yellow cards are given during a match to a team, a red card is given to the team.

In addition, a red card may be directly given to a team in the following situations:

- Active player not registered on the list of the players.
- Severe uncivilized conduct of a player or a coach towards a referee, an opponent player or coach, or a spectator.
- Dangerous or hazardous behaviour or action by an active player during a set.

The active player receiving the red card will be ejected from the rest of the match, and the team concerned will play with one less drone during the rest of the match.

When the red card does not concern a particular active player, the team captain decides the active player to be ejected from the rest of the match.

## B.10 INTERRUPTION OF THE EVENT

The event should be interrupted or the start delayed in the following circumstances:

- For an outdoor event, due to atmospheric conditions (rain, stormy condition, ...) in which it would be dangerous to continue to fly, or if wind is continuously stronger than 9 m/s measured at 2 m above the ground near in the centre of the playing zone for at least one (1) minute.
- Any incident affecting safety or requiring access for emergency services.

The decision is taken by the main referee in conjunction with the event director.

The match referee has the right to interrupt a set for an external disturbance or any other justified reason. When an interruption occurs during a set, the set must be completely rerun when possible except if the match referee considers a team as directly responsible of the interruption (for example forfeit). In that situation, the team which is the cause of the interruption loses the set which means the other team wins it.

The decision to stop definitively a match must be taken by the main referee.

## B.11 DISQUALIFICATION FROM THE EVENT

A disqualification from the event is decided by the event director with the consent of the Jury.

A disqualification from the event affects the concerned team for the entire event. A disqualified team is placed at the end of the ranking with a 'DISQ' mention.

Disqualification from the event may be considered in the following situations:

- Use of a drone ball or equipment that does not conform to the rules.
- Deliberate very dangerous behaviour by an active player on another person.
- Unsporting behaviour by a member of the team.

## B.12 OFFICIALS

### B.12.1 EVENT DIRECTOR

The event director has a complete oversight of the event.

He/she has the responsibility of the safety concerns and will support the main referee to ensure compliance of the event with rules.

He/she is also in charge of:

- Organizing the running of the event (draws, detailed schedule, order of the matches, etc.) according to the event format which has been retained.
- Nominating for each match the match referee and the scoring referees.
- Validating the result of each match and the provisional and final rankings.

The following responsibilities and duties of the event director are also defined in the present rules:

- Definition of the eventual restrictions for use of RC systems equipment outside the playing field (see 0).
- Possibility of practice flights (see 0).
- Disqualification from the event of a team (see 0).

### B.12.2 REFEREES

A main referee will be appointed for the event in order to manage sportive conduct of the event in conjunction with the event director.

In addition, match referees may be appointed. When match referees are not appointed, the main referee act as match referee.

*In any case, scoring referees will be appointed.*

#### **B.12.2.1 Main referee**

*The main referee has the final authority regarding application of the drone soccer rules for the event.*

*Responsibilities and duties of the main referee as defined in the present rules are:*

- *Before the beginning of the event, mention how it will be proceeded to decide the winning team (when this is necessary) in case a match ends with a tie between the two teams (see 0).*
- *Compliance of the drone balls with specification rules (see 0).*

**Note:** *Model processing may be organised before the event, where important characteristics of each model may be checked and the drone ball marked to signify compliance. During the event, in case of doubt, the main referee may request the organiser to check the characteristics of a specific drone ball. He/she may also consider a random spot-check following any match to check the most important characteristics of the drone ball.*

- *Interruption of the event or delay of the start if necessary (see 0).*

#### **B.12.2.2 Match referee**

*The match referee has the overall responsibility to lead the match seamlessly, smoothly, and fairly in cooperation with the scoring referees.*

*He/she must also pay appropriate attention to the safety concerns during the match and take care that only authorised persons are present on the playing field.*

*He/she will be positioned in order to have an overview of the entire playing field and to be seen by the active players. He/she will be equipped with a microphone or equivalent in order to be heard clearly by every active player on both sides of the playing field.*

*Responsibilities and duties of the match referee as defined in the present rules are:*

- *Choice of the position of the two teams on the playing field (see B.8.1).*
- *Check before each set that the active players for both teams are on the players' list (see 0).*
- *Start (see 0) and end (see 0) of each set.*
- *Break time between two sets (see 0).*
- *Validation of goals and scores in cooperation with the scoring referees (see 0).*
- *Request an active flyer to stop flying if it is considered the drone ball no longer meets acceptable safety standards (see 0).*
- *Set and match result in cooperation with the scoring referees (see 0).*
- *Granting of penalties (see 0).*
- *Interruption of a set for an external disturbance or any other justified reason (see 0).*
- *At the end of the match, record the score of each set in cooperation with the scoring referees, the final result of the match, the penalties which have been granted during the match and any incident which to notice.*

*The match referee may change his/her decision if he/she considers he/she has made an error of judgment or after considering the advice of a scoring referee. In any case, the position of the match referee prevails.*

#### **B.12.2.3 Scoring referee**

*Two scoring referees should be appointed prior to each match with one on each side of the playing field match.*

*Both will be positioned outside the flying zone. The scoring referees will follow the game on their side of the playing field to follow the scoring of the Striker concerned.*

*The match referee may specify before the match to the scoring referees what he/she expects first and foremost from them.*

#### **B.12.3 JURY**

*In any International event included in the FAI Contest Calendar, a FAI Jury must be nominated according to Volume CIAM General Rules C.7.1 and C.7.3.*

*In the other events, a Jury may be nominated to make all decisions dictated by any circumstances which may arise and to rule on disputes.*



## C. F9U (OFFICAL CLASS) - DRONE RACING RULES

*Drone Racing consists of several multi-rotor model aircraft flying together through a closed racing circuit.*

**Note:** *A multi-rotor is a rotary wing radio-controlled model aircraft equipped with at least three power driven propeller devices.*

*The generic term 'model' will be used in the present document.*

*Each model is operated by an FPV (First Person View) pilot who is considered as the competitor. The pilot must be equipped with a headset goggle that allows him/her to pilot from the video picture of the on-board camera which is transmitted in real time on his/her headset goggle.*

*The FPV pilot is assisted during the race by one and only one helper who stays next to him/her during the whole flight. The helper is mandatory. He/she may be another competitor.*

*The main task of the helper is to keep the model in visual line of sight. He/she must inform the FPV pilot of anything occurring that can affect his/her piloting, especially about safety. If the helper requests the FPV pilot to land or to cut off the motors, he/she must do it immediately. In case of emergency, the helper is authorised to shut off the transmitter in order to trigger the fail-safe device.*

### C.1 GENERAL SPECIFICATIONS FOR MODELS

*The model must be equipped with:*

- *Fail-safe device, the triggering of which stops the motors.*
- *Pit mode, the triggering of which cuts the video transmission power.*

*Competitors must have these features configured and understand how to use them.*

*The following are strictly forbidden:*

- *Pre-programmed manoeuvring device.*
- *System for automatic positioning and/or path rectification in longitude, latitude or height.*
- *Pre-programmed video power increase.*

**Note:** *Software recovery modes such as "Flip over after crash" (also known as 'Turtle mode') or "Crash recovery" which can be activated by the competitor to return the model to an upright position after a crash are permitted.*

#### C.1.1 WEIGHT AND SIZE

*The total weight of the model including all equipment necessary for flight (including batteries) shall not exceed 1 kg.*

*The axes of all motors must fit within a 330 mm diameter circle.*

#### C.1.2 MOTORIZATION

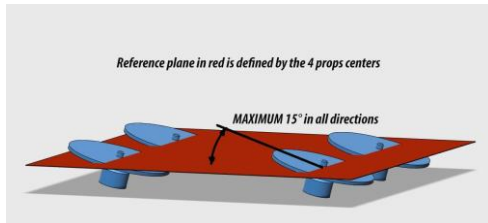
*Only electric motors are allowed.*

*Battery pack up to 6 S is allowed.*

*The voltage for each cell must not exceed 4.25 V when fully charged. This means a maximum voltage of 17 V for a 4S battery pack, and 25.5 volts for a 6S battery pack.*

*The voltage measurement of the battery pack will be performed before each race.*

*The reference plane is defined with propellers centres. Each motor can be tilted up to 15° maximum angle in each direction.*



### C.1.3 PROPELLERS

Maximum diameter: 6 inches (15.2 cm).

