



FAI Sporting Code

*Fédération
Aéronautique
Internationale*

Section 10 – Microlights and Paramotors

Annex 4 TASK CATALOGUE FOR CHAMPIONSHIPS

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Section 10 and General Section combined make up the complete Sporting Code for Microlights and Paramotors

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Annex 4 to SECTION 10, Task Catalogue

TASK CATALOGUE for MICROLIGHT AND PARAMOTOR CHAMPIONSHIPS

AUTHORITY

This Task Catalogue is to be used in conjunction with the Local Regulations. The General Section and Section 10 of the FAI Sporting Code takes precedence over the Local Regulation and Task Catalogue wording if there is ambiguity.

CLARIFICATION

Classes AL1, AL2, WL1, WL2, GL1 and GL2 are "Microlights", classes PF1, PF2, PL1 and PL2 are "Paramotors"

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Key to symbols used in the task catalogue

	Line drawn before takeoff
	Line drawn after takeoff
	Free flight
	Direction of travel
	Marker selected from list of Marker Symbols
	Ground feature to be identified from photograph
	Turnpoint
	Turnpoint to be identified from photograph
	Ground feature to be photographed or controlled by FR evidence.
	Timing point or gate
SP 	Initial or Start point
SP 	Initial or Start point with time gate

FP 	Finish point
FP 	Finish point with time gate
 II	Marker identity given before takeoff
	Home airfield
	Outlanding airstrSP
	Direction of landing
	Left hand circuit
	Right hand circuit
 600'	Circuit height above ground in feet
	Windsock
	Landing direction indicator
	Road or track

Marker Symbols

**H
I
K
L
N
T
U
X
O
=
II
Δ**

Annex 4, Part 1. Applies to All classes

1.1 INTRODUCTION

This catalogue describes tasks which may be set in FAI World and Continental championships. It does not preclude new tasks provided they have been tried out satisfactorily in national competitions and are clearly described and accepted when the FAI Microlight Commission (CIMA) approves the Local regulations.

Good tasks make for good championships, but tasks also drive the design direction for the aircraft. For example, Microlights would soon lose their short field capability if no more precision landing tasks into a 100m deck were given.

Flight planning and navigation tasks develop good pilot skills but they, too, affect the characteristics of competition aircraft so a Director must try to set a reasonable balance between tasks where ultimately speed is the advantage and economy is the advantage. These tasks should be as long as possible, so that pilot skills are tested by having to fly over new and different country.

Competition Directors are cautioned against setting a few complicated tasks in favour of lots of simple ones. It is all too easy for a Championship to end with the minimum of tasks required (S10 4.3.3) and there is nothing more likely to upset pilots than if they think they have not flown enough in a championship to properly demonstrate their skills.

1.2 TASK TYPES

1.2.1 GENERAL

Tasks fall into Three Categories:

- A** Flight planning, navigation estimated time and speed. No fuel limitation.
- B** Fuel economy, speed range, duration. Fuel limited to maximum 15 kg for aircraft flown solo and 22 kg for aircraft flown with two people.
- C** Precision

The proportion of each task to be used is stated in S10, 4.29.3

Any task may be set more than once, either identically or with variations.

Distances should be as long as possible referring to the recommended still air range of the competing aircraft stated in S10 4.17.7.

In any task requiring pre-declaration of speed or elapsed time the Director may set up hidden gates through which the pilot would fly if on the correct flight path. Pilots failing to be checked through such gates or who are observed flying a devious path to adjust timing/speed errors may be penalised. No information will be given at briefing on the existence or whereabouts of hidden gates, or the method by which they are controlled.

The Director may set a time period for completion of a task in addition to the last landing time.

Where 2m Pylons are defined in tasks, at the discretion of the Competition Director these may be replaced by 12m (+- 1m) inflatable pylons.

1.3 EXAMPLE TASKS

The following tasks are examples of the tasks described above. Their purpose is to show the way in which real tasks have been designed using the generic principles outlined earlier. However, this is not an exhaustive set of tasks and others may be designed using these principles. Certain aspects of the scoring have been included in the task descriptions, in particular a schedule of penalties. However, the specific scoring for markers, turnpoints etc to be used in the competition will be briefed prior to the task being flown.

Annex 4, Part 2. Tasks for Microlights

2.A1 CURVE NAVIGATION WITH TIME ESTIMATION

Precisely fly the course defined by an arbitrary line drawn on the map, with time estimations and a time limit.

Description

Pilots will receive a course drawn on a map. There will also be a number of known time gates where pilots will estimate their crossing time, counted from the start point.

Before take-off, pilots will hand their declarations to a marshal.

They will take off from their designated deck and fly to the start point, where time will start. Then they will precisely fly the course trying to cross the time gates in order at their estimated times.

Navigation and timing end at the finish point.

There will be an undetermined number of hidden gates to validate the course. Gates must be crossed in order and proper direction. Crossing the same gate more than once in any direction invalidates the gate. Example: The sequence 1-2-4-3-5-6-5-7 will be evaluated as 1-2-4-6-7, a total of five correct gates.

Time will be measured at the known time gates and checked against pilot declarations. If a time gate is crossed more than once, time will be extracted from the first crossing.

There will be a maximum flight time – Tmax – between crossing the start and finish points. No pilot may declare an estimated time beyond this limit.

SP	→	HG	→	TG1	→	HG	→	...	→	TG2	→	HG	→	...	→	FP
T = 0	Nav	+1	Nav	T1	Nav	+1	Nav		Nav	T2	Nav	+1	Nav		Nav	T < Tmax

Scoring

Spatial precision

Nh = Number of hidden gates in the task

H = Number of hidden gates correctly crossed (crossed once, in order and proper direction)

Qh = 1000 x H / Nh

Time precision

Nt = Number of time gates.

Emax = Maximum error (in seconds) in each time gate (typically 180).

Et = Sum of absolute errors in time gates.

Maximum error of Emax seconds in each point.

Emax seconds error is applied if point not flown.

Qt = Emax * Nt – Et

Total: Q = Qh + Qt P = 1000 x Q / Qmax

Comments

An additional penalty may be established for an excessive delay to cross SP since take-off.

An additional penalty may be established for an excessive delay to cross FP since crossing SP.

The task can also be run without the time precision part (no known time gates). Then Qt is dropped from the scoring formula.

A 50% penalty will be imposed for backtracking. Backtracking is defined in S.10 4.24.5.

If the task involves more than one possible active track line (e.g. Cog wheel navigation with unknown legs), all track lines shall be considered as active.

2.A2 PRECISION NAVIGATION

Fly a circuit at a constant speed in each straight leg, estimating arrival times to known turn points.

Description

A circuit will be defined by a start and finish points, with a number of intermediate turn points. All points will be known before take-off.

Before take-off, competitors will hand a declaration of their estimated times of arrival to every turn point in the circuit, including the finish point.

Competitors will take-off from their designated decks and fly to the START point where navigation and timing start. They will fly each leg at a constant speed that should be consistent with their declarations. The speed in each leg may be different, but it must be constant along the leg.

