Fédération Aéronautique Internationale

Drone model aircraft event
Draft rule

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Maison du Sport Intenational
Avenue de Rhodanie 54
CH-1007 Lausanne
Switzerland
Tel: +41(0)21/345.10.70
Fax: +41(0)21/345.10.77
Email: sec@fai.org
Web: www.fai.org

FEDERATION AERONAUTIQUE INTERNATIONALE

Maison du Sport International, Avenue de Rhodanie 54, CH-1007 Lausanne, Switzerland

DRAFT RULE FOR A DRONE MODEL AIRCRAFT EVENT

TECHNICAL REGULATIONS FOR DRONE MODEL AIRCRAFT EVENTS

Miniaturization of on-board electronic devices (video camera, gyro sensors, altimeter, telemetry, GPS, ...) and advanced flight systems (flight stabilisation, automatic flight control,...) offer new possibilities for model aircraft and open the field of exciting aeromodelling activities.

As an illustration, First Person View (FPV) activities are more and more developed in some counties regarding the actual performances of on-board video cameras with transmission to a pilot headset goggle or to a screen on ground.

This draft rule document has to be considered as a base for organisation of recreational or sporting events for "drone model aircraft". It must be clearly considered only as a guideline document and definitively not as an official FAI set of rules.

Such events can be organised on a national basis, but also on an international one if a country is interested to organize an international event. In case of an international event, it is strongly recommended to publish it on the FAI calendar in order to get better information.

Note: *for aeromodelling activities, use of terms such as Unmanned Aerial Vehicle (UAV), Unmanned Aircraft System (UAS) Remotely Piloted Vehicle (RPV) or Remotely Piloted Aircraft System (RPAS) must be avoided. Indeed, those terms are directly relative to FAI class U which corresponds to professional activities (scientific research, commercial, governmental or military purposes) done with aerodyne that does not carry a human being. It is important to avoid any confusion between those professional activities and aeromodelling activities (competition, sport or recreational purposes) corresponding to class F.*

1. DEFINITIONS

1.1. General definitions

Aircraft: vehicle that can be sustained in the atmosphere by forces exerted on it by the air.

Aerodyne: aircraft heavier-than-air which derives its lift in flight mainly from aerodynamic forces.

Model aircraft (FAI class F)**:** aircraft of limited dimensions, with or without a propulsion device, not able to carry a human being and to be used for competition, sport or recreational purposes.

Important: *for the whole flight, a radio-controlled model aircraft must be within visual line of sight (VLOS) of the person who directly assumes its control or who is in a situation to take the direct control at any moment, including if the model is being flown automatically to a selected location.*

Fixed wing model aircraft: model aircraft with mean(s) of propulsion which derives its major lift from fixed wing(s) surface(s).

Rotary wing model aircraft: model aircraft with mean(s) of propulsion which derives the whole or a substantial part of its lift from a rotary wing system.

Multi-rotor (or multi-copter) **model aircraft:** rotary wing model aircraft with more than two rotors.

1.2. Definitions relative to drone model aircraft

Drone model aircraft: model aircraft equipped with on-board electronic devices (video camera, gyro sensors, altimeter, telemetry, GPS, , ...) at ends of catch of sight with information feedback towards the operator(s) and/or for automatic flight control.

Note: *a drone model aircraft such as defined in the present document is with a mean of propulsion; it can be rotorcraft (such as a multi-rotor) or fixed-wing.*

Self-guided drone (model aircraft)**:** drone model aircraft equipped with a programmable autopilot system which can automatically stabilize the drone and/or initiate a programmed flight path. Such a drone is mission orientated and computer controlled nearly its entire flight, but it must be possible for the flight operator to desactivate at any moment the autopilot system.

Note: *it is strongly recommended that the system includes a "Return To Home" (RTH) function so that the drone may automatically return to a selected location in case of lost of the radio link.*

Flight operator: person who flies the drone model aircraft and takes flight decisions based on received information.

Important:

VLOS of the drone model aircraft must be maintained at any moment of the flight. So, a self guided drone model aircraft must be maintained within visual line of sight (VSOL) for the whole flight.

If the flight operator is not sure to be in VLOS of the model aircraft at any moment of the flight, he must have a helper in situation to maintain permanent direct unaided visual contact with the model aircraft and to take if necessary the direct control or to inform immediately the flight operator of any danger.

FPV flight requires such a helper (other than the FPV flight operator) in situation to guarantee the VSOL of the drone model aircraft during all the flight.

First Person View (FPV)**:** video view of the model aircraft's camera transmitted to a pilot headset goggle or to a screen on ground.

Note: *it is strongly recommended that the system is configured to initiate a failsafe procedure cutting off motors when losing the radio link.*

2. GENERAL CHARACTERISTICS OF THE DRONE MODEL AIRCRAFT

For an event as concerned in the present document, it is recommended to limit the maximum flying mass to 5 kg. In any case, the flying mass must not be over 25 kg which correspond to a general characteristic of a model aircraft (see Volume ABR Section 4C 1.2).

For respect of environment, noise limit of 96 dB(A) at 3 metres is also strongly recommended to be imposed.

Other specifications may be defined for the event such as a maximum span for a fixed wing or swept area of the lifting rotor(s) for a multi-rotor drone model aircraft.

3. GENERAL CONSIDERATIONS

Two types of events are covered in the document:

- Contest event for multi-rotor drone model aircraft (FPV Racing and Freestyle Aerobatics).
- Recreational event based on a list of flight tasks to be done (task A to task H) for multi-rotor and/or fixed wing drone model aircraft.

For the recreational event based on a list of flight tasks, the list of flight tasks and the corresponding rules must be published by the organiser before the event, and preferably in advance of the entry deadline. The event rules must precise how the final placing will be done and if each participant may or not choose a limited number of flight tasks to fly.

For both types of events, the organiser must provide a suitable site according to the flights tasks and that permits flights under safety conditions with safe recovery of the drone

The organiser must also organise the different controls to be done prior to the beginning of the flights: checking of frequencies, control of the individual participant insurance, checking of the documents required such as certificates, processing of the drones (for example mass), …

4. OFFICIALS

4.1. Event Director

It is strongly recommended for the organiser to nominate an Event Director responsible for the management of the event and smooth and safe running.

The Event Director shall take operational decisions in accordance with the event rules. He must also take care about a sufficient number of qualified officials and the necessary technical equipment (electronic stopwatches, distance measurement devices, target equipment,…).

4.2. Flight Director

It is also recommended to nominate a Flight Director in charge of the march of the flight tasks.

The Flight Director defines the flight conditions for each flight task (take-off area, targets, timing, measured distance, …), controls the evolution of the flight tasks and validates them.

The Flight Director may:

- cancel a task if the weather conditions do not allow a normal and equal flight between competitors,
- invalidate a task if all competitors receive zero for their flight score.

4.3. Panel of judges

It is recommended to nominate a Panel of judges including a Chairman, the Flight Director and one other judge. The Panel of judges must be defined prior to the start of the event and the members shall be chosen for their experience and/or drone model aircraft competence.

It is the responsibility of the Panel of judges, in conjunction with the Event Director, to make any decision dictated by the event circumstances that may arise. The Panel of judges can penalise / disqualify a participant for infringement to the rules, misconduct, unsafe or unsporting behaviour.

Any decision from the Panel of judges is obtained by majority vote and in the case of a tie the Chairman makes the final decision.

4.4. Other officials

Other officials can be in charge of distance measurements or timekeeping, and of other observations.

Those officials will be nominated provided they are qualified or trained for the activity they have to perform.

They will report as necessary to the Flight Director and/or to the Chairman of the Panel of judges of any incident or deviation occurring during the event.

5. PARTICIPANTS AND HELPERS

It is the participant's responsibility to obtain the event rules.

Entry can be closed at a deadline date defined by the organiser.

By his entry, each participant recognises that he accepts, and will comply with, the event rules and especially on safety.

Each participant must comply with the national regulations such as (but not limited to): flight drone authorisation, pilot degree, insurance, radio equipment. Unless specific agreement is obtained from authorities, the radio frequencies must fit the regulations of the organising country.

Each participant can be allowed one helper but who is not allowed in normal flight to touch the radio equipment.

6. SAFETY

The Event Director, the Flight Director and other judges must always take care about safety and ensure that participants, helpers and officials involved in the flying site comply with the safety rules defined by the organiser.

Any participant who infringes or ignores the safety rules may be disqualified, without right of appeal. Any other person who deliberately infringes or ignores the safety rules may be excluded from the flying site.

7. LOCAL RULES

The organizer may define any local rule that he considers appropriate especially in order to respect the airworthiness and airspace regulations applicable in the organizing country.

Such local rules may especially concern:

- how to respect the permanent VSOL of the drone (safety operator, …),
- national regulation applicable for FPV flight (safety operator with or without a dual radio-control transmitter, RTH function, …).
- limitation regarding dropping of objects.

8. EVENT RESULTS

The organiser must inform the participants on results throughout the event and publish the final results and placing as soon as possible after the last flight task is finished.

It is recommended to publish the official results and placing within one week after the event.

9. CONTEST EVENT

Note: *FPV Racing and Freestyle Aerobatics concern multi-rotors only.*

9.1. FPV Racing

The competition can start by a qualification sequence based on the best time lap done by each competitor (one competitor in flight at the same moment). As defined by the organiser, each registered competitor may have two or more timed qualification runs; the best time lap done by each participant is taken in account for the ranking after qualification.