Full metal propellers are forbidden.

### C.1.4 RADIO CONTROL (RC) EQUIPMENT

Any 2.4 GHz spread spectrum technology RC equipment may be used.

Frequencies and emission power must comply with the relevant regulations in the organiser country.

The organiser may define a list of authorised RC equipment, for example 868 MHz / 915 MHz modules.

The output power of 868 MHz / 915 MHz RC modules must be set to the lower of 100 mW, or the limit as defined by relevant regulations in the organiser country.

The organiser may also define a list of authorised equipment in order to minimise risk of radio control problems. This information must be available at least one month before the event.

In order to limit risk of potential problems during the races with unwanted interference, the organiser may define restrictions for use of RC systems equipment outside the racing circuit.

In case of use of non-authorised RC equipment, penalty going up to disqualification from the event of the concerned competitor may arise (See 0).

### C.1.5 VIDEO SYSTEM

#### Competitor video device

Analogic and digital video devices operated solely on the 5.8 GHz band may be used for piloting.

All models must have pit mode configured.

The maximum output power emission authorised for any video transmitter is 25 mW, whether on the ground or in flight, and any pre-programmed features to alter this during a flight are strictly forbidden.

A violation of that requirement may result in penalties up to and including disqualification from the event (see C.9.2) of the competitor concerned.

The video output must be centred on designated frequencies with a 30 MHz maximum bandwidth. Broadcast with the video transmitter of an additional video signal outside the designated frequencies is not authorised.

If a competitor chooses to use their own video reception equipment, the video receiver and antenna must be directly mounted to their FPV goggles and extend no more than 160mm above the goggle antenna connector. The use of a personal external video reception equipment, such as antennas mounted on masts, stands, or any extension devices, is prohibited.

#### Organiser video receiver

The video receiver system used by the organiser must support both analog and digital video transmitters, as well as LHCP and RHCP antenna polarization.

It is recommended that the organiser provides to the competitors flying in the race the access to the video feed available from the organiser ground station.

### **Digital video recorder**

Recording of all races by the organiser is strongly recommended to enable video reviews as necessary in case of disputes or complaint.

**Note:** Recordings provided by the competitor concerned, or other competitors or third parties may be considered. However, the recording provided by the organiser shall take precedence in any official decision.

### **Unwanted 5.8 GHz video emission**

To reduce the risk of interference during races, the organiser may impose restrictions on the use of video transmitters outside the racing circuit.

It is recommended that the organiser provides an RF spectrum analyser to monitor external RF interference and identify malfunctioning competitor equipment.

Unauthorised activation of any 5.8 GHz video transmitter is strictly prohibited. Such actions may result in penalties up to and including disqualification from the event (see 0) of the competitor concerned, regardless of whether the activation was intentional or not.

### **C.1.6 LED LIGHT UNIT (OPTIONAL)**

In order to improve the view of the models during the races for the audience, and/or to facilitate the task of the judges, the organiser may request the competitors to equip their models with a LED light unit including possibility to choose the colour so that each model in flight will have a different colour.

In that situation, the specifications for the LED light unit will be as follows:

- Minimum of 32 RGB LED light bulbs, or minimum length of 280 mm of RGB LED strips with obfuscated light source (such a COB LED). In either scenario, the LED light should be uniformly distributed across all the arms of the model, allowing it to be clearly visible from any angle.

- Required colours: Blue - Green - Red - Yellow - Cyan - Magenta.

- Capability to easily switch before the race to the colour assigned to the competitor concerned.

**Note:** In order to improve the understanding of the races by the public and simplify organisation, the colours will be allocated according to the order of the competitors in the race.

### **C.1.7 IDENTIFICATION MARK**

Each model shall carry the 3 (three) letters national identification mark followed by the FAI Sporting Licence (or Drone Permission) ID number.

The letters and numbers must be readable (unaided) at arm's length and appear at least once on each model.

## **C.2 RACING CIRCUIT**

The racing circuit may be outdoor or indoor. The organiser must ensure that the chosen location is suitable for good video reception for the competitors.

A racing circuit (or track) is a defined volume that contains a 3D flight path. It shall consist of a start line, obstacles to be crossed or avoided and a finish line.

The circuit shall be a closed loop with three laps to be completed or an open loop to be flown once. Optionally, the track may be divided into sectors to facilitate timekeeping.

The minimum length of a racing circuit from the start line to the finish line, including all laps, is 250 m. The length of a track is measured along the centreline of the optimum 3D flight path.

For the start, the models will be placed side by side on a single start line perpendicular to the initial trajectory. The starting positions of the models shall be defined to ensure to provide equal opportunities for the competitors flying in the race.

*To minimise risk of a collision between models just after the start, it is recommended to place a 60 to 120 degrees turn before the first gate. In that case, the turn will be marked with a flag positioned as far as possible at least 10 meters away from the start line and from the gate.*

*The organiser may choose to keep the circuit secret or make it public before the event. In both cases, the organiser shall make every effort to prevent any unfair advantage for certain competitors.*

*If the circuit is made public, it shall be published no later than one month before the event. After the circuit had been published, only duly justified changes of the circuit may be considered and competitors expected to participate must be informed immediately of any such adjustments.*

*If the circuit is kept secret, the main characteristics such as approximate length, number of laps, focus on speed or technical elements, types of obstacles shall be published no later than one month before the event. This will allow the competitors to adapt their equipment for the event as much as possible.*

*See Annex C.1 for additional details and recommendations.*

### **C.3 NUMBER OF MODELS**

*Each competitor may use throughout the entire event a maximum of 3 (three) models.*

*A model can be used by only one competitor during the event.*

*In case of an infringement to those rules, the competitors concerned will be disqualified from the event (See 0).*

*Before the race, the competitor can change the model in the preparation area. Any technical problem after leaving the preparation area will be considered a race incident with no more possibility to change the model.*

### **C.4 MODEL REGISTRATION AND PROCESSING**

*Each competitor can register up to three models. The organiser will mark each registered model with an easily visible, difficult to falsify identification such as a sticker or paint mark.*

*During registration, the specifications of the model may be checked by the organiser including:*

- Identification mark.
- Weight and size.
- Batteries (voltage).
- Fail-safe and associated device to cut off the motors.
- Radio control equipment.
- VTX, camera and headset goggle.
  - LED light unit if such a device is required by the organiser.

*If one of the models registered is lost or destroyed due to causes not applicable to the competitor concerned, the competitor shall have the right to present a replacement model for registration and processing up to one hour before the official starting time of the event.*

*During the event, on request of the race director, or event director, or Jury, any model may be checked by the organiser after the race to ensure it fits the specifications.*

*A competitor whose model is not compliant may be disqualified from the event (See 0).*

### **C.5 TRACK WALK - PRACTICE FLIGHTS**

*A practice flight session on the racing circuit will be organised.*

*All competitors will be allocated same time/laps to ensure for all of them the same flight opportunities on the track.*

*Before the start of the practice flight session, the organiser shall conduct a track walk to allow the competitors to familiarise with the racing circuit.*

*In order to allow the competitors to warm-up before racing and subject to sufficient time being available, the organiser may plan a practice flight round at the beginning of a competition day other than those for which qualification round(s) are planned.*

*Flights on the racing circuit other than those scheduled or authorised by the organiser are strictly forbidden during the event and before the start of the event. In case of a violation of that rule, penalty going up to disqualification from the event of the concerned competitor may arise (See 0).*

## **C.6 EVENT ORGANISATION**

*An event is normally organised on the basis of three stages:*

- *Qualification stage (rounds for qualification for the elimination stage).*
- *Elimination stage (to qualify for the final stage by successive elimination rounds).*
- *Final stage.*

**Note:** *The event may be organised with only one stage based a fixed number of rounds for all competitors, especially when the total number of competitors is below 16. For each race, each competitor will be awarded a number of points corresponding to his/her place. The final placing is then done taking into account the sum of the points awarded to every competitor in all rounds.*

*Each round for the qualification stage and the elimination stage is organised by groups (subdivision of the round corresponding to the number of competitors flying at the same time in the same race).*