There will be hidden time gates along the corridors.

Navigation and timing end at the FINISH point. Then they will proceed to land at their designated decks.

START	→	AA	→	BB	→	CC	→	DD	→	FINISH
T = 0	Nav	Ta	Nav	Tb	Nav	Tc	Nav	Td	Nav	Te

Scoring

Each hidden gate crossed scores 180 points. A gate crossed twice or crossed in the opposite direction will be invalidated.

An estimated time for crossing each gate will be calculated by the organization. Crossing time will be checked against this estimation. Each second of error will score one negative point. If a gate is crossed twice, time will be extracted from the first crossing.

Spatial precision:

Emax = Maximum error (in seconds) in each time gate (typically 180).

Ng = Number of gates correctly crossed

Qp = Emax * Ng

Time precision:

Ei = Absolute error in seconds in gate i.

Maximum error is Emax. Time gates not crossed score Emax seconds error.

Qt = Σ Ei (sum of errors in all time gates)

Total: Q = Qp + Qt P = 1000 * Q / Qmax

Penalties

An additional penalty may be established for a delayed crossing of SP from the take-off time.

A 50% penalty will be imposed for backtracking. Backtracking is defined in S.10 4.24.5. If the task involves more than one possible active track line (e.g. Cog wheel navigation with unknown legs), all track lines shall be considered as active.

2.A3 CONTRACT NAVIGATION WITH TIME CONTROLS

Fly a course between a combination of declared turn points, flying over some of them at a specified time.

Description

Pilots will receive a catalogue of turn points. Three of them, the start point SP, a middle point MP and the finish point FP, are mandatory and will be crossed at designated times.

Before take-off, pilots will declare the sequence of turn points they will fly.

They will take off and fly to the START point where navigation begins. Then they will fly the sequence of declared points in order, including the mandatory MIDDLE POINT and FINISH POINT. These two points will be flown at the specified time. Upon reaching the finish point, navigation ends.

Turn points may only be visited once.

Time starts counting at the start point (SP). Competitors will fly over the middle point (MP) exactly T seconds after SP and will fly over the finish point (FP) exactly 2T seconds after SP.

Pilot's declaration will include MP. Points declared to be flown after MP can't be flown before the established time for MP. Otherwise those points will be invalid.

SP	→	P1	→	...	→	MP	→	Pn	→	...	→	FP
Time = 0 s	Nav		Nav		Nav	Time = T s	Nav	Nav			Nav	Time = 2T s

Scoring

Turn-points

N = Number of turn-points declared and flown in order (different from SP, MP and FP).
 Ep = Number of declared points that were not flown (or not in order), including SP, MP and FP.
 $V = N - E_p$
 $Q_p = 1000 * (V / V_{max})$

Time estimation:

Emax = Maximum error (in seconds) in each time gate (typically 180).

Et = Sum of absolute errors in SP, MP and FP.

Maximum error of Emax seconds in each point.

Emax seconds error is applied if point not flown.

$Q_t = E_{max} * 3 - E_t$

Total: $Q = Q_p + Q_t$ $P = 1000 * Q / Q_{max}$

Comments

An additional penalty may be established for a delayed crossing of SP from the take-off time.

A 50% penalty will be imposed for backtracking. Backtracking is defined in S.10 4.24.5. If the task involves more than one possible active track line (e.g. Cog wheel navigation with unknown legs), all track lines shall be considered as active.

2.A4 NAVIGATION OVER A KNOWN CIRCUIT

Follow a known circuit, finding markers or identifying ground features from photographs and locating their positions on a map or crossing hidden gates.

It may be required to distinguish between on-track and off-track markers and ground features.

There may be timing gates to take times if part of the task must be evaluated for time precision or for speed.

The task may finish with an outlanding.

Summary

Competitors will be given:

A series of headings to follow or lines drawn on a map or a description of the procedure to draw them.

The location of a start point (SP) before which no markers, ground features or gates will be found.

The time at which they must overfly the start point.

The location of a finish point (FP) after which no markers or ground features will be found.

Photos of any ground features or description of canvas markers to be identified.

If the task is to contain a speed prediction element before takeoff the competitor must either:

Declare the ground speed at which he plans to fly, or

Select a ground speed from those specified at the briefing, or

Declare crossing times at certain turn points.

After completing the landing the competitor will be required to enter a Quarantine area for scoring.

Scoring

Spatial precision:

Vh = Value assigned to crossing a hidden gate or properly placing a mark on the map (e.g. 100)

Nh = Number of hidden gates correctly crossed or properly placed marks on the map (less than 2 mm error).

Markers placed between 2 and 5 mm error score ½ point.

More than 5 mm score zero.

Out of track marks score zero.

$Q_h = V_h * N_h$

Time precision (when included in the task):

Vt = Gate value (e.g. 180)

Ei = Absolute error in seconds in gate i.

Maximum error is Vt.

Time gates not crossed do not add error.

$Q_t = \sum (V_t - E_i)$ (sum of gate value minus time error each gate crossed)

Speed (when included in the task):

Vs = Relative value for the speed term
 S = Pilot's speed in the speed section
 Qv = Vs * S / Smax

Total: Q = Qh + Qt + Qv P = 1000 * Q / Qmax

Penalties

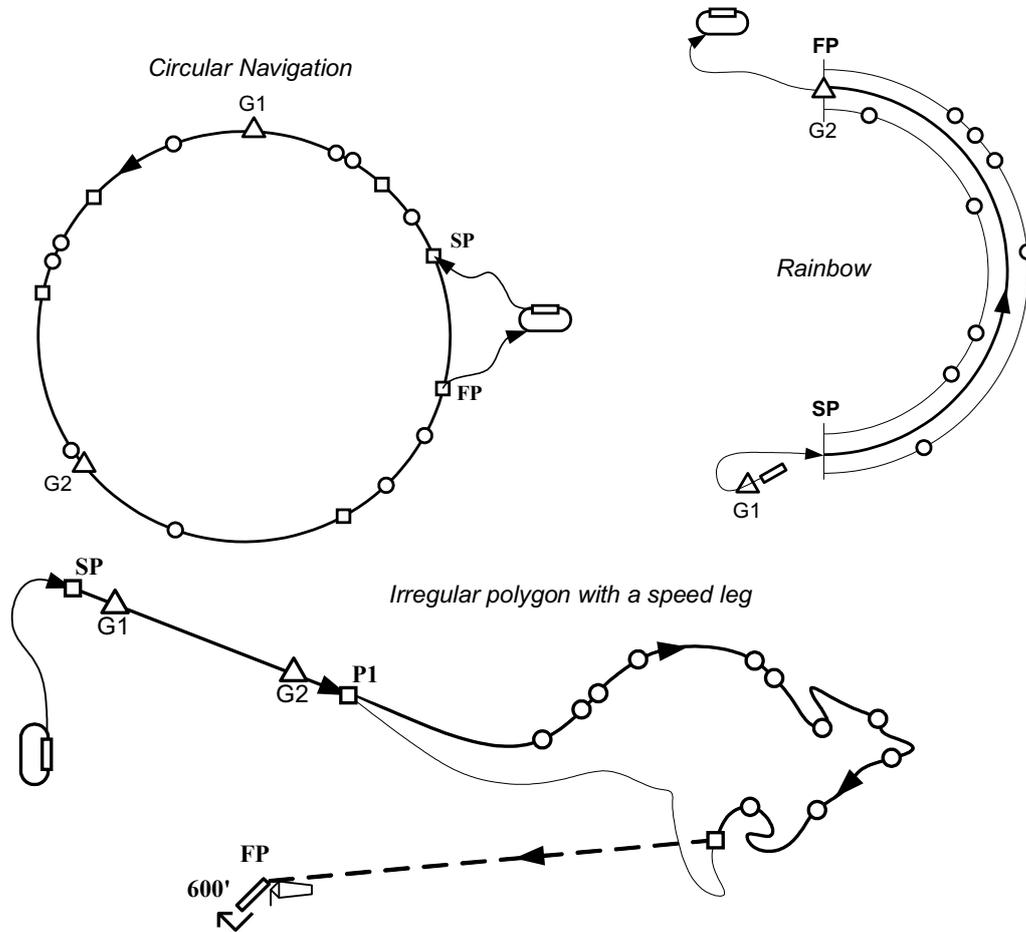
Each photo or marker correctly identified and located on the map to within 2mm and any ground speed element will score as briefed. The following penalties will apply:

Breach of Quarantine: 100%

Crossing a hidden gate twice invalidates the gate.

A 50% penalty will be imposed for backtracking. Backtracking is defined in S.10 4.24.5. If the task involves more than one possible active track line (e.g. Cog wheel navigation with unknown legs), all track lines shall be considered as active.

Examples



2.A5 NAVIGATION WITH UNKNOWN LEGS

Follow a series of headings or known lines, finding markers and identifying ground features from photographs, and locating their positions on a map or crossing hidden gates.

It may be required to distinguish between on-track and off-track markers and ground features.

Certain of the ground features or markers will indicate a change of heading or the start of a leg to another point.

There may be timing gates to take times if part of the task must be evaluated S for time precision or for speed.

The task may finish with an outlanding.

Summary

Competitors will be given:

A series of headings to follow or lines drawn on a map or a description of the procedure to draw them.

The location of a start point (SP) before which no markers, ground features or gates will be found.
 Details of which markers or ground features indicate a point from which a new line must be drawn.
 The location of a finish point (FP) after which no markers or ground features will be found
 Depending on the specific task design, competitors may be given:
 Sealed instructions giving the location of next turn points or outlanding sites.
 The time at which they must overfly the start point.
 Photos of any ground features or description of canvas markers to be identified.
 If the task is to contain a speed prediction element before takeoff the competitor must either:
 Declare the ground speed at which he plans to fly, or;
 Select a ground speed from those specified at the briefing.
 Declare crossing times at certain turn points.
 After completing the landing the competitor will be required to enter a Quarantine area for scoring.

Scoring

Spatial precision:

Vh = Value assigned to crossing a hidden gate or properly placing a mark on the map (e.g. 100)

Nh = Number of hidden gates correctly crossed or
 properly placed marks on the map (less than 2 mm error).

Markers placed between 2 and 5 mm error score ½ point.

More than 5 mm score zero.

Out of track marks score zero.

$Q_h = V_h * N_h$

Time precision (when included in the task):

Vt = Gate value (e.g. 180)

Ei = Absolute error in seconds in gate i.

Maximum error is Vt.

Time gates not crossed do not add error.

$Q_t = \sum (V_t - E_i)$ (sum of gate value minus time error each gate crossed)

Speed (when included in the task):

Vs = Relative value for the speed term

S = Pilot's speed in the speed section

$Q_v = V_s * S / S_{max}$

Total: $Q = Q_h + Q_t + Q_v$ $P = 1000 * Q / Q_{max}$

Penalties

Each photo or marker correctly identified and located on the map to within 2mm and any ground speed element will score as briefed. The following penalties will apply:

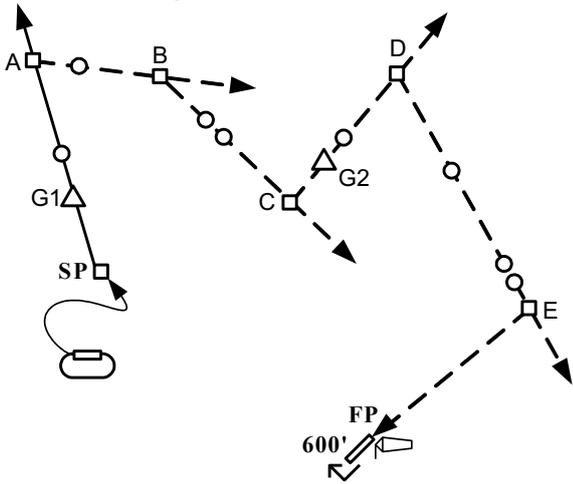
Breach of quarantine: 100%

Crossing a hidden gate twice invalidates the gate.

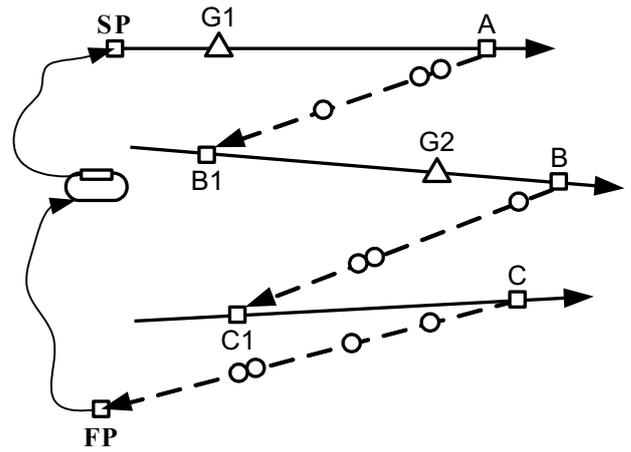
A penalty will be specified for braking an envelope seal.

A 50% penalty will be imposed for backtracking. Backtracking is defined in S.10 4.24.5. If the task involves more than one possible active track line (e.g. Cog wheel navigation with unknown legs), all track lines shall be considered as active.