The number of competitors selected for the race rounds from the qualification sequence is defined by the organiser.

Each race round is defined by the ranking issued from the qualification times, so that the fastest qualified competitors are in different rounds.

The race rounds are conducted in groups of a maximum of four competitors. The fastest two competitors in the race of each group are selected for the next race round until four competitors remain for a final race. The final race will determine the first, second, third and fourth places.

Note: *depending of the number of competitors selected for the race rounds from the qualification sequence, it could be justified to conduct race rounds with groups of three competitors instead of four, for example if there are twelve competitors selected.*

9.1.1. Classes

The competition can be organised with only one class only (all types of multi-rotors together) or with different classes such as defined by the organiser prior to the competition.

Classes can be for example defined considering the diameter of the propellers:

- Class A: maximum propeller diameter of 5 inches.
- Class B: diameter propeller between 5 inches and a maximum of 7 inches.
- Class C: diameter propeller between 5 inches and a maximum of 10 inches.

Classes may also be defined as follows (maximum 6 motors for all classes and LiPo batteries only):

a) Limited Mini Class
   - 250 mm max axis motors spacing.
   - 6 inches maximum prop diameter.
   - Batteries: Electric motors are limited to a maximum no load voltage of 17 volts (4S) for the propulsion circuit.

b) Unlimited Mini Class
   - 300 mm max axis motor spacing.
   - 7 inches max prop diameter.
   - Batteries: Electric motors are limited to a maximum no load voltage of 17 volts (4S) for the propulsion circuit.

c) Open Class: any multi-rotor which does not meet the specifications of the two Mini Classes. For safety, a maximum flying weight of 2 kg is recommended.

9.1.2. Multi-rotor equipment

The multi-rotor must be equipped with a failsafe system that cut immediately motors as soon as radio signal is lost.

Autopilot system with GPS and/or RTH is not allowed.

9.1.3. Circuit

The circuit is defined by the organizer taking care about safety of officials, competitors and spectators alike.

The circuit may be:

- a path marked through a wooded area or,
- a path marked through a man made structure,
- or a series of marked gates in an open field,
- or any combination of the above.

The number of laps for the race rounds is defined by the organiser prior to the competition but in such a way that the time race is between 2 and 6 minutes. The number of laps for the final race can be different for example the double of the number of laps defined for race rounds.

9.1.4. Time result

Competitors will take-off from ground within a designated start area.

A box for timed events, from behind a line for group races. The multi-rotors are placed in the start area armed and ready to fly; that can be done by an helper for each competitor. It is recommended that motors are not running before start but that is not always possible with some flight controllers.

The competitors will take place in the designated pilots area and will await the call of the official timer.

Note: *as this is an FPV event in which the competitors fly via a video feed from the multi-rotor, the pilots area does not need to be adjacent to the start area.*

The official timer should give for the start of the race a clear countdown, second per second for the last 5 seconds. The timekeeping starts when the start of the race is announced. The time is stopped when any part of the multi-rotor crosses the finish line.

If the finish line is some distance from the start area, and/or from the pilots area, then the timekeepers should be near the finish line.

9.1.5. Video transmitter frequency allocation

Each competitor must take care that his video transmitter is not powered when he is not racing in order to avoid interference with competitors who are flying.

Powering a video transmitter on a channel being used but another competitor who is racing may conduct the offender to be excluded from the event.

Before each race round, the concerned competitors need to ensure they are on a different video channel and do not interfere each other.

9.1.6. Safety

We recommend for this type of race to deploy around the course a number of race officials. These officials will be equipped with walkie-talkies and alarms (Whistle, Horn). In case of intrusion or problem on the course they can immediately stop the race. Any intervention by a official is followed by a full stop of the race. All pilots must land their machine. A pilot does not land his machine is disqualified.

9.2. Freestyle Aerobatics

9.2.1. Specifications

a) Mass: maximum mass (with batteries) of 2 kg.

b) Batteries: electric motors are limited to a maximum no load voltage of 17 volts (4S).

c) Rotor blade or propeller: metal is prohibited.

9.2.2. Number of multi-rotor per competitor

The number of multi-rotor that can be used by a competitor for the competition s not limited.

9.2.3. Helper

After leaving the start box, the pilot is allowed one helper.

The helper may give information to the pilot during the flight.

9.2.4. Contest Area Layout

Refer to the layout at the end of this section. The drawing below shows the recommended layout, the shape and distances of which should be kept for safety.

9.2.5. Types and number of flights

There are two different types of flight: Freestyle and Music Freestyle.

The organiser defines before the competition the number of rounds of flight for the competition with about the same number of rounds on Freestyle flight and on Music Freestyle flight.

The competition can be organised with preliminary rounds (with a minimum of two preliminary rounds) followed by two fly-off rounds (one on Freestyle flight and one Music Freestyle flight) for the top best placed competitors after preliminary rounds. The organiser defines the number of competitors selected for the fly-off rounds within a minimum of 6 and a maximum of 10 (depending of the number of competitors).

9.2.6. Organisation

The flight order for the first round of flight (Freestyle) will be determined by a random draw.

The flight order for round two (Music Freestyle), three (Freestyle), four will start after the first, second and third quarter of the initial order.

In case of fly-off rounds, the flight order for the fly-offs will be determined in the same manner.

Use of music on Freestyle flight is not allowed. Play-back music for Music Freestyle flight is mandatory.

The competitor must be called at least 5 minutes before he is required to enter the start box.

After the preceding competitor has finished his flight, the competitor can enter the start box and is given one minute to make adjustments and final checks.

The multi-rotor may be hovered only up to 2 m in the start box. To reach the flying area, the multi-rotor can be flown or be manually carried.

For each flight, the competitor is given a flight time of at least two minutes, and no more than three minutes. The flight time begins:

- when the competitor or his helper gives a distinctive hand signal;
- or if the multi-rotor leaves the start box before the end of the one minute period of adjustments and checks or if this period finishes.

If the music starts before the flight for Music Freestyle, the flight time starts not later than 15 seconds after the start of the music.

During the flight time, there are no restrictions for the flight or the performed manoeuvres except those regarding safety.

The flight time finishes only with another distinctive helper hand signal.

9.2.7. Safety

The prohibited flying area (see figure below) is observed by the judges. If the safety line is crossed, the flight will be scored zero points.

The competitor may choose his position during the flight with the following constraints:

(a) The multi-rotor must not fly between the pilot and judges.

(b) The pilot must stand in front of the judges.

The non-observance of these constraints will be penalized by a zero score in the safety criterion for the flight

If, during a flight in any of the schedules, a part of the multi-rotor, except the landing gear or top body touches the ground the flight is finished and scored zero points. This does not apply to the multi-rotor tilting over after a landing.

9.2.8. Judging and scoring

The number of judges is at least three, and no more than five.

If the flight time is less than two minutes or more than three, a downgrade of 5 % will be applied on the score of the flight. A flight shorter than one minute thirty seconds or more three minutes thirty seconds will be scored zero points.

Each flight will be scored on the basis of the following criterias.

Criterion	Maximum points for Freestyle flight	Maximum points for Music Freestyle flight
Difficulty	80	40
Harmony	20	40
Creativity	20	40
Precision	20	20
Safety presentation	20	20

The score for each criterion are given after the flight. It is important, that the scores reflect the entire flight, not only some details of the flight.

Difficulty: evaluation of the level of difficulty of the flight. It is important to judge the entire flight, not only some highlights, in such a way the score reflects the average level of difficulty of the total flight. Risky manoeuvres should never be mistaken as difficult manoeuvres and must not lead to higher scores for difficulty, but result in a downgrade for safety.

Harmony: the combination of the manoeuvres, smooth or flowing transitions between them are the main factors for this criterion. The manoeuvres size and dynamic in relation to the multi-rotor performance may be taken in account. Harmony can be as well evaluated in dynamic as in gentle sequences. For Music Freestyle flights, the harmony between the music and the presentation must be taken in account.

Creativity: new combinations or new manoeuvres at all will lead to high scores. Also dynamic and diversified sequences are positive. There also should be a variety of different tempi in the presentation. Sequences without manoeuvres or repetitions will lead to downgrades.

For Music Freestyle flights, the transformation of musical accents into the performance is of great importance.

Precision: precision and recognition of manoeuvres and sequences are evaluated in this criterion.