*The event will be run with a maximum of 4 (four) competitors per race in order to minimise risk of video problems especially for elimination and final stages.*

*Nevertheless, when the number of competitors justifies it, the qualifying rounds may be run with 6 (six) competitors per group subject it is legally and technically possible.*

*Races with 3 (three) consecutive laps to complete and 3 (three) minutes flight time allowed for that must be considered as the standard way to proceed for the entire event. This applies for all stages (qualifying, elimination and final) including the additional rounds optional sequence.*

**Note:** *For a specific event for which a different number of laps is duly justified, the rules concerned will be adapted consequently as local rules.*

### **C.6.1 TIMEKEEPING**

*Drone racing consists of completing three laps in as short a time as possible, so an accurate timekeeping of all laps completed is essential to ensure the quality and fairness of the event.*

*Laps that are not finished will not be considered and do not contribute to a result, placing or tie-breakers.*

*Manual timekeeping is not authorised.*

*An electronic timing system must be implemented, with appropriate redundancy, in order to ensure complete and permanent reliability of the timekeeping.*

*For the qualifying stage, timekeeping for each model is triggered when the model passes the gate equipped with the timekeeping sensor(s). After taking off from the start line, the model must go directly to that gate.*

*For the elimination stage, final stage and additional rounds optional sequence (See 0), timekeeping is triggered at the start of the race when the start signal is sounded.*

### C.6.2 START OF THE RACE

Competitors and helpers shall have a maximum of two minutes to place their models on the start line and prepare them for the race. Any model not ready within this time must be removed from the start line.

The Starter shall announce once the two minutes has elapsed (or sooner if all competitors signal that they are ready to proceed), and all persons must directly exit the track area within 30 seconds.

Competitors and helpers must not return to the models again unless instructed by the Starter, and the start sequence shall commence as soon as the track area is clear.

#### **Start sequence:**

- The Starter will clearly announce "Pilots, arm your quads" to indicate that the start is underway.
- There will be an interval of between 2 and 4 seconds after which a single distinct tone will signal the start of the race. There will be no audible countdown preceding the start signal.

#### **Restart:**

- If the Starter is made aware of a technical problem during the start procedure then they must immediately stop and reset the sequence.
- If two or more models are involved in a mid-air collision before the first gate and the incident results in the involuntary change to the flight path of any of the participating models then the competitors involved can immediately request a restart. If the models continue to fly through the first gate then the race will not be restarted. Only one restart caused by such a collision will be permitted per race. Competitors will be given the opportunity to swap a fresh battery pack before the restart.

#### **False start:**

- Any competitor whose model leaves its start position (model not touching any point of its starting position) before the start signal and progresses through the first gate will be disqualified from the race.
- If the model leaves its start position as a consequence of factors outside of the competitor's control (e.g.: during the arming sequence) then the competitor must drop to the ground immediately and start the race from the ground after the other competitors have launched (i.e.: from the 'back of the grid'). A competitor starting from the ground and having a mid-air collision during their start will be disqualified from the race.
- As soon as a disqualification is announced, the competitor concerned must immediately stop. A violation of that requirement may lead to a disqualification from the event (see C.9.2) of the competitor concerned.
- Where possible, the race will proceed without interruption for the remaining competitors. A restart will only be ordered if the Starter deems that the false start has prevented another competitor from starting cleanly and safely.

Competitors must be prepared before each race with all tools and spares required to achieve a successful start. The start must not be delayed by competitors or helpers needing to retrieve equipment.

### C.6.3 QUALIFICATION STAGE

The number of qualifying rounds is defined by the organiser by considering the available time with a minimum of 3 (three) qualifying rounds.

The organiser shall announce no later than one month before the event how many qualifying rounds are expected to be held.

All races for the qualifying stage will be limited to 3 minutes flight time with 3 consecutive laps to complete. As soon as a competitor has completed 3 laps or when the 3 minutes flight time is over, he/she must land the model.

Composition and flight order of the groups for the races will be determined with a blind draw.

**Note:** A different draw for each qualifying round is recommended in order to avoid the same competitors fly in the same group for all qualifying rounds. In any case, the same draw cannot be applied to more than three qualifying rounds.

Races with fewer than the required number of competitors (4 or 6), for example in case of withdrawal of a competitor, will be put at the end of the round, in order to allow a complete competitors race with competitor(s) that have been granted a reflight in that qualifying round.

If necessary, the last groups of each qualifying round may be rearranged by the race director (under supervision of a Jury member) in order to achieve as much as possible a minimum of 3 competitors per group.

Two options may be considered for the qualification stage. The organiser defines which one will be used and must announce it at least one month before the event.

**a) Option 1 - Fastest time to complete 3 consecutive laps**

**Note:** It is not recommended to use this qualification method when 3 qualifying rounds or less are scheduled.

The result of each competitor in each qualification round is the registered time to complete the 3 consecutive laps. For a competitor not completing 3 laps, the number of laps completed and the corresponding registered time will be considered for the result.

A ranking will be established at the end of the qualifying stage taking into account the best result obtained by each competitor on their qualifying flights. The competitors with a time on 3 laps will be ranked ahead those with a time on 2 laps, which in turn are ranked ahead those with only 1 lap. Those who have been able to get any registered time will be ranked at the end.

In situation of a tie for the last place(s) for selection to the elimination round, the 2<sup>nd</sup> best result will be considered to split the tie, and then if needed the 3<sup>rd</sup> result. In case the results of the qualifying flights are not sufficient, a tie-break flight will be organised between the competitors still concerned by the tie.

When the number of competitors required for the elimination stage is not reached, an additional qualifying flight will be organised for the competitors who have not been able to get a time at that stage. This will be repeated until the appropriate number of competitors for the elimination stage is reached.

**b) Option 2 - Average of the 3 best times to perform a lap**

The result of each competitor in a qualification round is the registered times for each valid lap completed (with a maximum of 3).

A ranking will be established at the end of the qualifying stage taking into account the average of the 3 fastest times registered to perform a valid lap in all the qualifying rounds. The competitors getting only 2 registered times to perform a valid lap are ranked after those with times taking into account the average of their 2 times, which in turn are ranked ahead those with only 1 registered time to perform a valid lap. Those who have been able to get any registered time are ranked at the end.

**Note:** The fastest times may be done in the same qualifying round or in different ones.

In situation of a tie for the last place(s) for selection to the elimination stage, the 4<sup>th</sup> best time recorded to perform one valid circuit lap result will be considered to split the tie, and then if necessary the 5<sup>th</sup> one, and so on. In case the times are not sufficient, a tie-break flight will be organised between the competitors still concerned by the tie.

In both options, when the number of competitors required for the elimination stage is finally not reached, an additional qualifying flight will be organised for the competitors who have not been able to get a time at that stage. This will be repeated until the appropriate number of competitors for the elimination stage is reached.

The competitors who need an additional qualifying flight to achieve a time to be selected for the elimination stage will be placed after those who are already selected, and then those who need a second additional flight, and so on.

#### C.6.4 ELIMINATION STAGE

The elimination stage will be organised according to one of the three following scenarios:

- Scenario A - 64 competitors selected from qualification stage.
- Scenario B - 32 competitors selected from qualification stage.
- Scenario C - 16 competitors selected from qualification stage.

The choice of scenario will be done by the organiser before the beginning of the event considering the total number of competitors in order to give possibility to a maximum of competitors to fly the elimination stage.

All races will be limited to 3 minutes flight time with 3 consecutive laps to complete. As soon as a competitor has completed 3 laps or when the 3 minutes flight time is over, he/she must land the model.

The placing for each race is determined by considering the registered time to complete 3 laps.

Those who do not finish their flight will be placed in the race considering the number of laps they did complete and the registered time in which those laps were completed. Disqualified competitor(s) will be placed at the end after the competitors getting a registered time or having not finished their first lap.

The two best placed in each race will be directly selected for the next round.

In case of a tie for the second place, the placing in the ranking established at the end of the qualifying stage will be considered to define who is selected for the next round.

##### **Double elimination optional sequence**

Instead of direct elimination of the competitors placed third and fourth in each race of any elimination round, the double elimination sequence may be applied.