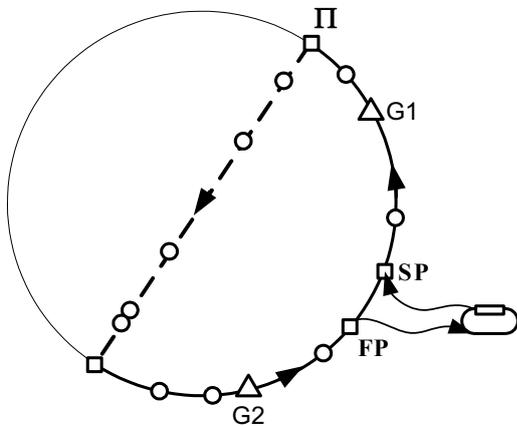
Examples



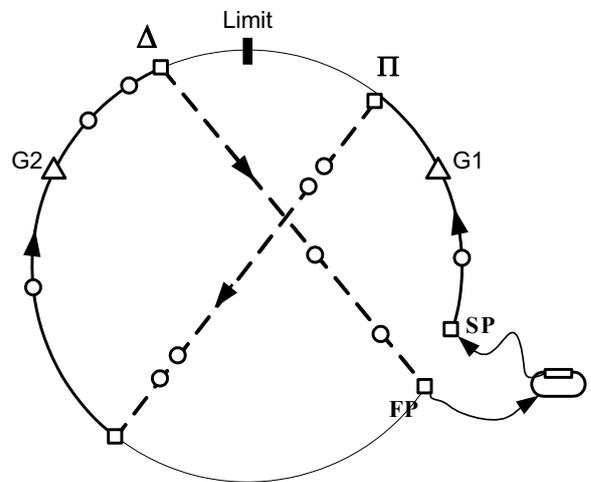
Sequential navigation



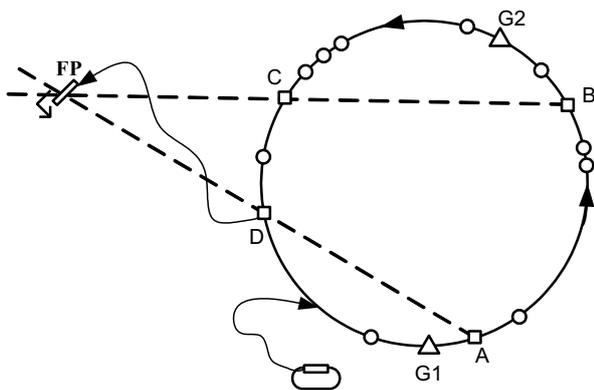
Linear navigation



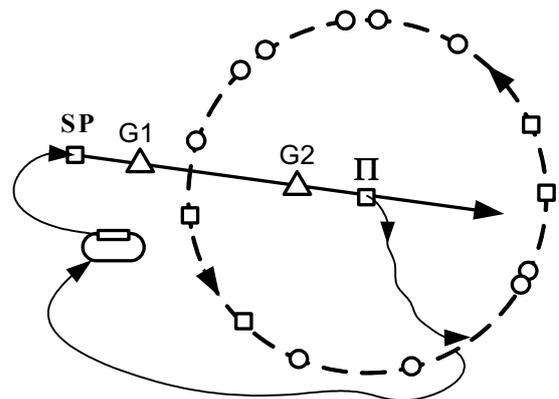
Circular navigation and diameter



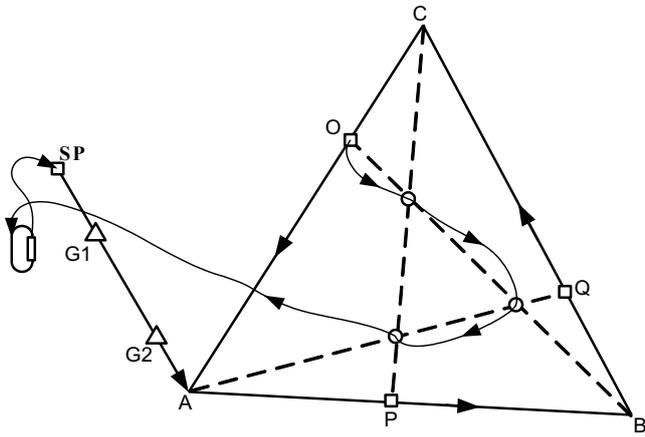
Circular navigation, diameter and reverse.