Safety presentation: in addition to the safety rules, the impression of the presentation related to safety has to be the guide taking in account if the competitor does not exceed the limit of his skills. Flying unsafe in any way (for example too close to himself) results in a downgrade. Flying low (within the rules) by itself is not a reason for downgrade

9.2.9. Classification

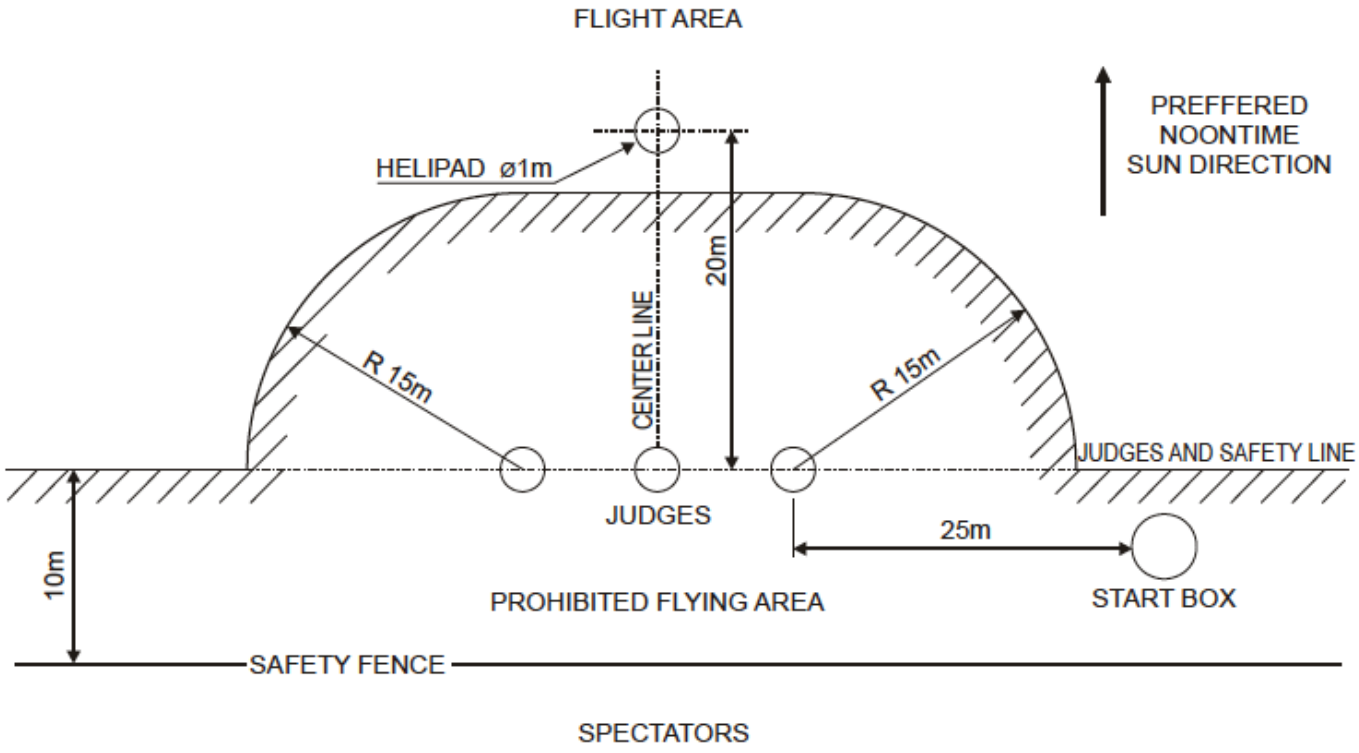
After completion of each round, all scores will be normalized by awarding 1000 points to the highest total score. The scores of the other competitors are then normalized to a percentage in the ratio of actual score over the highest score for the round.

The lowest normalized score of each competitor will not be taken in account for his result (throwaway score). To determine the final result, the other normalized scores are added together and then divided by the number of rounds taken in account. If only one round is flown, then the classification will be based on the normalized score of that unique round.

In case of fly-off rounds, the final result of the preliminary rounds plus the two normalized fly-off scores provide three normalized scores with the best two taken in account for the classification of the finalists.

Ties on placing will be broken by taking on the basis the throwaway score. If a tie still stands for the three first places, a “sudden death“ fly-off (Music Freestyle flight) is organised.

FREESTYLE CONTEST LAYOUT AREA



10. RECREATIONAL EVENT

The event is based on a list of flight tasks to realise.

The event rules will define if rotary wing drones such as multi-rotor are only concerned, or if the event is also opened to fixed wing drones.

Note: *some of the flights tasks which are defined in the present document are mainly adapted only to rotary wing or to fixed wing.*

Some of the flight tasks are adapted fro FPV flight. The event rules will precise id such a task is realised in FPV or not.

For each flight task, a working time is defined which can depend of the flight task. This working time is defined by the Flight Director before the beginning of the flight task or before each round in case of different rounds.

The beginning and end of the working time will be announced with an acoustic signal. The first time when the acoustic signal is heard defines the beginning, and the second one the end of the working time

The penalty points applicable in each task must be defined prior to the beginning of the flight task.

Marker: for some flight tasks, a marker is necessary.

Each participant may have his own marker. The marker shall have a minimum mass of 60 g. A control of the mass of the marker may be done by after each release of the marker.

The marker must be inside the following dimensions volume: 110 mm x 45 mm x 20 mm.

The organiser can mark the marker at the initial processing of the drone done prior to the beginning of the flight tasks.

Flight task score

For each flight, each participant gets a flight score. The score may consist of the distance from target in cm and/or the flight time in seconds and takes in account the eventual penalty points.

For some flight tasks, it is appropriate to fly in groups. In that case, the number of participants in a group is defined in the event rules for each concerned flight task, or by the Flight director prior to the beginning of the flight task. The event rules will also precise how are done the groups, for example by draw.

The results within each group may be normalised if appropriate, 1000 points being the basis for the best score of the winner of the group. In that case, the normalised scores within a group are calculated by using the following formula: Normalised points = Participant's score / Best participant's score x 1000.

For a flight task, different rounds can be organised. In that case, the event rules will precise how is done the calculation for the final scores of the concerned flight tasks. When different rounds are organised and when the flight task does not justify to fly in groups, it could be also be considered appropriate to normalise the results at the end of each round.

General placing

There will be a separate individual placing for each flight task. It is also recommended to have a specific individual placing for juniors (age limit 18 in the year of the event).

It is also possible to define a general placing taking in account all flight task scores. In that case, the event rules must define how will be done that general placing.

10.1. Task A - Fast and Precise

Note: *task for rotary wing drones. This task is organised with one participant in flight at the same moment.*

Flying area: square 50 m x 100 m.

Target area: diameter 2 m with different marked lines circles (for example every 0,5 m radius).

Lowest height to fly: 4 m.

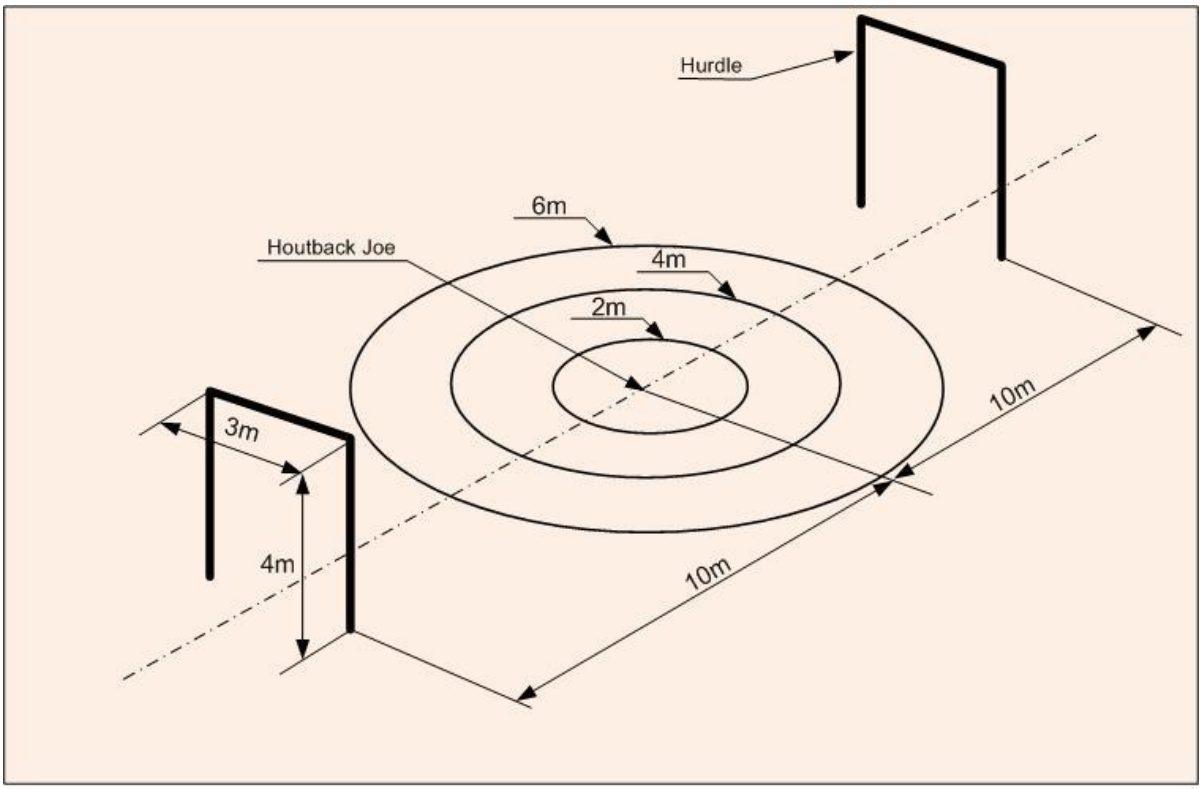
Points are based on the circle in which the marker fells. A marker dropped outside the target area can give penalty points.