This sequence is optional. The organiser must inform the competitors at least one month before the event if double elimination sequence will be applied or not.

This optional sequence allows competitors eliminated in elimination rounds to continue to fly still getting possibility to access the final.

Competitors placed third and fourth in any race of the double elimination sequence are definitively eliminated.

##### **Organisation of the races**

For the first elimination round, the composition of the groups for the races is defined considering the ranking established at the end of the qualifying stage.

For each scenario, the composition of races for the first elimination round and detailed organisation of the rounds up to the final are defined in:

- Annex C.2 for scenario A (64 competitors selected from qualification stage).
- Annex C.3 for scenario B (32 competitors selected from qualification stage).
- Annex C.4 for scenario C (16 competitors selected from qualification stage).

**Note:** When the number of competitors is lower than the number of competitors required for the considered scenario, some races of the 1<sup>st</sup> elimination round will be flown with 3 competitors instead 4. As an illustration, if for the scenario B there are only 28 competitors (instead the 32 normally required), then races 1, 4, 5 and 8 will be flown with 3 competitors considering there are no competitors placed 29 to 32 after the qualifying stage.

#### C.6.5 FINAL STAGE

The organiser must clearly inform the competitors before the competition begins if the final stage will be run with a single final race, or with successive final races (See 0). If it is not done, the final must be run with one single final race.



*Each final race will be limited to 3 minutes flight time with 3 consecutive laps to complete. As soon as a competitor has completed 3 laps or when the 3 minutes flight time is over, he/she must land the model.*

*The placing for each final race is determined by considering the registered time to complete 3 laps. Those who do not finish their flight will be placed in the race considering the number of laps they did complete and the registered time in which those laps were completed. Disqualified competitor(s) will be placed at the end after the competitors getting a registered time or having not finished their first lap.*

*In case of a tie for the first, second or place in the final stage ranking, an additional race will be organised with the competitors concerned to split their tie.*

#### **C.6.5.1 Double elimination sequence not applied for the elimination stage**

*The two best placed competitors in each of the two semi-final races are selected for the final race to determine their final ranking from 1<sup>st</sup> to 4<sup>th</sup> place.*

*A small final may be organised for the other two competitors from the semi-final races to determine their final ranking from 5<sup>th</sup> to 8<sup>th</sup> place.*

#### **C.6.5.2 Double elimination sequence applied for the elimination stage**

*The two best placed in the last elimination round (one race) and the two best placed in the last round of the double elimination sequence (one race) are selected for the final race to determine their final ranking from 1<sup>st</sup> to 4<sup>th</sup> place.*

#### **C.6.5.3 Successive final races (Optional)**

*Instead a single final race, the final may be run with successive final races. The final is over as soon as a finalist competitor has won two final races. This competitor is the winner of the event.*

*For the final ranking for 2<sup>nd</sup> to 4<sup>th</sup> places, points will be allocated as follows in each final race: 1 point for the first placed, 2 points for the second, 3 points for the third and 4 points for the fourth.*

*The ranking of the finalists concerned will be done taking into account their sum of points in all the final races, the finalist with the lower sum of points being placed 2<sup>nd</sup>, and so on.*

*In case of a tie, the placing in the last final race will be considered to split the tie for the concerned finalists.*

**Note:** *This option of successive final races cannot be applied to the small final which may be organised when the double elimination sequence is not applied for the elimination stage (See 0).*

### **C.6.6 ADDITIONAL ROUNDS OPTIONAL SEQUENCE.**

*This sequence, which is optional, gives a possibility to the competitors who are not selected to fly in the first elimination round after the qualification stage to participate to additional rounds and improve their placing.*

*The additional rounds sequence may be organised, but not only:*

- *with successive eliminating rounds as proceeded for the elimination stage (See 0);*
- *or with a fixed number of additional rounds.*

*In case additional rounds are planned, the organiser must inform properly the competitors how that sequence will be organised and the results taken into account for the final classification of the competitors concerned.*

### **C.6.7 FINAL CLASSIFICATION**

*Final classification tables are provided in Annex C.2 for scenario A, Annex C.3 for scenario B and Annex C.4 for scenario C.*

*Those tables cover the different possible situation with double elimination and/or additional rounds sequences applied or not.*

## C.7 FLIGHT OCCURRENCES

### C.7.1 OBSTACLE DAMAGED OR DESTROYED DURING THE RACE

*When an obstacle is accidentally damaged or destroyed during a race, the competitors still flying will be informed as soon as possible of the incident and how to proceed.*

**Note:** *The organiser must define the person (race director, starter,...) in charge to decide how to proceed and to clearly inform the competitors.*

*In the case where it concerns an obstacle to be crossed (air gate, tunnel,...), the decision may be to continue to cross the obstacle, or to give permission to bypass it, or to stop the race. When bypassing of the concerned obstacle is authorised, the competitors must do their best not to take advantage of the situation.*

*In case it concerns an obstacle to be avoided, the race will continue except if it is decided differently considering for example that safety is impacted. When the race continues, the competitors must do their best to follow the track and not to take advantage of the situation.*

### C.7.2 FAULTS AND PENALTIES

*In the case a competitor does not fly on the expected way (does not cross an obstacle, misses a pylon or flag, does a circuit cut ...) the corresponding circuit lap will not be validated. The competitor may try to execute immediately and on a safe manner a manoeuvre to correct the mistake.*

*If the competitor corrects its mistake, the lap will be validated.*

*If during this manoeuvre the competitor has a collision with another model, the competitor will be disqualified for the race.*

### C.7.3 CRASH

*If a model cannot go on after a crash, it must stay on the ground with motors cut off until the end of the race.*

*The competitor concerned must immediately activate the pit mode on their model to avoid causing video interference for the other competitors still flying in the race.*

*The competitor must clearly indicate that he/she stopped the race by removing his/her headset google.*

*The competitor and the helper must then stay quiet in their position until the race is finished.*

### C.7.4 SAFETY ISSUE

*A competitor can be requested to stop its flight if it is considered the model no longer meets acceptable safety standards. It could be for example the case when a model is damaged after a collision or after a crash, or when the battery is dangling.*

*In case of a serious safety issue, the race director may decide to stop the race and disqualify the competitor(s) eventually responsible of the safety issue. A restart of the race will be done for the competitors who had not been disqualified and were still in the air when the safety issue occurred.*

## C.8 REFLIGHTS

### C.8.1 REFLIGHTS

*Possibility of an individual reflight will only be considered for the qualification stage in situations where an incident outside of the competitor's control prevents them from completing their flight.*

*The reflights will be organised at the end of the qualifying round concerned, or as part of any race that has fewer than the required number of competitors.*

*For any competitor being granted a reflight, the original flight for which the competitor has been granted the reflight is then definitively cancelled.*

*For the rest of the event (elimination stage, final stage and, where appropriate, additional rounds sequence), individual reflights will not be awarded.*

## **C.8.2 RESTARTS**

*A full race restart will be considered for the elimination stage, final stage and, where appropriate, additional rounds sequence, in the following situations:*

- *Mid-air collision occurring before the first gate. Only one restart will be allowed per race.*
- *Critical safety incident (such as a fire, or unauthorised person on the track) requiring the Starter to stop the race.*
- *External incident preventing one or more competitors from competing fairly.*
- *Deliberate incident by a competitor taking part in the race that is identified to have given them an unfair advantage over the other competitors in that race.*

*Will be excluded from restarts any competitor:*

- *who caused the safety incident,*
- *who had already signalled they were out of the race (by removing their goggles) at the time of such an incident,*
- *found to have given themselves unfair advantage through contravening the rules.*

*Competitors will be given the opportunity to swap a fresh battery pack before the restart.*

## **C.9 DISQUALIFICATION**

### **C.9.1 DISQUALIFICATION FROM THE RACE**

*A competitor may be disqualified from a race in the following circumstances:*

- *Start before the start signal (See 0).*
- *Collision with another model when executing a manoeuvre to correct a mistake (See 0).*
- *Circuit exit (crossing of the safety line).*
- *Flying after having removed even temporarily his/her headset goggle.*
- *Celebratory manoeuvre, especially after the competitor finishes.*
- *Hazardous piloting or safety issue.*