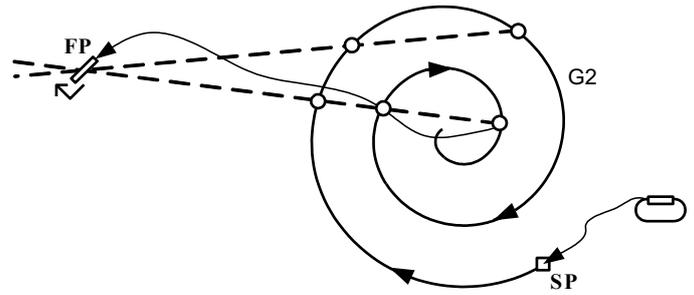
Circle and two lines



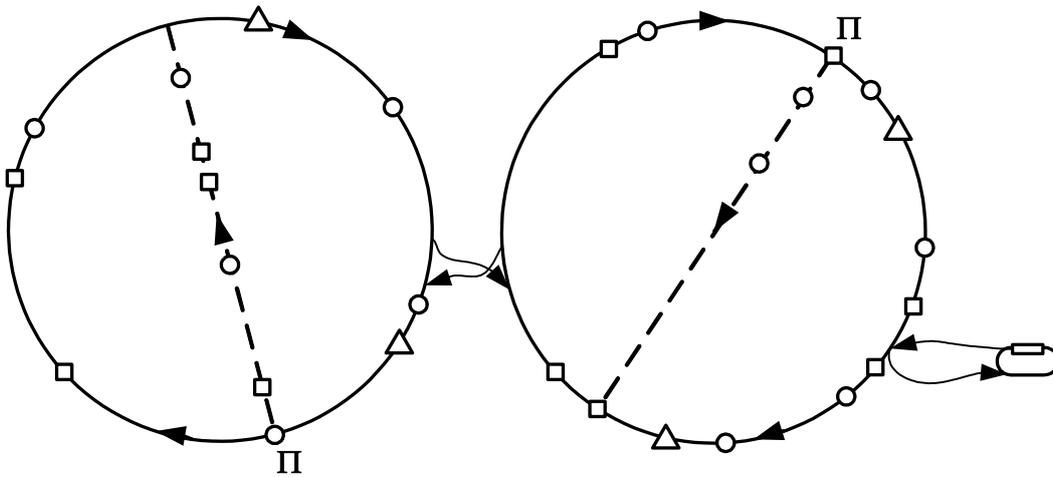
Drawn circular navigation



Triangle and three lines



Speed spiral and two lines

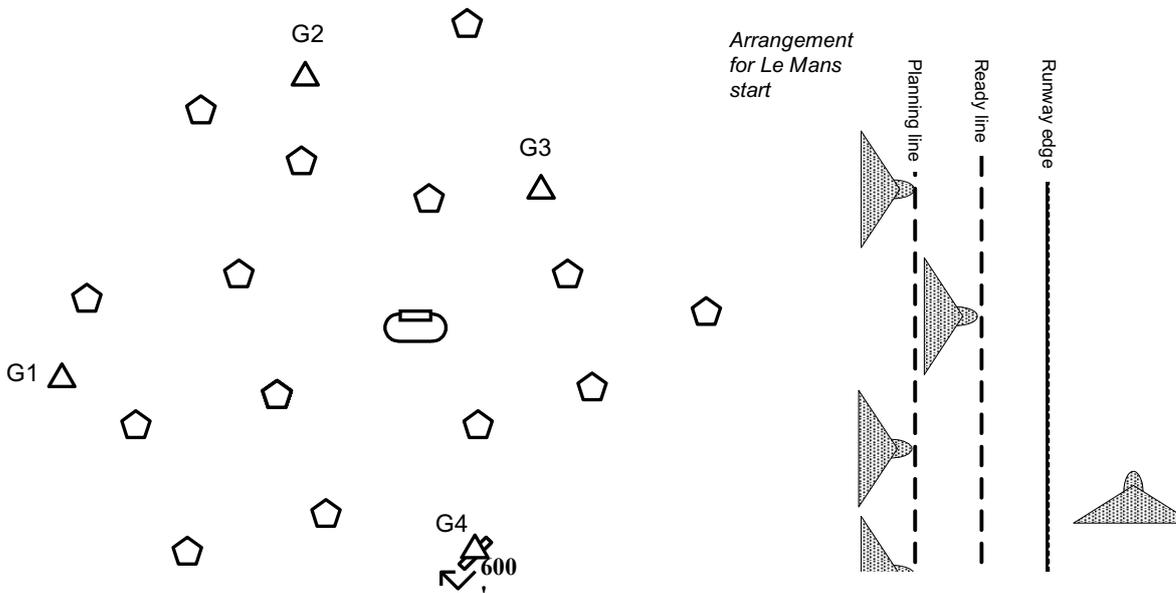


Double circular navigation

2.A6 TURNPOINT HUNT

Objectives

To fly to and identify from given photographs as many turnpoints as possible within a limited time and in the order predicted. 3 of the turnpoints will be compulsory timing gates which must be overflown within 10 seconds of a time predicted by the competitor. One of the gates may require a precision touchdown. A 'Le Mans' start may be required.



Summary

Competitors will be given:

- The location and score of all turnpoints and gates
- Photos of any ground features to be identified

Before takeoff the competitor must declare:

- The predicted time at which the gates will be overflowed
- The predicted turnpoints and gates that will be visited and their sequence in the flight

After completing the landing the competitor will be required to enter a Quarantine area for scoring.

Le Mans Start

If a 'Le Mans' start is required for this task the aircraft will initially be lined up alongside the runway on the Planning line, about two aircraft lengths away. Each competitor's time will start when the turnpoint information is given. Once a competitor's planning is completed he will indicate this by starting his engine and pulling forward one aircraft length to the Ready line where he will wait until the Start Marshal flags him to enter the runway and line up. Once an aircraft is on the runway it must be allowed to take off before any other aircraft may enter the runway.

Safety

During the task competitors must be aware that their paths may cross those of other aircraft. They must maintain careful observation of the sky at all times and should avoid flying at predictable heights.

Scores

Typically each photo will score 100 points, each time gate 200 points and an additional score will be awarded if the full and correct turnpoint and gate sequence is achieved. The following penalties will apply:

- Breach of Quarantine: 100%
- Photo wrongly identified on the map: Penalty 50% of photo score
- Timing gate error >10 seconds from prediction: 10 points/second
- Time over maximum task duration: 10 points/second

2.A7 CIRCLE

Objectives

The objective is to fly a precise 360 degree circle around a marker in a range of radius of minimum 200 meters to a maximum of 750 meters. The competitor may choose the radius within the given limits. To fly into the circle the competitor has to overfly the start point (SP) as well as the center marker (CM) in a straight line initially.

The scored 360 degree circle has to be flown in any desired height, but without exceeding 200ft (61m) between lowest and highest height.

Penalties: A 20% penalty will be imposed for flying the circle outside of a range of 200ft (61m) between lowest and highest height.

After passing the center marker the competitor has to bank into the left using a desired radius. The first 180 degrees are for orientation purposes and not scored, even if the limits are exceeded. After 180 degrees, passing

the given entry line (X) the scoring starts for the next 360 degrees. The scoring ends by crossing the entry line (X). The competitor has to leave the circle heading to the next waypoint (WP).

Summary

Competitors will be given:

The position of the start point (SP)

The position of the center marker (CM)

The next Waypoint (WP) after leaving the task

The elevation of the CM above MSL

Safety

During the task the competitor has to ensure that his aircraft is operating within the limits of speed, bank and g-force defined for the aircraft. The competitor is responsible to fly within the legal regulation, especially with respect to the minimum altitude.

The organizer has to ensure that only one aircraft is flying within the task at one time, to avoid critical approaches. Therefore, the organizer can issue special instructions regarding height or heading for entering or leaving the task.

Scores

The maximum score is given if the circle is flown exact circular, within the given limits.

$$P = (R_{min}/R_{max} - 0,5) * 500$$

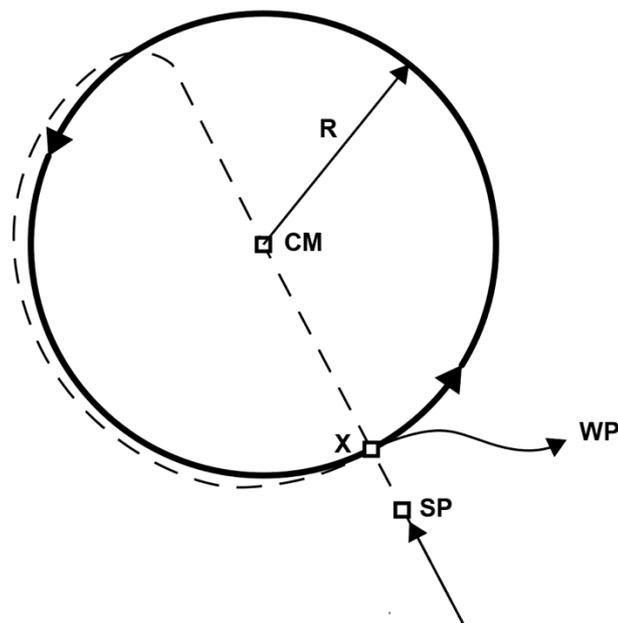
$$P_{max} = 250$$

Penalties

A 20% penalty will be imposed for flying the circle outside of a range of 200ft (61m) between lowest and highest height.

A 100% penalty will be imposed if

- The circle is flown clockwise
- The CM is located outside of the flown circle
- EP and CM are not flown over within the briefed limits
- The aircraft leaves the limits of the radius
- Ratio of Rmin to Rmax is 0,5 or smaller



2.A8 PRECISION NAVIGATION AIR NAV RACE (ANR)

Precisely fly the course defined by several straight and/or arc legs with a given width (forming a corridor) at a given ground speed and over a minimum height from the ground (500 feet or minimum state limits, whichever is higher).

Summary

Competitors will prepare the flight plan in quarantine. Time to start flight planning and take off time will be published in advance. The typical flight planning time is 30 minutes. The typical time available to reach the aircraft and take is 15 minutes. This could be adapted depending on the course length and the airport's size.