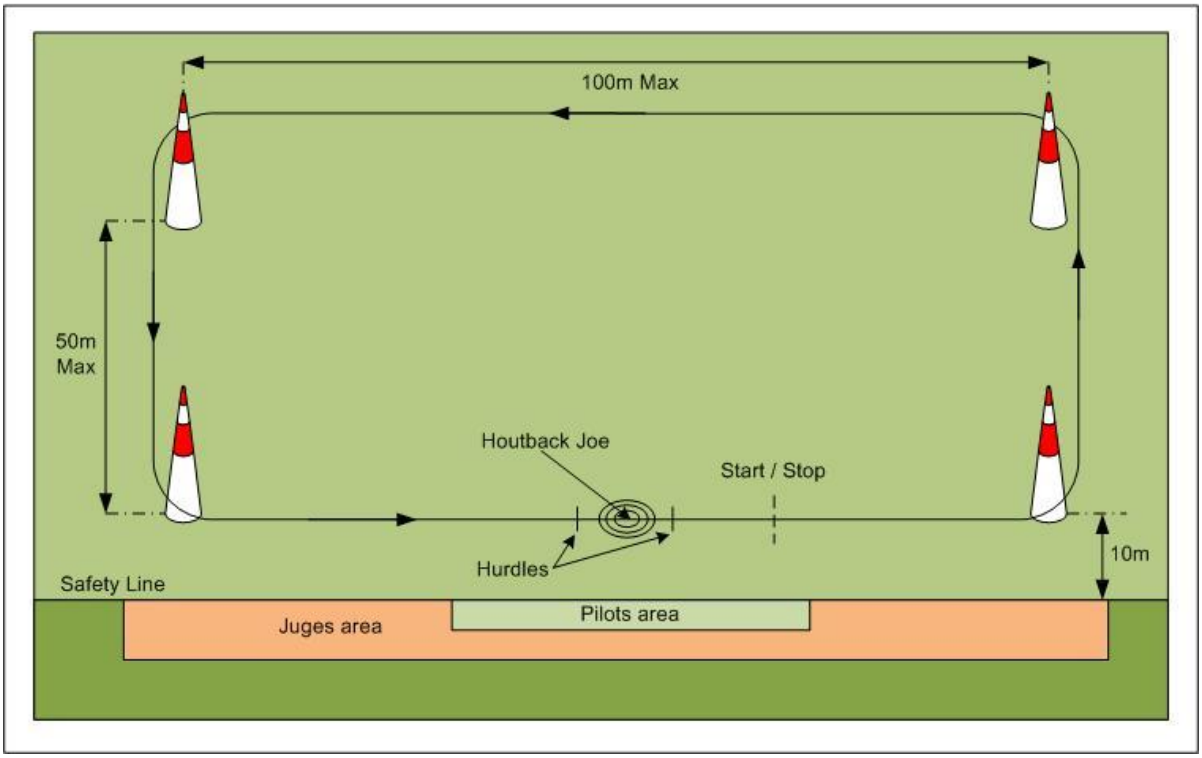
Automatic flight devices (GPS) are forbidden for this event

Goal: Starting from start point and realize x times the flight circuit with a precision landing inside the circle, stopping propellers 5' and restart for a new circle. Approach must be done upside of the hurdle.

Scoring: time between first take off and last landing with motors off.

For each precision landing, 5% downgrade total time if a piece of the drone is outside the circle.





10.2. Task B - Ground targets to find

Note: *task for rotary wing drones and fixed wing drones. This task is adapted to FPV flight. This task can be organised with one participant in flight at the same moment or by groups of 2 or 3.*

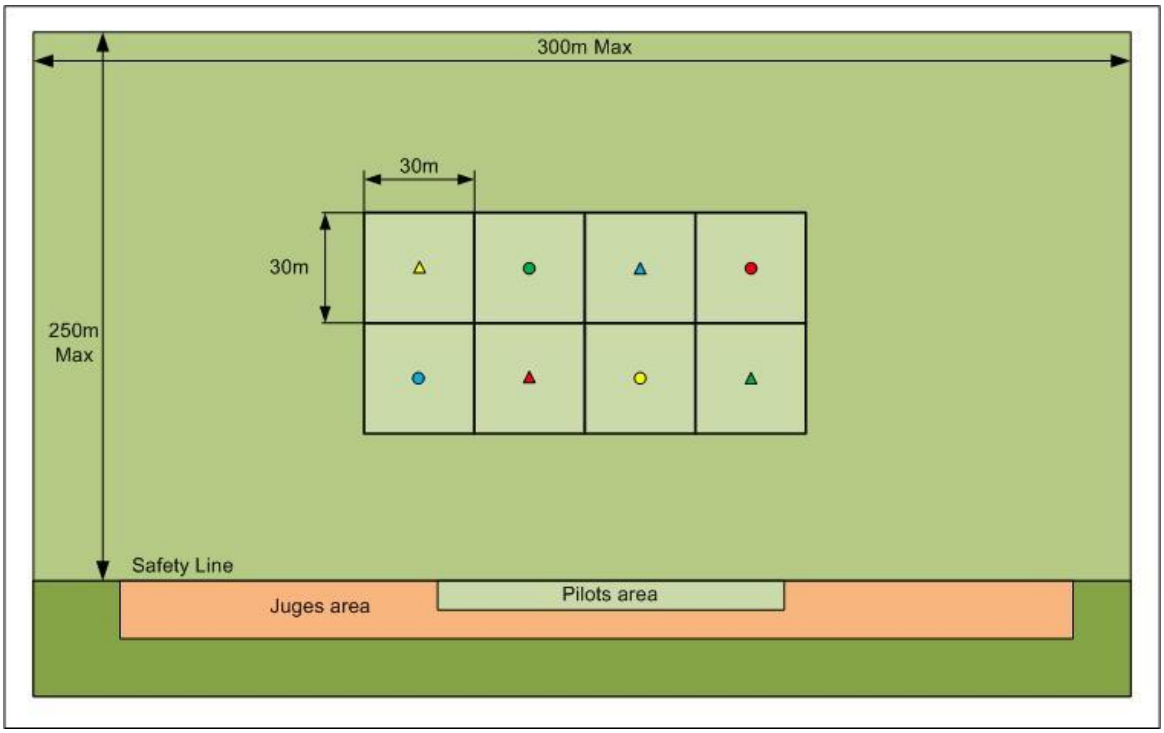
6 target zones marked in a target area of 300 m x 300 m.

The pilot is at a distance of about 100 m from the target area.

The ground target in each target zone must have a size of about 30 cm in order to be clearly visible by the pilot. The ground targets must be distinct (different shape and/or different colour).

For each ground target, the participant will drop its marker.

Points are based on the distance between the marker and the centre of the ground target: for example, one point for each centimetre from the centre of the target and 400 points when the distance is greater than 4 meters.



10.3. Task C - Deck landing

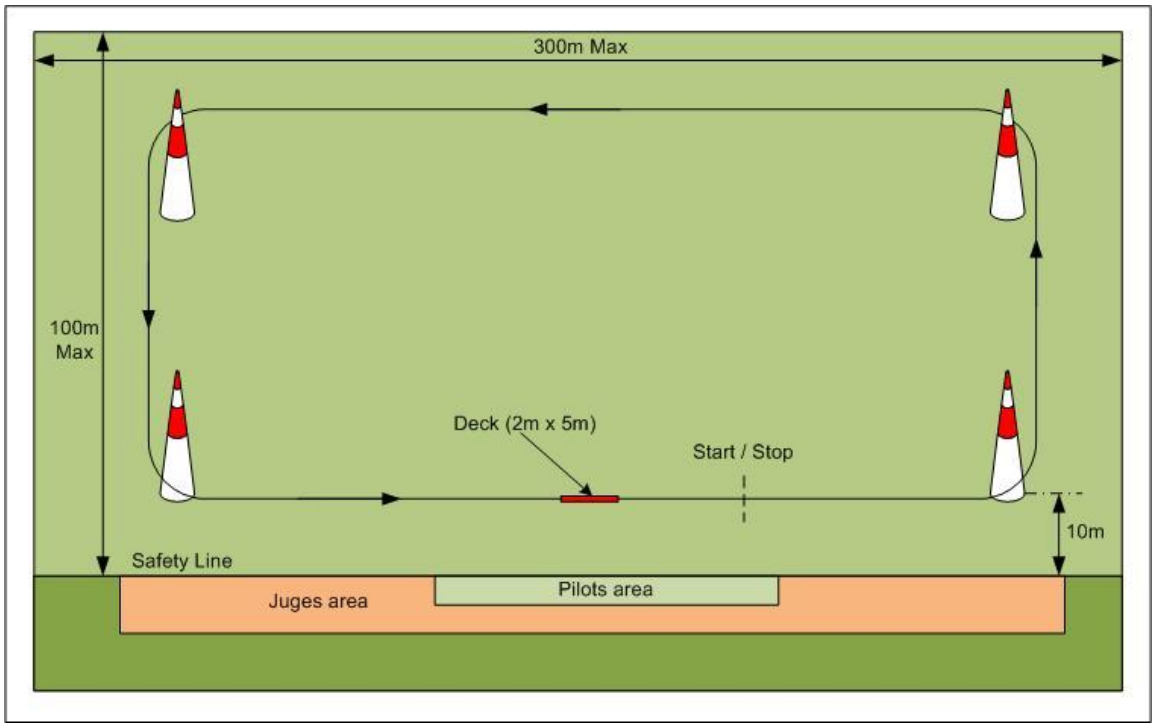
Note: *task mainly for fixed wing drones. This task is adapted to FPV flight. This task can be organised with one participant in flight at the same moment or by groups of 2 or 3.*

Flying area: square 100 m x 300 m.

Target: 2 m x 5 m marked on the ground.

The purpose is to make 5 "touch and go" in the minimum time.

Points are based on the time spent to realize the 5 "touch and go". If all 5 "touch and go" are not realised during the working time, penalty points can be allocated depending the number of "touch and go" realised.