*The disqualification is decided by the race director or, where applicable, by the judge assigned to the concerned competitor.*

*When a competitor is disqualified, he/she must land as soon as he/she has been informed. In any case, the result of the competitor for the race will not be validated.*

*Competitor(s) disqualified will be placed for the race after the other competitors. In case more than one competitor is disqualified from the race, the competitors concerned will be placed taking into account the qualification stage ranking.*

*If a competitor disqualified from a race is considered not being sufficiently cooperative to land, the concerned competitor may be disqualified from the event by the event director with the consent of the Jury.*

### **C.9.2 DISQUALIFICATION FROM THE EVENT**

*A disqualification from the event is decided by the event director with the consent of the Jury.*

*A competitor who is disqualified from the event is placed at the end of the ranking with a 'DISQ' mention.*

*Disqualification from the event may be considered in the following situations:*

- *Use of a non-authorised RC equipment (See C.1.4), or another equipment that does not conform to the rules.*
- *Power emission of a video transmitter over the maximum authorised (See C.1.5).*
- *Non-authorised activation of a video transmitter (See C.1.5).*
- *Use during the event of a same model by different competitors (See C.3).*
- *Use of a model that does not fit the specifications stated in the rules (See C.4).*
- *Flight on the racing circuit other than those scheduled or authorised by the organiser (See C.5).*
- *Competitor not stopping after having been disqualified for a false start (See C.6.2).*
- *Cheating or unsporting behaviour according to the CIAM General Rules Volume (See C.19).*

## **C.10 OFFICIALS**

### **C.10.1 JURY**

*In any International event included in the FAI Contest Calendar, a FAI Jury must be nominated according to Volume CIAM General Rules C.7.1 and C.7.3.*

*In the other events, a Jury may be nominated to make all decisions dictated by any circumstances which may arise and to rule on disputes.*

### **C.10.2 OFFICIALS REQUIRED TO RUN THE EVENT**

- *Event director in charge of preparation, organisation and oversight of the event. The event director has responsibility to ensure compliance with the applicable rules and safety during the whole event.*
- *Race director in charge of preparation, organisation and oversight of the races. The race director has responsibility to ensure compliance with the applicable rules and safety during the whole race.*
- *Starter. The starter may be assisted by another official in charge to call competitors for racing, do pre-flight checking, etc.*
- *Official responsible for score sheets gathering and/or for results accounting.*

*According to the event standing and the number of competitors, some official tasks may be assumed by the same person.*

### **C.10.3 JUDGES**

*Judges in charge to monitor the performance of the competitors flying in the race are mandatory.*

*A different judge assigned to each competitor is recommended. The organiser may arrange for dedicated judges or select competitors to fulfil the role.*

*Judges must have a video device, such as video screen, headset or goggles to validate that the competitors follow the designated flight path and cross every gate and obstacle correctly.*

*Except for a disqualification, notifications to a competitor or helper should be provided by the judges only after the race is finished, so as not to disturb the other competitors still flying.*

*The organiser may appoint additional judges to perform specific tasks, including supervision of the judges, ensuring that models remain in visual line of sight, monitoring compliance with safety boundaries, and providing information to the competitors.*

## C.11 INTERRUPTION OF THE EVENT

*The event should be interrupted or the start delayed by the race director or event director in the following circumstances:*

- *Wind continuously stronger than 9 m/s measured at 2 m above the ground near the preparation area for at least one (1) minute.*
- *Due to atmospheric conditions (rain, stormy condition,...) in which it would be dangerous to continue to fly.*
- *Other exceptional circumstances such as for example incident affecting safety or requiring access for emergency services.*

*When an interruption occurs during an official flight, this flight is cancelled.*

*If the event cannot go on, the final ranking will be the last available provisional ranking.*

## C.12 COMPETITORS INFORMATION

*The organiser must display on site in an appropriate place such as the competitors area:*

- *List of the officials.*
- *Start list for every round with the names of the competitors.*
- *Video channels and, where appropriate, LED light colour allocation.*
- *Results after every round with the names of the competitors.*
- *Qualification stage ranking and final ranking.*

*In each round, the following races must be clearly announced so the competitors concerned may be prepared to go without hurry to the pre-flight or in waiting area.*

**Note:** *A posting on Internet is also advised how those who are not at the site to follow the progress of the event*

## - ANNEX C.1 -

### RACING CIRCUIT

#### 1. Racing circuit design

*The track should be designed to maximise competition and to demonstrate piloting skills. The organiser is encouraged to demonstrate creativity and to take advantage of the specifics of the site. It is recommended to facilitate live spectator viewing by making the track understandable from an outside point of view.*

*All racing circuits must be designed on the "safety first" principle. The flight path must prevent accidental diversions from the racing area. In this context, if a competitor flies out of the optimal path, any trajectory to get back to the track must be made in the direction of a safe area without any persons (public, competitors, helpers, judges).*

#### 2. Safety

*The area where the flight zone is allocated shall be demarcated by a "safety line". The safety line shall surround the start line, end line, obstacles, 3D flight path, trajectories to get back to the track and areas which a model can reach in case of crash or losing of control.*

*The safety line must be an unmistakable physical element or marker that must not be crossed by any person without the authorization of an official. The organiser must prepare basic procedures in case of fire or first aid inside the safety line. The plans must be informed to any person before being authorised to cross the safety line*

*During races or if any model is flying, the presence of any person without the adequate safety equipment (nets, cages, protection suit) in the flight area is strictly forbidden.*

*The organiser must take care that the flights, live viewing and media coverage of the event can be done while guaranteeing the safety of the concerned persons. Areas for competitors, officials and spectators must be secured (nets, fences, transparent walls, recommended minimum separation,...) to avoid uncontrolled models reaching them.*

#### 3. Obstacles

*The number of obstacles must be adapted to the environment characteristics; in particular, the available space. The number of obstacles shall maximise competition and demonstrate competitor skills.*

*Obstacles can be located at any height and position. The flight path between obstacles must allow a smooth flight.*

*Obstacles must contrast with the background and be perfectly visible with a standard FPV video device at a distance of 30 m. The flight path, once in the area defined by the obstacle, must be clearly marked and obvious to follow.*

*There are two types of obstacles:*

##### 1) Obstacles to be crossed

*This type of obstacle (single air gate, combination of air gates, tunnel, etc.) can be crossed in any 3D direction. The internal space can be 2D or 3D of any length and shape. The internal space along with any area used by the optimal flight path must be free of any rigging (wire, rope, etc.).*

*The obstacle inside shall be free space within a minimum diameter of 1.5 m centred in the optimal flight path.*

##### 2) Obstacles to be avoided

*This type of obstacle (wall, flag, pylon, flyer, etc.) defines virtual or physical areas that are not intended to cross. They can be a single obstacle to avoid shortcuts or a combination of them that create structures such as horizontal or vertical slaloms.*

*The design must allow a free space to avoid the obstacle. The free space shall be of a minimum 2.5 m diameter centred in the optimal 3D flight path.*

**Note:** Small gates/obstacles are not recommended considering this increases the risk of collisions between models passing the gate/obstacle at the same moment.

Reasonable efforts should be made by organisers to create or to cover obstacles by shock absorbing materials to protect models in case of a crash.

#### **4. Finish line**

The finish line indicates the end of the race. If the track is a closed circuit, the finish line is not necessarily on the circuit track.

The finish line shall be defined by a 2D area to be crossed. The competitor finishes the race when his/her model touches the area and crosses it completely.

There shall be a pick-up area after the finish line to land or to recover safely the models. The area shall be designed not to interfere after crossing the finish line with the flight of the other competitors.