Entering the quarantine pilots will receive:

- A map with the following information:
 - Course to follow formed by straight and/or arc lines drawn on a map with a given width, forming an "corridor".
 - The course to reach the SP and return from the FP to the airport.
 - Location of the start point (SP) and the finish point (FP).
- A time chart with the following information:
 - End of quarantine time.
 - Take off time.
 - SP time.
 - FP time.
- SP and FP pictures with the time gate clearly defined.

SP and FP times will be calculated at the aircraft declared ground speed in the registration form.

Time gates width at the SP and FP will be 0.6 NM (0.3 right and left from the SP/ FP).

Scoring

The competitor will start with 2.000 points and the scoring will result by applying the following penalties:

Spatial precision: (Pnav)

- Each time the aircraft leave the "corridor":
 - 0 – 5 seconds out of the "corridor": no penalty
 - Additional time out of the "corridor": 3 points per full second.

Time precision at SP and FP: (Ptime)

- Plus or minus 1 second error: no penalty.
- Additional error: 3 points per full second with a maximum of 200 points.
- Not crossing SP or FP gate (each), 200 points.

Failure to leave flight planning room in time: 100 points. (Pfpr)

Failure to take off at the given time (Pto)

- Plus 60 seconds: no penalty
- Take off before given time or later than 60 seconds: 100 points.

Not following course to reach the SP and return from the FP to the airport (Prr) 200 points each.

Backtracking or circling Pbc (turn of more than 90 degrees from the course leaving the corridor or reentering the corridor before the exit). 200 points each.

$Q = 2000 - Pnav - Ptime - Pfpr - Pto - Prr - Pbc$

$P = 1000 * Q / Qmax$

Software already used and tested by the GAC could be used to score Spatial and time precision, loading the track from the GNSS recorders used for the championship.

Additionally, if GSM/GPS data transmitter approved by the GAC approved is used, the system will provide real time scoring and tracks plotted in a screen available to follow the task from the airport or to broadcast.

Other Penalties

The following penalties will apply:

Breach of Quarantine: 100%

Any kind of track than shows intention to not follow the task instructions (fly part of the course twice, proceed directly to FP, etc.): 100%.

2.B1 SPLIT SQUARE

Objectives

To fly around a square circuit, divided into a speed leg and an economy leg, using the minimum amount of fuel, the competitor deciding how much fuel to take. The competitor may choose to identify an optional scoring marker or ground feature in the centre of the square.

Summary

Competitors will be given:

- The location of the four turnpoints or time gates that form the square
- The location of optional scoring ground feature or marker
- The weight or volume of fuel specified by the competitor

If a residual fuel requirement has been specified, after completing the landing the competitor will be required to enter a Quarantine area for fuel checking and scoring.

Scores

- Failing to pass around the outside of the turnpoints or through gates: 100%
- Backtracking against the task direction: 100%. Backtracking is defined in S.10 4.24.5. If the task involves more than one possible active track line (e.g. Cog wheel navigation with unknown legs), all track lines shall be considered as active.
- Returning with less than minimum specified fuel: 100%

The task score calculation will be:

$$\text{Pilot score} = \left(450 \times \frac{t_{\text{Min}}}{t_p} \right) + \left(450 \times \frac{f_{\text{Min}}}{\hat{f}_p} \right) + X$$

Where:

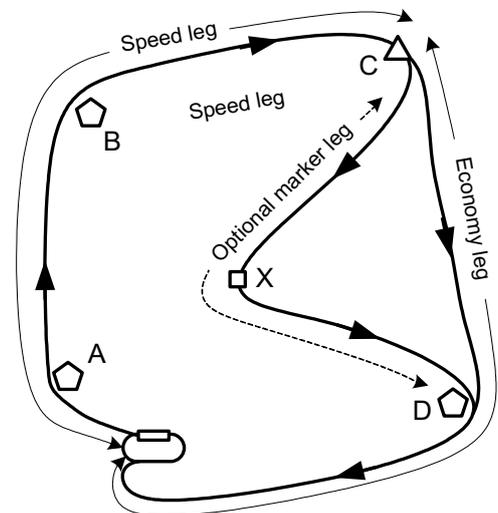
t_p = the pilot's time,

t_{Min} = the best time (Part 1)

f_p = the pilot's fuel

f_{Min} = the least fuel (Part 2)

X = marker score of 100 points



2.B2 LIMITED FUEL TURNPOINT HUNT

Objectives

To fly to and identify from given photographs as many turnpoints as possible within a limited time, carrying limited fuel. Three of the turnpoints will be compulsory timing gates which must be overflowed within 10 seconds of a time predicted by the competitor. One of the gates may require a precision touchdown.

Summary

Competitors will be given:

- The location and score of all turnpoints and gates
- A specified weight or volume of fuel
- Photos of any ground features to be identified

Before takeoff the competitor must:

- Declare the predicted time at which the gates will be overflowed

After completing the landing the competitor will be required to enter a Quarantine area for fuel checking and scoring.

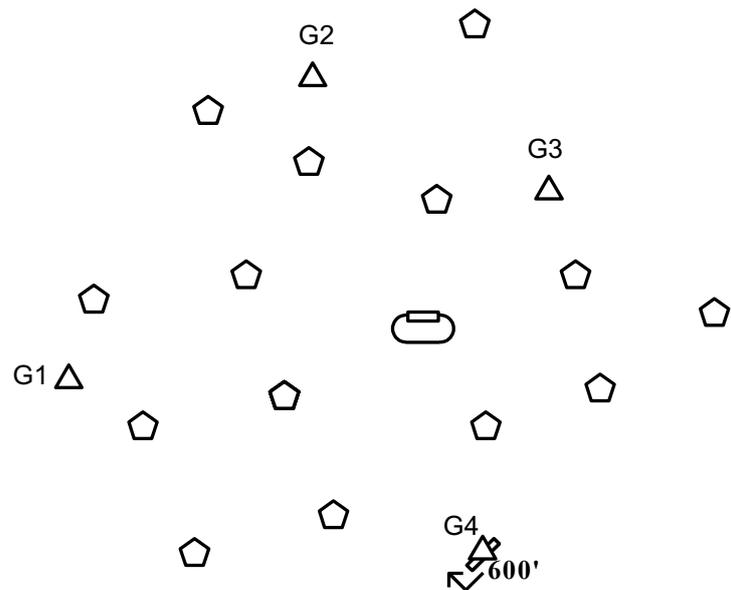
Safety

During the task competitors must be aware that their paths may cross those of other aircraft. They must maintain careful observation of the sky at all times and should avoid flying at predictable heights.

Scores

Typically each photo will score 100 points and each time gate 200 points. The following penalties will apply:

- Breach of Quarantine: 100%
- Photo wrongly identified on the map: Penalty 50% of photo score
- Timing gate error >10 seconds from prediction: 10 points/second
- Time over maximum task duration: 10 points/second



2.B3 DURATION

Objectives

To fly for as long as possible on a limited amount of fuel.

Summary

Competitors will be given:

- A specified weight or volume of fuel

Landing will normally be in an extended area, to be specified at the briefing. If a residual fuel requirement has been specified, after completing the landing the competitor will be required to enter a Quarantine area for fuel checking.