10.4. Task D - Slalom

Note: *task for rotary wing drones and fixed wing drones This task can be organised with one participant in flight at the same moment or by groups of 2 or 3.*

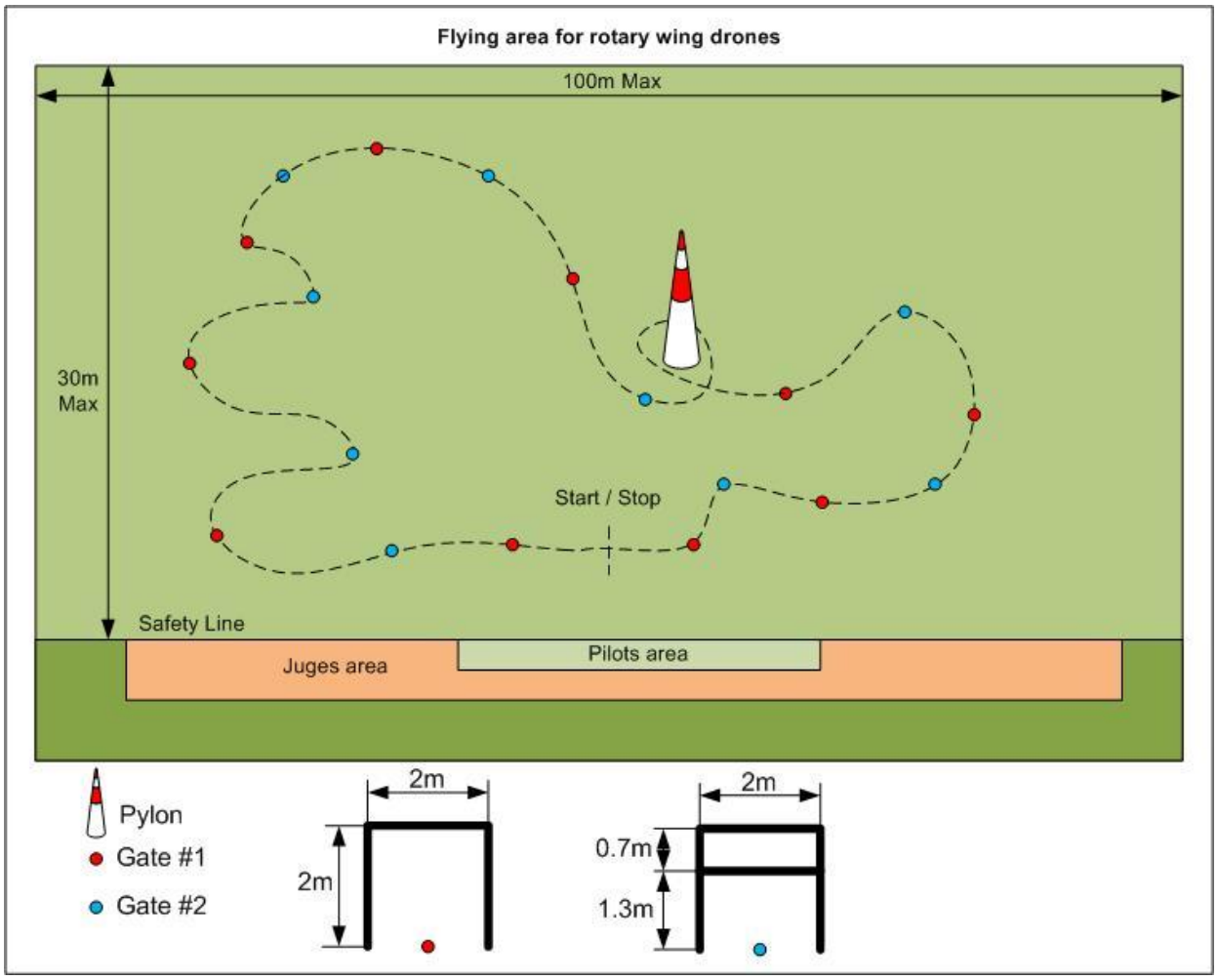
The purpose of this task is to pass through gates, make circles around a mast, and pass under obstacles.

The circuit and the gates are defined by the organiser.

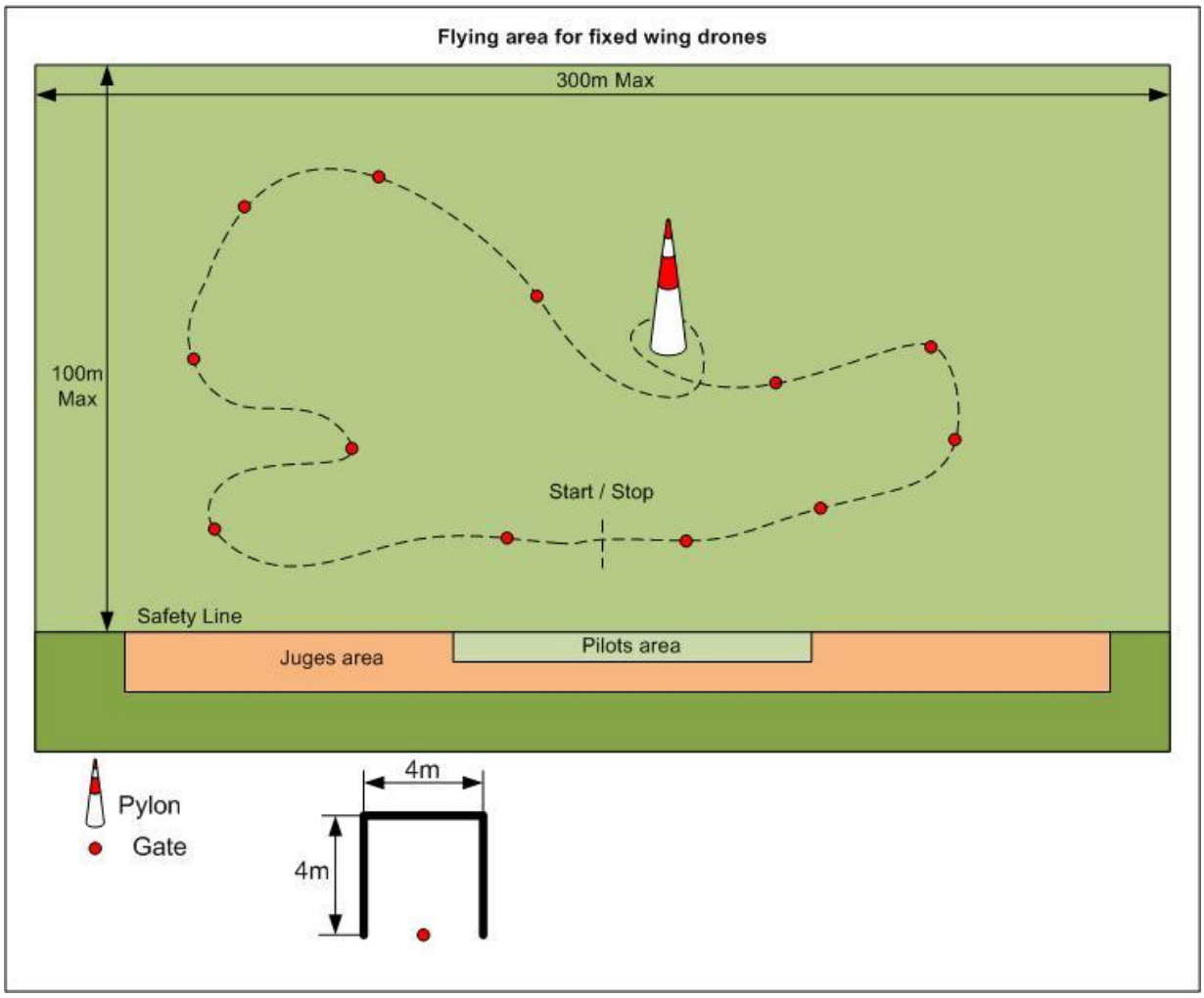
Flight time is recorded in seconds, since the signal of beginning of the working time up to the landing.

Penalty points can be allocated for errors.

Flying area for rotary wing drones: square 30 m x 100 m.



Flying area for fixed-wing drones: square 100 m x 300 m.