## - ANNEX C.2 -

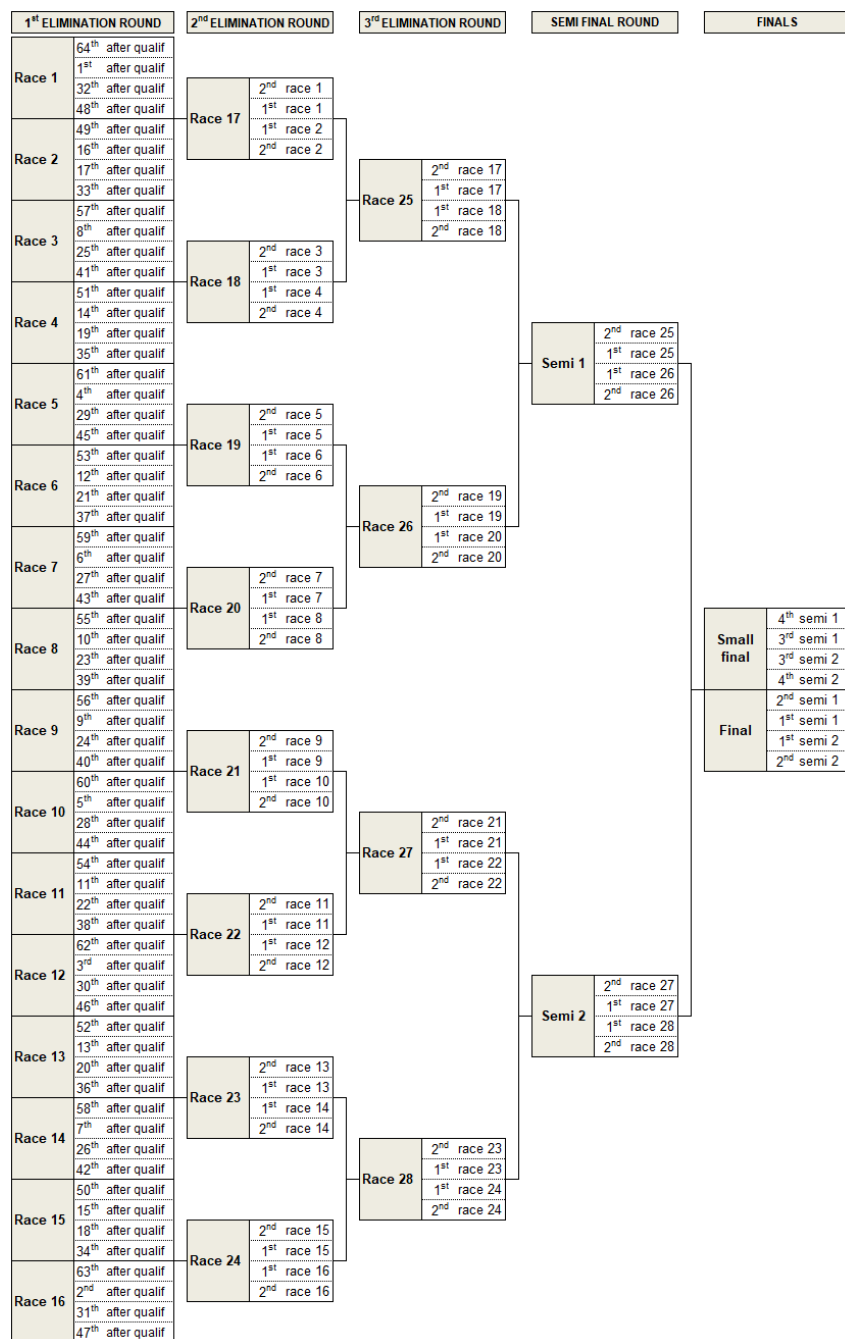
### SCENARIO A - 64 competitors selected from qualification stage

#### 1. COMPOSITION OF THE RACES FOR THE 1<sup>ST</sup> ELIMINATION ROUND

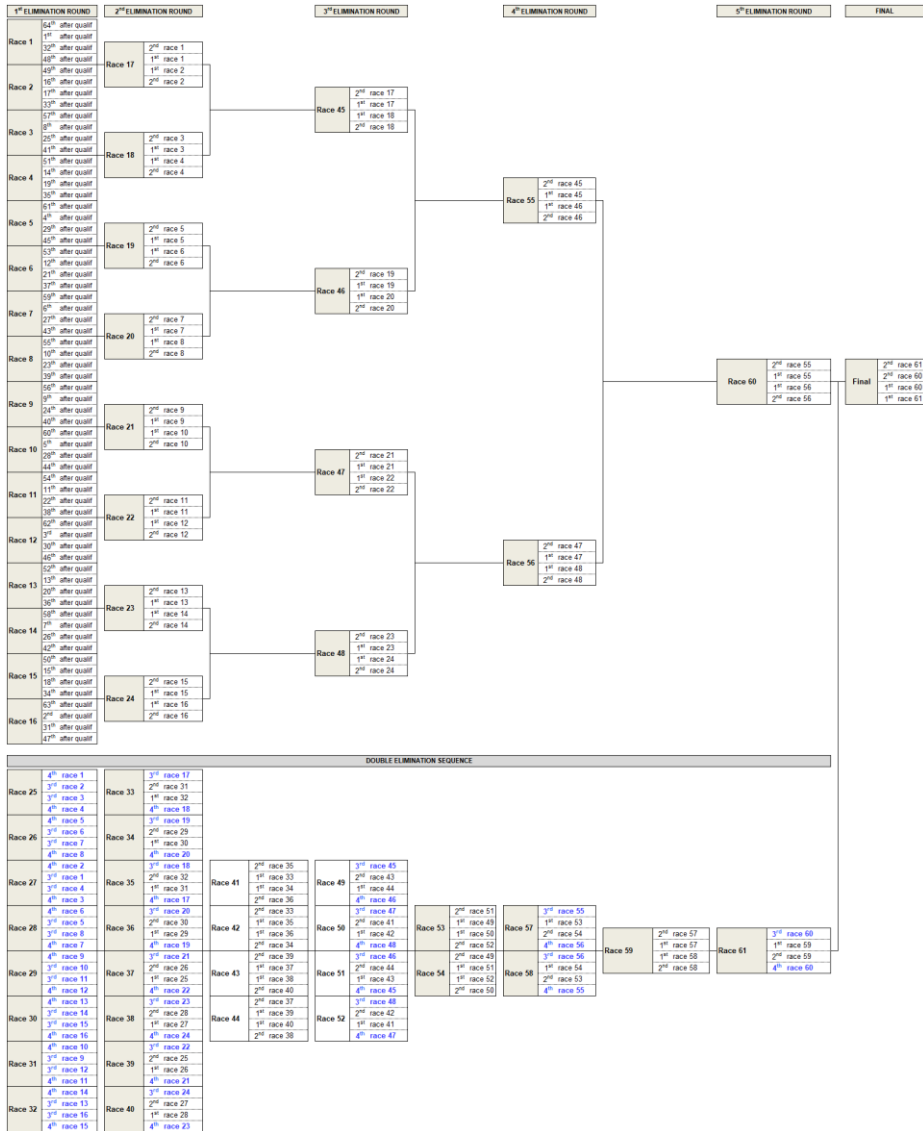
<b>Race 1</b>	Placed 1	Placed 32	Placed 48	Placed 64
<b>Race 2</b>	Placed 16	Placed 17	Placed 33	Placed 49
<b>Race 3</b>	Placed 8	Placed 25	Placed 41	Placed 57
<b>Race 4</b>	Placed 14	Placed 19	Placed 35	Placed 51
<b>Race 5</b>	Placed 4	Placed 29	Placed 45	Placed 61
<b>Race 6</b>	Placed 12	Placed 21	Placed 37	Placed 53
<b>Race 7</b>	Placed 6	Placed 27	Placed 43	Placed 59
<b>Race 8</b>	Placed 10	Placed 23	Placed 39	Placed 55
<b>Race 9</b>	Placed 9	Placed 24	Placed 40	Placed 56
<b>Race 10</b>	Placed 5	Placed 28	Placed 44	Placed 60
<b>Race 11</b>	Placed 11	Placed 22	Placed 38	Placed 54
<b>Race 12</b>	Placed 3	Placed 30	Placed 46	Placed 62
<b>Race 13</b>	Placed 13	Placed 20	Placed 36	Placed 52
<b>Race 14</b>	Placed 7	Placed 26	Placed 42	Placed 58
<b>Race 15</b>	Placed 15	Placed 18	Placed 34	Placed 50
<b>Race 16</b>	Placed 2	Placed 31	Placed 47	Placed 63