Safety

Particularly if the task is to be flown to empty tanks, pilots must look out for other aircraft preparing to land engine off. A proper look-out must be kept at all times. An aircraft joining another in a thermal shall circle in the same direction as that established by the first regardless of height separation

Scores

The following penalties will apply:

- Breach of Quarantine: 100%
- Flight in a prohibited area: 100%
- Landing outside the specified area but within the airfield boundary: To be briefed

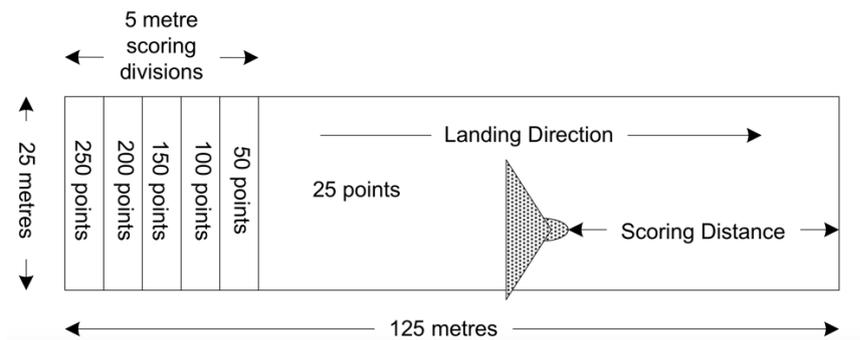
2.C1 SPOT LANDING

Objectives

The objective is for the aircraft to touch down within a marked deck, as close to the start of the deck as possible, coming to a halt in as short a distance as possible.

Summary

This task simulates a landing on an aircraft carrier deck, the deck being a deck 125 metres long and 25 metres wide. Deck length shall be adjusted according to the airfield elevation (S10 4.31.5). The width of the deck may be decreased to be adjusted to the width of the existing runway (S10 4.31.5). The first 25-metre section of the deck is divided into five 5 metre strips which are scored from 250 to 50 points as shown. The remainder of the deck scores 25 points. In order to score the main wheels must touch down in a particular strip and the aircraft must come to a complete halt within the 125-metre deck, as close to the start of the deck as possible.



Takeoff

The takeoff order will be specified at the task briefing. The pilot must position his aircraft to the satisfaction of the marshal and must not take off until instructed to do so by the marshal. The form of signal to be used by the marshal for this purpose will be specified at the briefing.

Climbing Circuit

The procedure for the climbing circuit will be specified at the task briefing.

Engine to Stop or Idle

The aircraft must approach the deck in the landing direction at a height of 1,000 ft. Before passing over the start of the deck the engine must be switched off or the throttle must be closed and the engine set to idle, as specified in the briefing. The aircraft must then fly over the full length of the deck before starting the descending circuit.

Descending Circuit

The procedure for the descending circuit will be specified at the briefing.

Landing

Once the aircraft has started its final approach no deviation of over 90° from the deck centreline either in the air or on the ground is permitted and the engine must remain at idle or may be switched off. The aircraft must come to a complete standstill and must not move until instructed to do so by a marshal.

Scoring

The score will be the value of the strip in which both main wheels touch down with the ground (PS) plus the distance between the finish of the deck and the closest wheel, scored 1 point per whole metre (PD). Touching down on a dividing line scores the higher of the two strips.

The pilot will be scored zero if:

- The aircraft commences takeoff before instructed to do so by the marshal
- The engine is not stopped or the throttle is not closed before passing over the deck
- The aircraft does not pass over the entire length of the deck before turning to descend
- The engine does not remain at idle once final approach has started if engine idle permitted
- The aircraft turns by more than 90 degrees from the deck centreline between starting the landing approach and coming to a standstill
- Any part of the aircraft touches the ground before the deck.

- The aircraft does not stop within the limits of the deck.
- The aircraft moves from the deck before instructed to do so by a marshal
- The aircraft is unable to taxi or take off unaided following the touchdown although failure to start the engine will not incur a penalty

Thus the score calculation will be $(P_S + P_D)$ with a hypothetical maximum score of 350

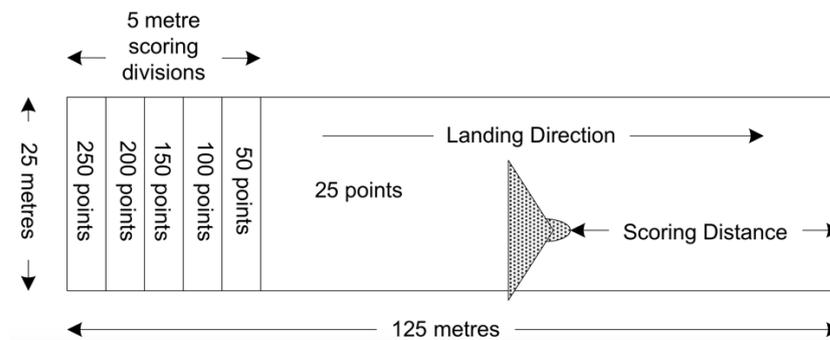
2.C2 SPOT LANDING - TIMED

Objectives

The objective is for the aircraft to touch down within a marked deck at a specific time, as close to the start of the deck as possible, coming to a halt in as short a distance as possible.

Summary

This task simulates a landing on an aircraft carrier deck, the deck being a deck 125 metres long and 25 metres wide. Deck length shall be adjusted according to the airfield elevation (S10 4.31.5). The width of the deck may be decreased to be adjusted to the width of the existing runway (S10 4.31.5). The first 25-metre section of the deck is divided into five 5 metre strips which are scored from 250 to 50 points as shown. The remainder of the deck scores 25 points. In order to score the main wheels must touch down in a particular strip and the aircraft must come to a complete halt within the 125-metre deck, as close to the start of the deck as possible. Additional points may be scored if the scoring touchdown takes place at or near an exact full minute as indicated by the competition clock, eg 11:31:00 hrs is a full minute, 11:31 17 hrs is not.



Takeoff

The takeoff order will be specified at the task briefing. The pilot must position his aircraft to the satisfaction of the marshal and must not take off until instructed to do so by the marshal. The form of signal to be used by the marshal for this purpose will be specified at the briefing.

Climbing Circuit

The procedure for the climbing circuit will be specified at the task briefing.

Engine to Stop or Idle

The aircraft must approach the deck in the landing direction at a height of 1,000 ft. Before passing over the start of the deck the engine must be switched off or the throttle must be closed and the engine set to idle, as specified in the briefing. The aircraft must then fly over the full length of the deck before starting the descending circuit.

Descending Circuit

The procedure for the descending circuit will be specified at the briefing.

Landing

Once the aircraft has started its final approach no deviation of over 90° from the deck centreline either in the air or on the ground is permitted. The aircraft must come to a complete standstill and must not move until instructed to do so by a marshal.