10.5. Task E - Tunnel

Note: *task for rotary wing drones and fixed wing drones. This task is adapted to FPV flight. This task can be organised with one participant in flight at the same moment or by groups of 2 or 3.*

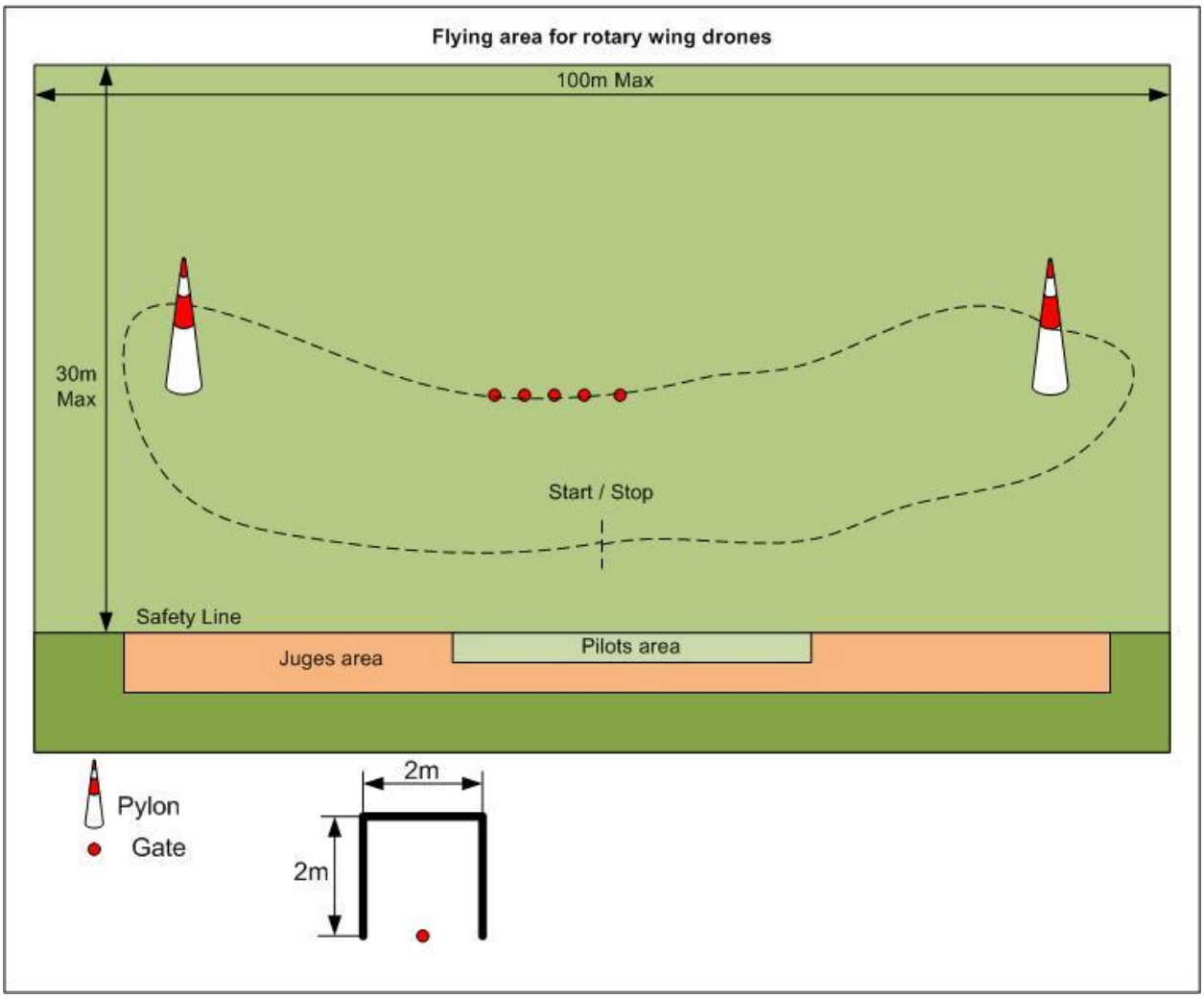
Flying area: square 100 m x 300 m.

The purpose of this task is to pass through different gates representing a tunnel; the tunnel circuit has to be done a certain consecutive number of times as defined by the Flight Director (for example 5 times).

The circuit and the gates are defined by the organiser.

Flight time is recorded in seconds, since the signal of beginning of the working time up to the landing.

Penalty points can be allocated for errors.



10.6. Task F - Pylon race

Note: *task for rotary wing drones and fixed wing drones. This task is adapted to FPV flight. This task must be organised by groups of 3.*

Flying area: square 100 m x 300 m.

The distance between the pylon 1 and the pylons 2 and 3 is about 180 m.

The purpose of this task is a race organised by groups with 10 laps to complete.

The number of participants per group (3 or 4) is defined by the Flight Director.

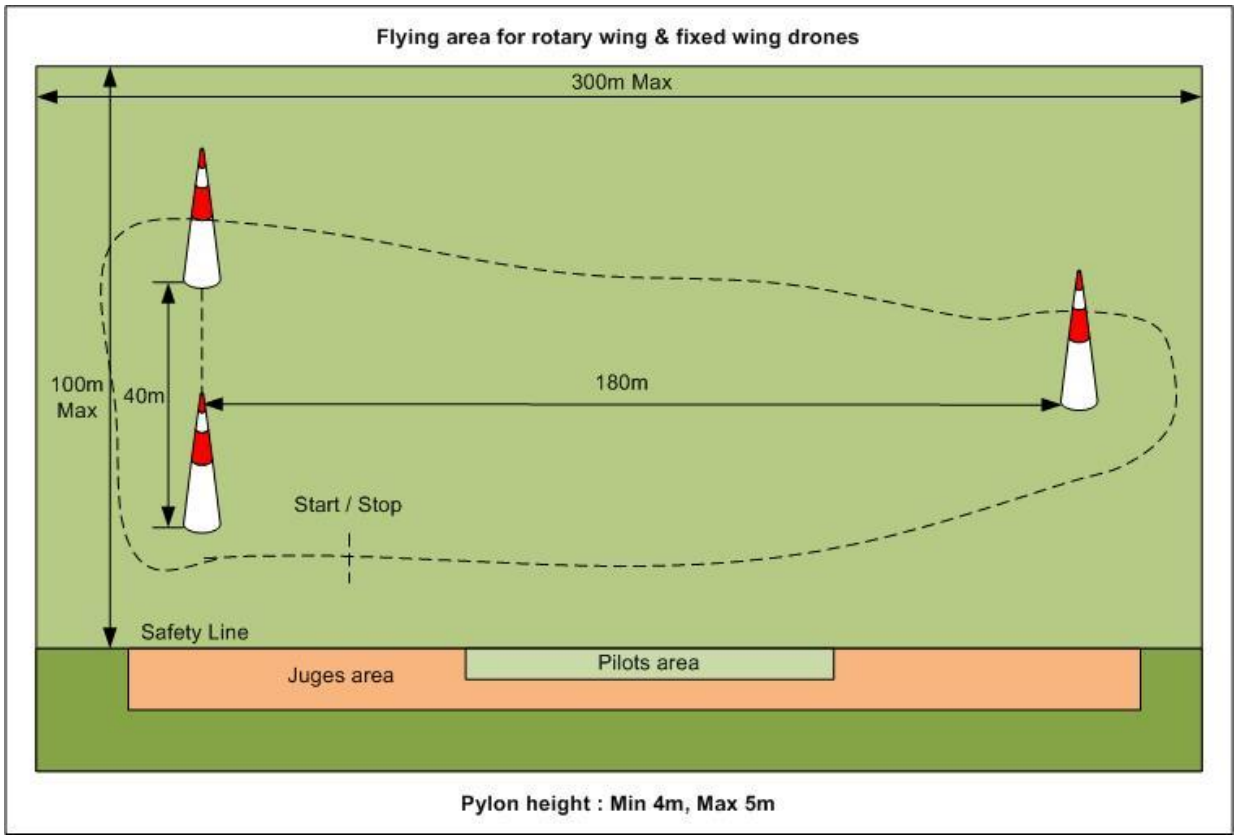
After qualifying rounds, a final can be organised.

The race starts with running engines at the start/finish line. Take-off will be hand launched. For each pilot, the race finished at the start/ finish line when 10 full laps have been completed.

Flight time is recorded in seconds, since the signal for start up to when the 10 laps are completed.

Penalty points are allocated:

- for a cut pylon infringement;
- if the 10 laps are not finished at the end of the working time.



10.7. Task G - Pyloon

Note: *task for rotary wing drones. This task is adapted to FPV flight. This task must be organised by groups of 2 or 3.*

Flying area: square 100 m x 300 m.

The distance between the two pylons is about 100 m.

The purpose of this task which can be assimilated to biathlon is a Pylon race with 5 laps to complete combined with burst of balloons.

The number of participants per group (2 or 3) is defined by the Flight Director.

After each performed lap, the pilot must burst a balloon attached to a post with propellers. The number of balloons must be adapted to the number of participants per group; it is also possible to associate a colour balloon to each participant.

After qualifying rounds, a final can be organised.

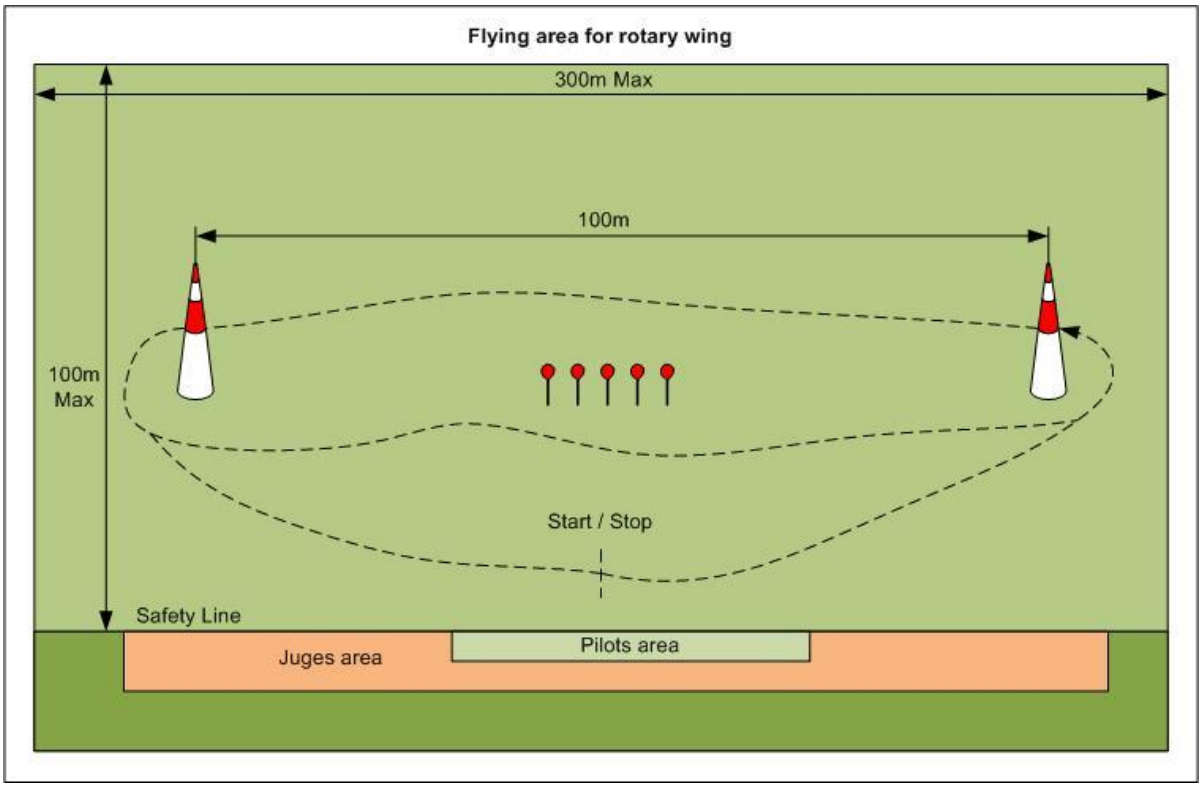
The race starts with running engines at the start/finish line. Take-off will be hand launched. For each pilot, the race finished at the start/ finish line when the 5 laps have been completed.