## 2. ORGANISATION OF THE ROUNDS (WITHOUT APPLYING DOUBLE ELIMINATION OPTIONAL SEQUENCE)



3. ORGANISATION OF THE ROUNDS WITH THE DOUBLE ELIMINATION SEQUENCE



#### 4. FINAL CLASSIFICATION

Place	Without double elimination	Place	With double elimination
1	1 <sup>st</sup> in final	1	1 <sup>st</sup> in final
2	2 <sup>nd</sup> in final	2	2 <sup>nd</sup> in final
3	3 <sup>rd</sup> in final	3	3 <sup>rd</sup> in final
4	4 <sup>th</sup> in final	4	4 <sup>th</sup> in final
5	1 <sup>st</sup> in small final	5	3 <sup>rd</sup> in race 61
6	2 <sup>nd</sup> in small final	6	4 <sup>th</sup> in race 61
7	3 <sup>rd</sup> in small final	7	3 <sup>rd</sup> in race 59
8	4 <sup>th</sup> in small final	8	4 <sup>th</sup> in race 59
9 to 16	3 <sup>rd</sup> and 4 <sup>th</sup> in races 25 to 28 with final placing according to provisional ranking after qualifying stage	9 to 12	3 <sup>rd</sup> and 4 <sup>th</sup> in races 57 and 58 with final placing according to provisional ranking after qualifying stage
17 to 32	3 <sup>rd</sup> and 4 <sup>th</sup> in races 17 to 24 with final placing according to provisional ranking after qualifying stage	13 to 16	3 <sup>rd</sup> and 4 <sup>th</sup> in races 53 and 54 with final placing according to provisional ranking after qualifying stage
33 to 64	3 <sup>rd</sup> and 4 <sup>th</sup> in races 1 to 16 with final placing according to provisional ranking after qualifying stage	17 to 24	3 <sup>rd</sup> and 4 <sup>th</sup> in races 49 to 52 with final placing according to provisional ranking after qualifying stage
		25 to 32	3 <sup>rd</sup> and 4 <sup>th</sup> in races 41 to 44 with final placing according to provisional ranking after qualifying stage
		33 to 48	3 <sup>rd</sup> and 4 <sup>th</sup> in races 33 to 40 with final placing according to provisional ranking after qualifying stage
		49 to 64	3 <sup>rd</sup> and 4 <sup>th</sup> in races 25 to 32 with final placing according to provisional ranking after qualifying stage
<b>With additional rounds sequence</b>			
65 and beyond	<b>Sequence with successive eliminating rounds as proceeded for the elimination stage:</b> Placing done as defined for places 1 to 64.		
	<b>Sequence based on a fixed number of additional rounds for all competitors:</b> Placing according to sum of points in all additional rounds. In case of tie, provisional ranking after qualifying stage considered to split the tie for the concerned competitors.		
	<b>Additional rounds sequence not applied</b> Placing according to provisional ranking after qualifying stage.		

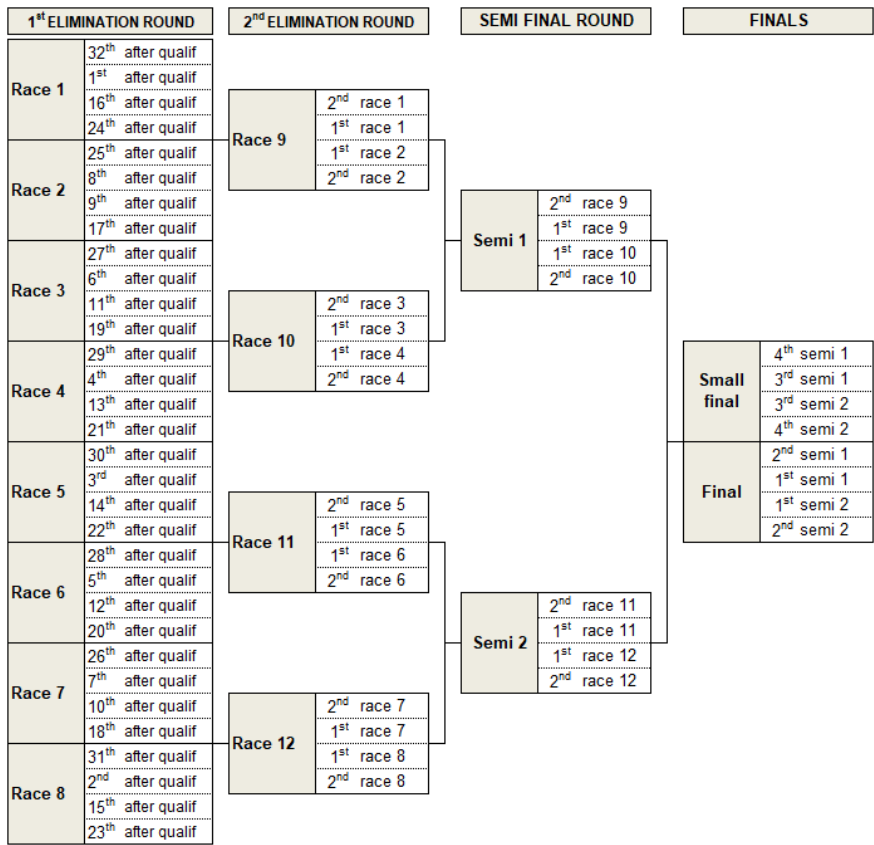
- ANNEX C.3 -

SCENARIO B - 32 competitors selected from qualification stage

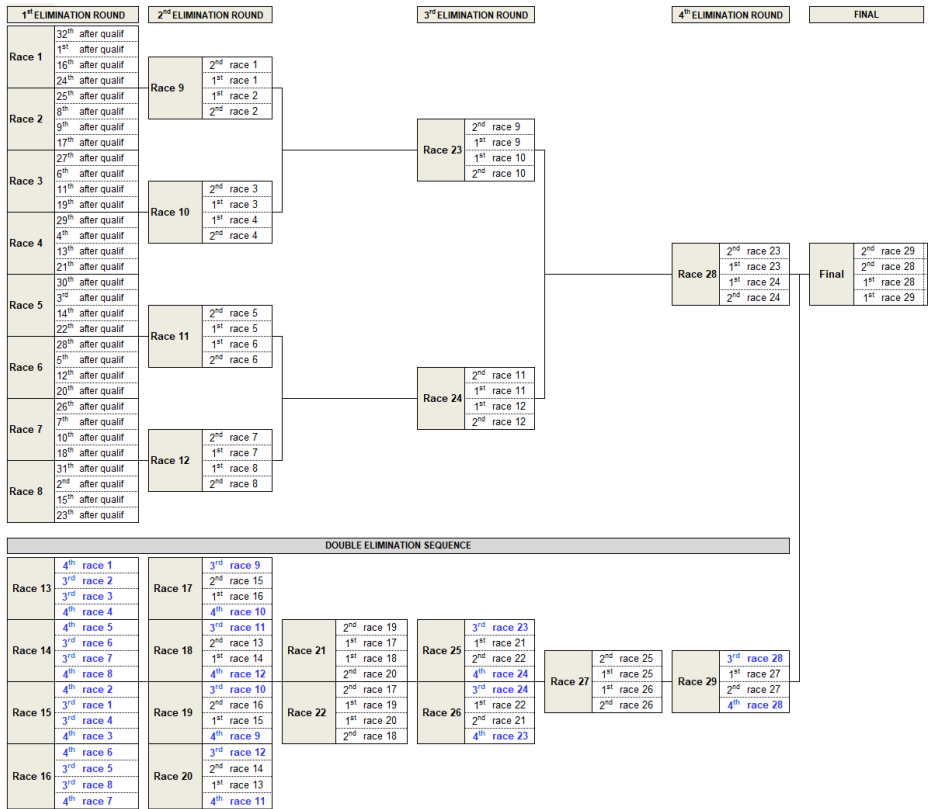
1. COMPOSITION OF THE RACES FOR THE 1<sup>ST</sup> ELIMINATION ROUND