Flight time is recorded in seconds, since the signal for start up to when the 5 laps are completed.

Penalty points are allocated:

- for a cut pylon infringement;
- for a non burst balloon;
- if the 5 laps are not finished at the end of the working time.

Note : The number of balloon must be proportional to the number of participants per round. We can also associate a balloon color per participant.



10.8. Task H - Multi tasks

Note: *task for rotary wing drones. This task can be organised with one participant in flight at the same moment.*

Flying area: square 20 m x 20 m.

The purpose of the task is to realize 5 elementary tasks:

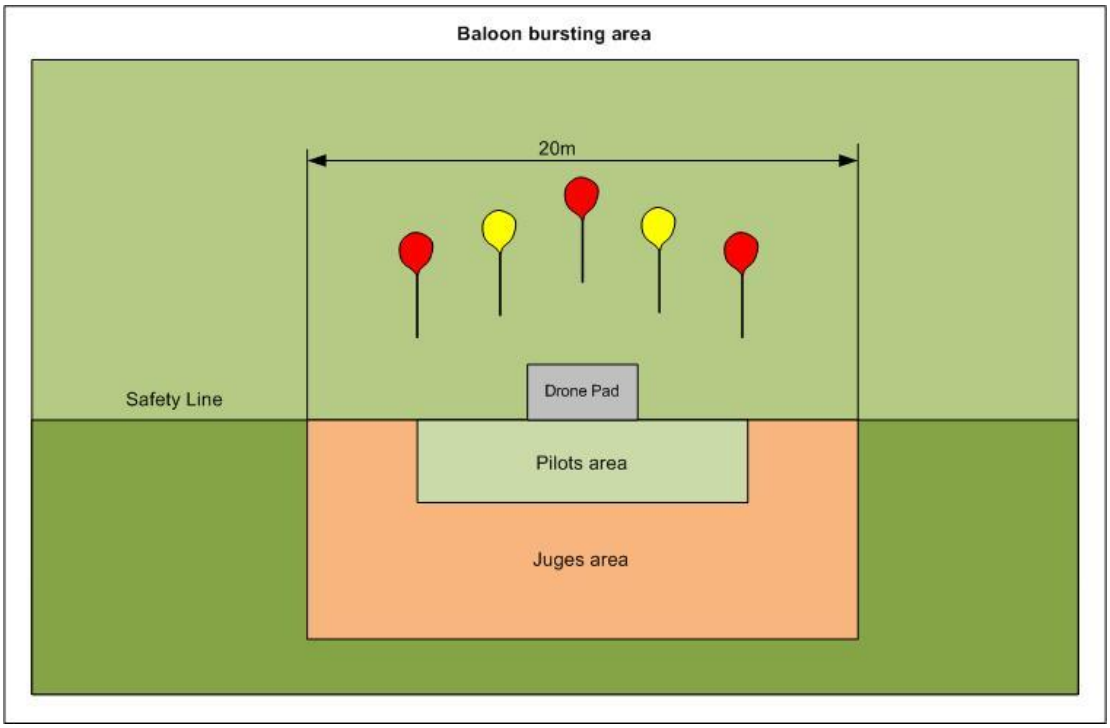
Each participant can choose the order in which he will perform the elementary tasks. All the elementary tasks will begin and closed at the same time.

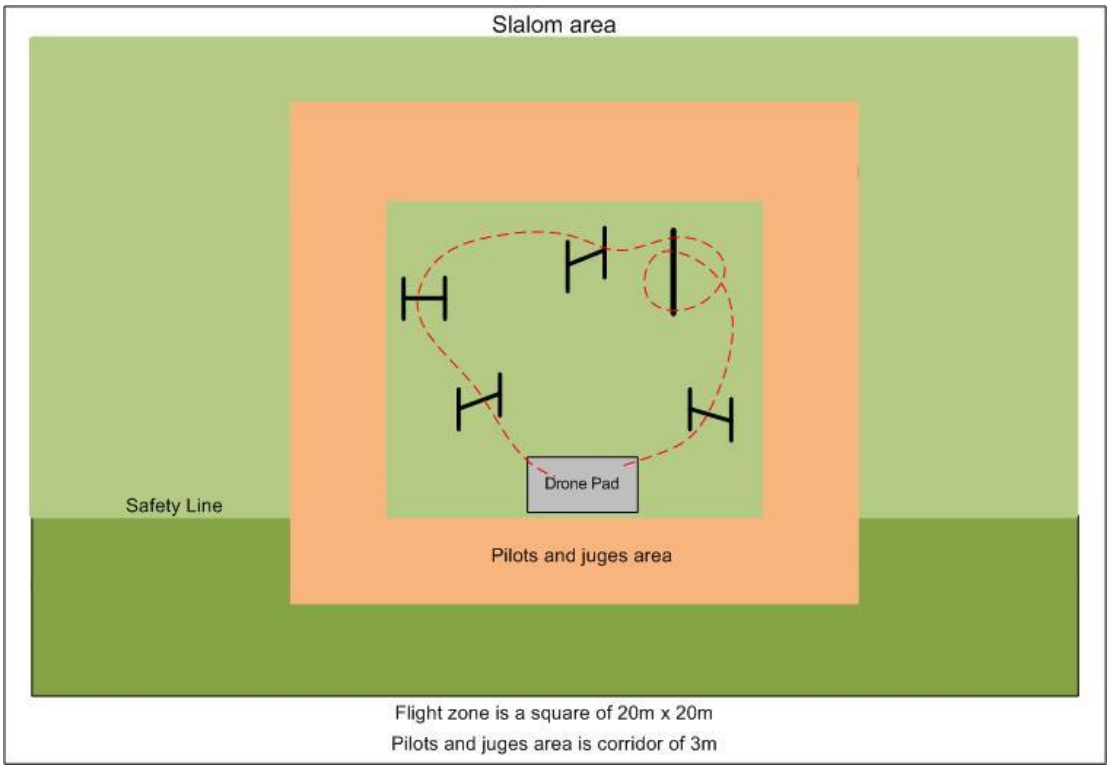
Each participant will take off from the same start/finish line. The race starts with running engines. Take-off will be hand launched.

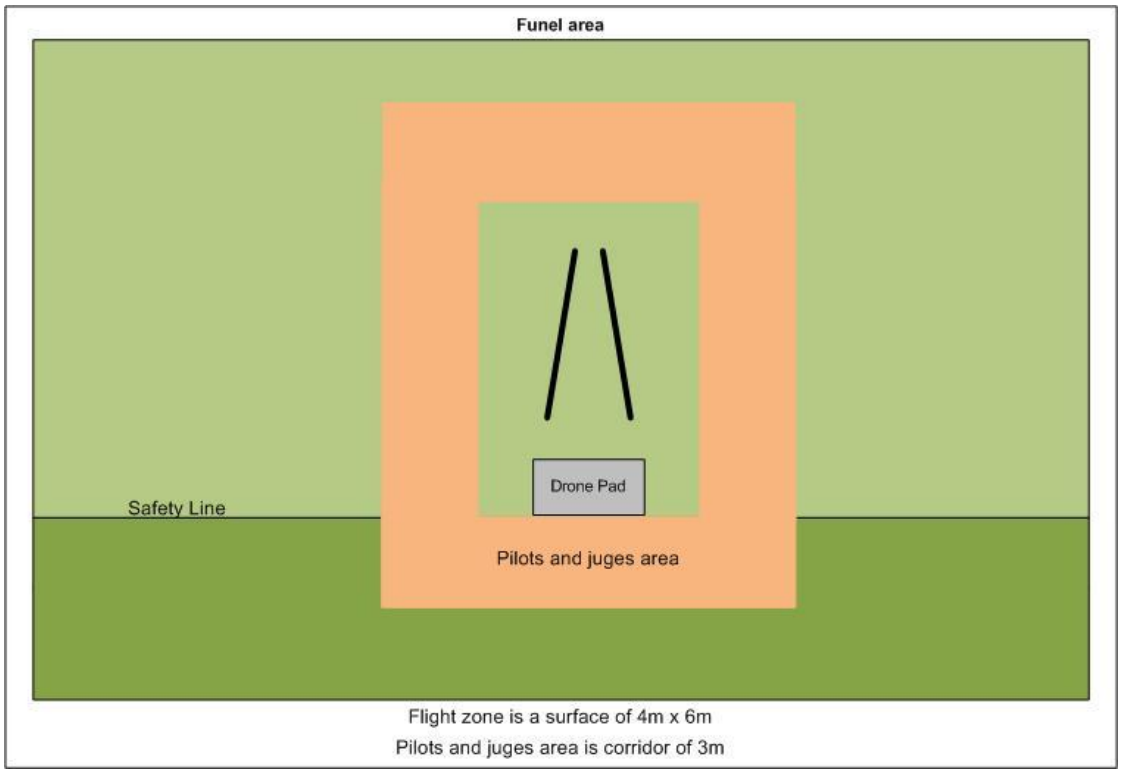
The flight time is recorded, in seconds, since the starting signal to landing at the start/finish line after performing all the elementary tasks.

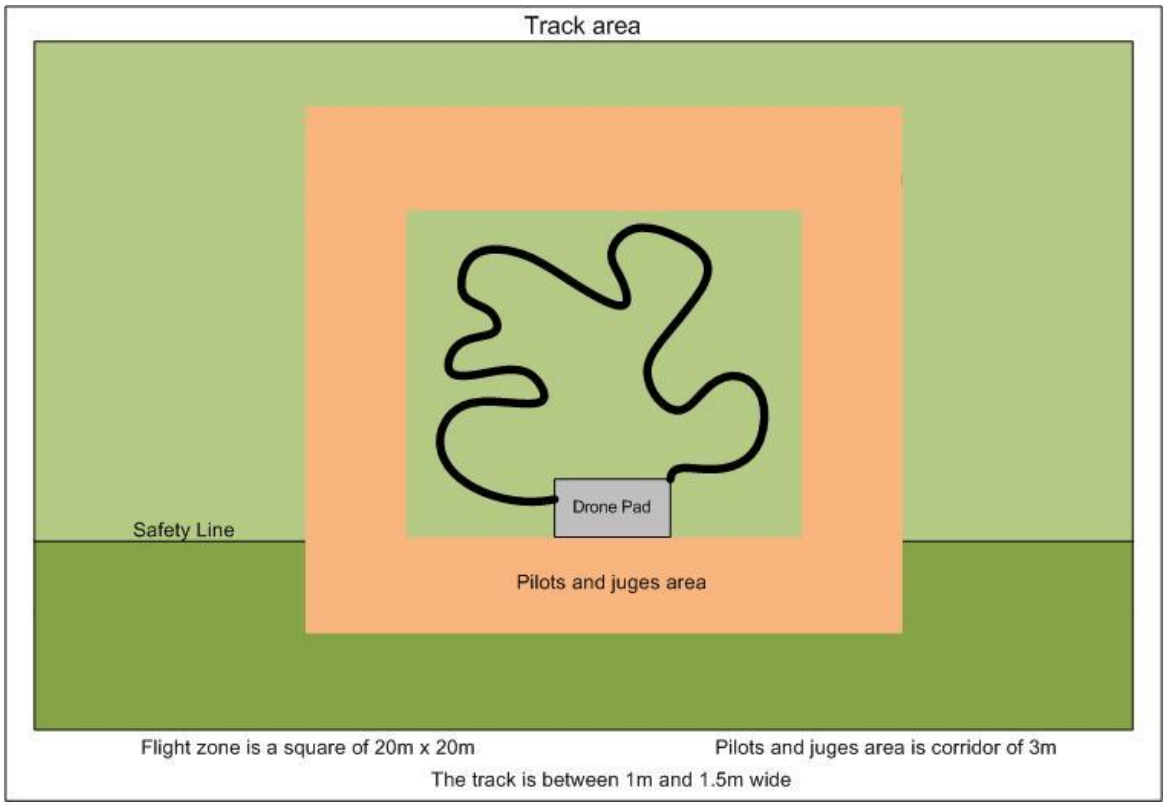
The 5 elementary tasks are:

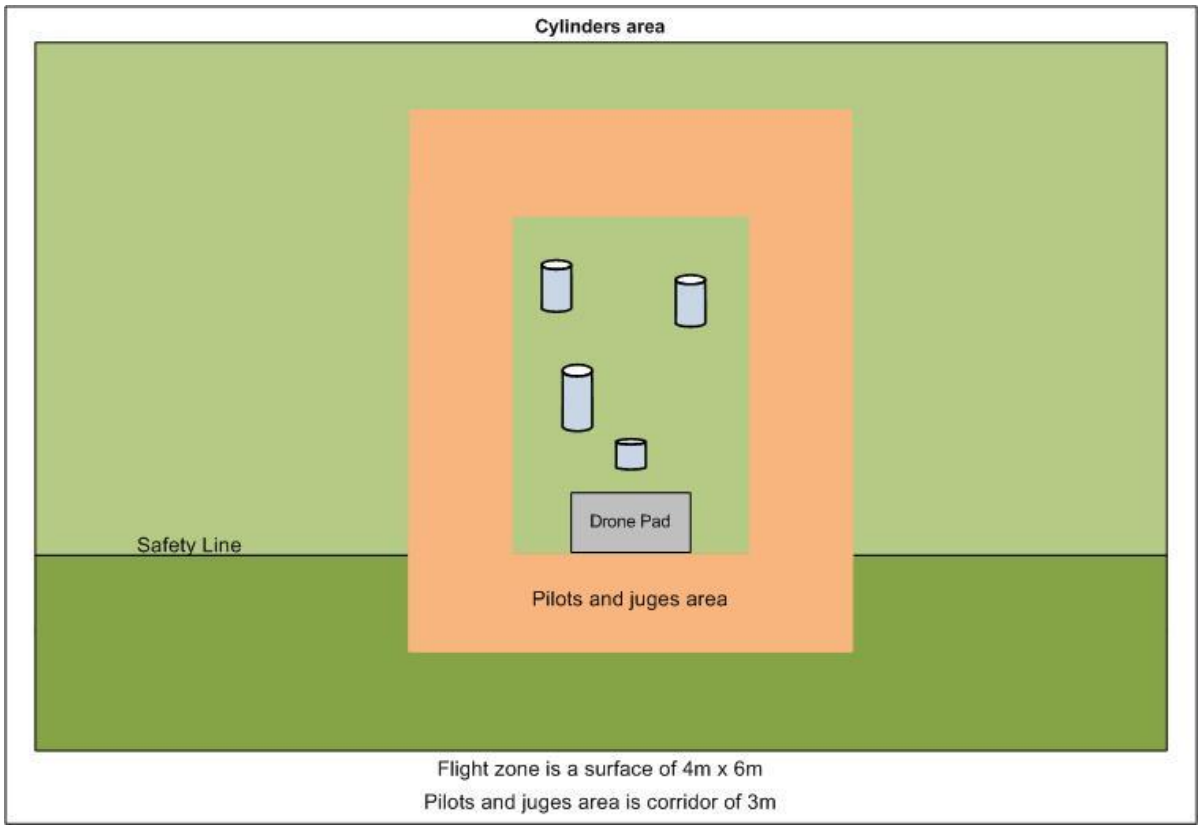
- **Balloons bursting:** 5 balloons to burst with the propellers in the minimum time. The balloons are fixed on rigid rods at 1.5m from the ground. The rods are at least two meters from the safety line and a maximum of 5m. If you want to harden a little, this ordeal. It is possible to have three stacked balloons of the same rod. One should burst, as the middle. For easier identification the balloon in the middle, is a different colour. Please do not replace the rods by wire or twine to keep the balloons. This can be dangerous.
- **Slalom:** 4 gates to pass through, and make circle around a mast, in the minimum time.
- **Funnel:** two metal or wood bars, 4 m long. Enter of the tunnel is 40 cm wide, exit is 10 cm wide. A 60 g weight is suspended to the rotorcraft by means of a 1 m long string. The task is to go trough the funnel the weight touching the ground. If the weight touches the sides of the funnel: 1 penalty of 10s. If the weigh take-of from the ground: 1 penalty of 10s. 2 penalties, the fly is null.
- **Track :** a 60 g weight is suspended to the drone with a string one meter long. The task is to follow the track, the weight touching the ground. Penalty of 10s if the weight touches the sides of the track. In case of 2 penalties, the score is zero.
- **Cylinder:** a 60 g weight is suspended to the drone with a string one meter long. The task is to touch the bottom of four cylinders, about 10 cm. Each cylinder should have a different height.


Baloon bursting area
20m
Safety Line
Drone Pad
Pilots area
Juges area


Slalom area
Safety Line
Drone Pad
Pilots and juges area
Flight zone is a square of 20m x 20m
Pilots and juges area is corridor of 3m


Funel area
Drone Pad
Safety Line
Pilots and juges area
Flight zone is a surface of 4m x 6m
Pilots and juges area is corridor of 3m


Track area
Drone Pad
Safety Line
Pilots and juges area
Flight zone is a square of 20m x 20m
Pilots and juges area is corridor of 3m
The track is between 1m and 1.5m wide


Cylinders area
Drone Pad
Safety Line
Pilots and juges area
Flight zone is a surface of 4m x 6m
Pilots and juges area is corridor of 3m