Race 1	Placed 1	Placed 16	Placed 24	Placed 32
Race 2	Placed 8	Placed 9	Placed 17	Placed 25
Race 3	Placed 6	Placed 11	Placed 19	Placed 27
Race 4	Placed 4	Placed 13	Placed 21	Placed 29
Race 5	Placed 3	Placed 14	Placed 22	Placed 30
Race 6	Placed 5	Placed 12	Placed 20	Placed 28
Race 7	Placed 7	Placed 10	Placed 18	Placed 26
Race 8	Placed 2	Placed 15	Placed 23	Placed 31

2. ORGANISATION OF THE EVENT (WITHOUT DOUBLE ELIMINATION)



3. ORGANISATION OF THE EVENT WITH THE DOUBLE ELIMINATION



4. FINAL CLASSIFICATION

Place	Without double elimination	Place	With double elimination
1	1 <sup>st</sup> in final	1	1 <sup>st</sup> in final
2	2 <sup>nd</sup> in final	2	2 <sup>nd</sup> in final
3	3 <sup>rd</sup> in final	3	3 <sup>rd</sup> in final
4	4 <sup>th</sup> in final	4	4 <sup>th</sup> in final
5	1 <sup>st</sup> in small final	5	3 <sup>rd</sup> in race 29
6	2 <sup>nd</sup> in small final	6	4 <sup>th</sup> in race 29
7	3 <sup>rd</sup> in small final	7	3 <sup>rd</sup> in race 27
8	4 <sup>th</sup> in small final	8	4 <sup>th</sup> in race 27
9 to 16	3 <sup>rd</sup> and 4 <sup>th</sup> in races 9 to 12 with final placing according to provisional ranking after qualifying stage	9 to 12	3 <sup>rd</sup> and 4 <sup>th</sup> in races 25 and 26 with final placing according to provisional ranking after qualifying stage
17 to 32	3 <sup>rd</sup> and 4 <sup>th</sup> in races 1 to 8 with final placing according to provisional ranking after qualifying stage	13 to 16	3 <sup>rd</sup> and 4 <sup>th</sup> in races 21 and 22 with final placing according to provisional ranking after qualifying stage
		17 to 24	3 <sup>rd</sup> and 4 <sup>th</sup> in races 17 to 20 with final placing according to provisional ranking after qualifying stage
		25 to 32	3 <sup>rd</sup> and 4 <sup>th</sup> in races 13 to 16 with final placing according to provisional ranking after qualifying stage
<b>With additional rounds sequence</b>			
Sequence with successive eliminating rounds as proceeded for the elimination stage: Placing done as defined for places 1 to 32.			
Sequence based on a fixed number of additional rounds for all competitors: Placing according to sum of points in all additional rounds. In case of tie, provisional ranking after qualifying stage considered to split the tie for the concerned competitors.			
<b>Additional rounds sequence not applied</b>			
Placing according to provisional ranking after qualifying stage.			

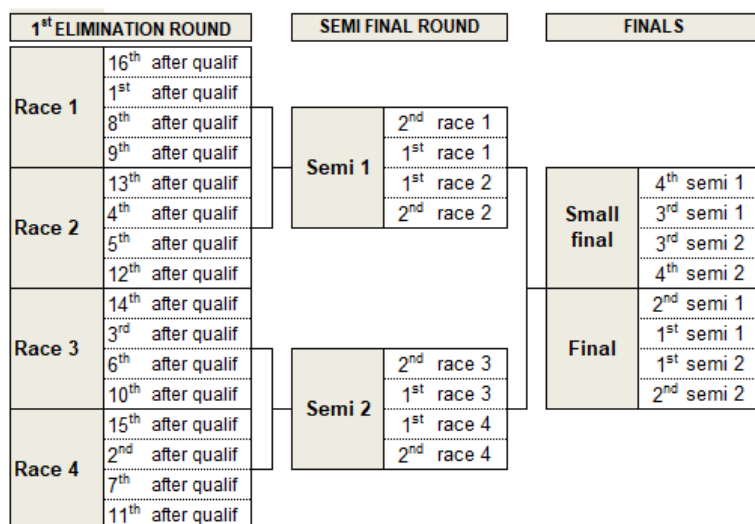
## - ANNEX C.4 -

### SCENARIO C - 16 competitors selected from qualification stage

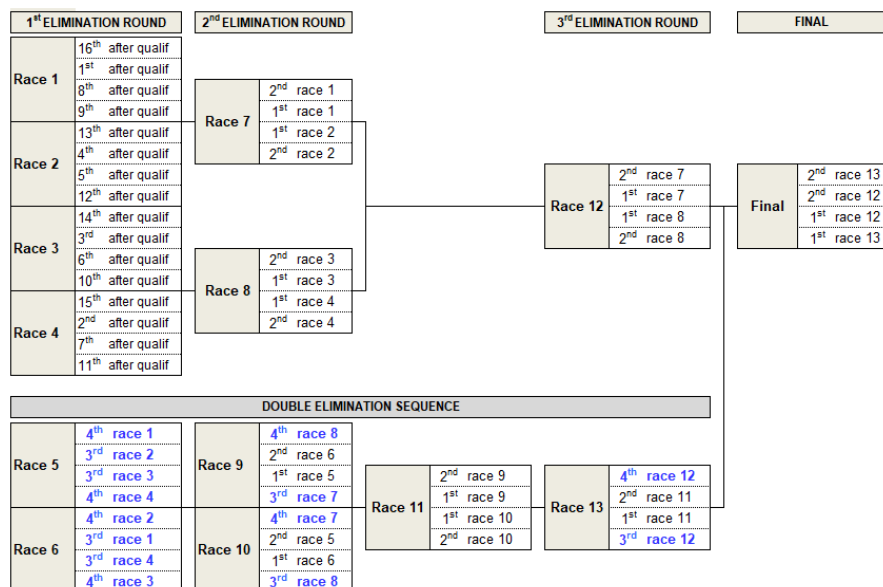
#### 1. COMPOSITION OF THE RACES FOR THE 1<sup>ST</sup> ELIMINATION ROUND

Race 1	Placed 1	Placed 8	Placed 9	Placed 16
Race 2	Placed 4	Placed 5	Placed 12	Placed 13
Race 3	Placed 3	Placed 6	Placed 10	Placed 14
Race 4	Placed 2	Placed 7	Placed 11	Placed 15

#### 2. ORGANISATION OF THE EVENT (WITHOUT DOUBLE ELIMINATION)



### 3. ORGANISATION OF THE EVENT WITH DOUBLE ELIMINATION



### 4. FINAL CLASSIFICATION

Place	Without double elimination	Place	With double elimination
1	1 <sup>st</sup> in final	1	1 <sup>st</sup> in final
2	2 <sup>nd</sup> in final	2	2 <sup>nd</sup> in final
3	3 <sup>rd</sup> in final	3	3 <sup>rd</sup> in final
4	4 <sup>th</sup> in final	4	4 <sup>th</sup> in final
5	1 <sup>st</sup> in small final	5	3 <sup>rd</sup> in race 13
6	2 <sup>nd</sup> in small final	6	4 <sup>th</sup> in race 13
7	3 <sup>rd</sup> in small final	7	3 <sup>rd</sup> in race 11
8	4 <sup>th</sup> in small final	8	4 <sup>th</sup> in race 11
9 to 16	3 <sup>rd</sup> and 4 <sup>th</sup> in races 1 to 4 with final placing according to provisional ranking after qualifying stage	9 to 12	3 <sup>rd</sup> and 4 <sup>th</sup> in races 9 and 10 with final placing according to provisional ranking after qualifying stage
		13 to 16	3 <sup>rd</sup> and 4 <sup>th</sup> in races 5 and 6 with final placing according to provisional ranking after qualifying stage

With additional rounds sequence	
17 and beyond	Sequence with successive eliminating rounds as proceeded for the elimination stage: Placing done as defined for places 1 to 16.
	Sequence based on a fixed number of additional rounds for all competitors: Placing according to sum of points in all additional rounds. In case of tie, provisional ranking after qualifying stage considered to split the tie for the concerned competitors.
	Additional rounds sequence not applied Placing according to provisional ranking after qualifying stage.

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## FAI AUTHORITY

The competition will be conducted under the authority granted by the FAI, according to the regulations of the Sporting Code of the FAI, General Section, and Section 4 as approved by the CIAM and validated by the FAI, and these rules. All participants accept these rules and the FAI regulations as binding by registering in the competition.



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