Scoring

The score will be the value of the strip in which both main wheels touch down (PS) plus the distance between the finish of the deck and the closest wheel, scored 1 point per whole metre (PD). Touching down on a dividing line scores the higher of the two strips. If the aircraft touches down on a full minute, the time being taken from the official clock, ±5 seconds a further 100 points is scored (PT). This score will be reduced by 5 points for every second outside ±5 seconds from a full minute.

The pilot will be scored zero if:

- The aircraft commences takeoff before instructed to do so by the marshal
- The engine is not stopped or the throttle is not closed before passing over the deck

- The aircraft does not pass over the entire length of the deck before turning to descend
- The engine does not remain at idle once final approach has started if engine idle permitted
- Any part of the aircraft touches the ground before the deck.
- The aircraft turns by more than 90 degrees from the deck centreline between starting the landing approach and coming to a standstill
- The aircraft does not stop within the limits of the deck.
- The aircraft moves from the deck before instructed to do so by a marshal
- The aircraft is unable to taxi or take off unaided following the touchdown although failure to start the engine will not incur a penalty

Thus the score calculation will be (PS+PD+PT) with a maximum score of 450

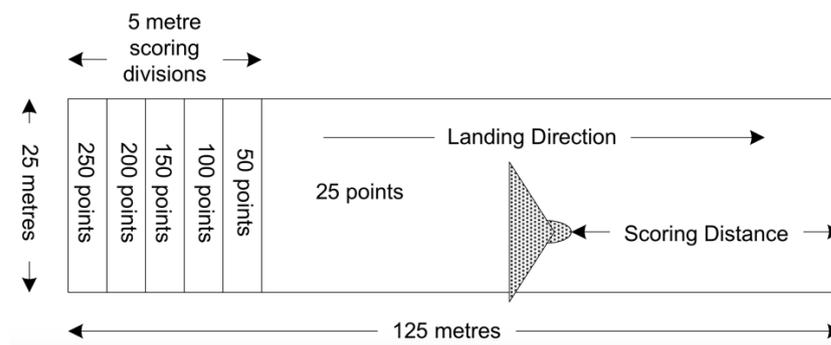
2.C3 POWERED PRECISION LANDING

Objectives

The objective is for the aircraft to touch down within a marked deck, as close to the start of the deck as possible, coming to a halt in as short a distance as possible.

Summary

This task simulates a landing on an aircraft carrier deck, the deck being a deck 125 metres long and 25 metres wide. Deck length shall be adjusted according to the airfield elevation (S10 4.31.5). The width of the deck may be decreased to be adjusted to the width of the existing runway (S10 4.31.5). The first 25-metre section of the deck is divided into five 5 metre strips which are scored from 250 to 50 points as shown. The remainder of the deck scores 25 points. In order to score the main wheels must touch down in a particular strip and the aircraft must come to a complete halt within the 125-metre deck, as close to the start of the deck as possible.



Joining

This task will follow the completion of a prior task in which no landing is required. Instructions for joining will be provided at the briefing or in the instructions for the prior task.

Landing

Once the aircraft has started its final approach no deviation of over 90° from the deck centreline either in the air or on the ground is permitted. The pilot may choose whatever engine setting he chooses or may switch off the engine unless otherwise instructed at the briefing. The aircraft must come to a complete standstill and must not move until instructed to do so by a marshal.

Scoring

The score will be the value of the strip in which both main wheels touch down (PS) plus the distance between the finish of the deck and the closest wheel, scored 1 point per whole metre (PD). Touching down on a dividing line scores the higher of the two strips.

The pilot will be scored zero if:

- Any part of the aircraft touches the ground before the deck
- The aircraft turns by more than 90 degrees from the deck centreline between starting the landing approach and coming to a standstill
- The aircraft does not stop within the limits of the deck.
- The aircraft moves from the deck before instructed to do so by a marshal
- The aircraft is unable to taxi or take off unaided following the touchdown although failure to start the engine will not incur a penalty

Thus the score calculation will be (P_S + P_D) with a maximum hypothetical score of 350

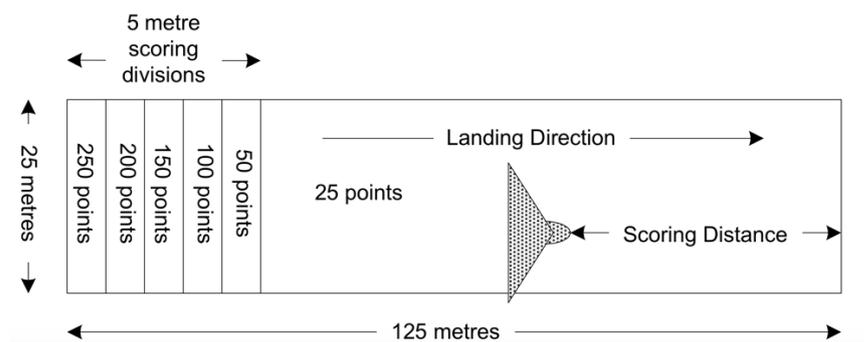
2.C4 POWERED PRECISION LANDING - TIMED

Objectives

The objective is for the aircraft to touch down within a marked deck at a specific time, as close to the start of the deck as possible, coming to a halt in as short a distance as possible.

Summary

This task simulates a landing on an aircraft carrier deck, the deck being a deck 125 metres long and 25 metres wide. Deck length shall be adjusted according to the airfield elevation (S10 4.31.5). The width of the deck may be decreased to be adjusted to the width of the existing runway (S10 4.31.5). The first 25-metre section of the deck is divided into five 5 metre strips which are scored from 250 to 50 points as shown. The remainder of the deck scores 25 points. In order to score the main wheels must touch down in a particular strip and the aircraft must come to a complete halt within the 125-metre deck, as close to the start of the deck as possible. . Additional points may be scored if the scoring touchdown takes place at or near an exact full minute as indicated by the competition clock, eg 11:31:00 hrs is a full minute, 11:31 17 hrs is not.



Joining

This task will follow the completion of a prior task in which no landing is required. Instructions for joining will be provided at the briefing or in the instructions for the prior task.

Landing

Once the aircraft has started its final approach no deviation of over 90 ° from the deck centreline either in the air or on the ground is permitted. The pilot may choose whatever engine setting he chooses or may switch off the engine unless otherwise instructed at the briefing. The aircraft must come to a complete standstill and must not move until instructed to do so by a marshal.

Scoring

The score will be the value of the strip in which both main wheels touch down with the ground (PS) plus the distance between the finish of the deck and the closest wheel, scored 1 point per whole metre (PD). Touching down on a dividing line scores the higher of the two strips. If the aircraft touches down on a full minute, the time being taken from the official clock, ± 5 seconds a further 100 points is scored (PT). This score will be reduced by 5 points for every second outside ± 5 seconds from a full minute.

The pilot will be scored zero if:

- Any part of the aircraft touches the ground before the deck
- The aircraft turns by more than 90 degrees from the deck centreline between starting the landing approach and coming to a standstill
- The aircraft does not stop within the limits of the deck.
- The aircraft moves from the deck before instructed to do so by a marshal
- The aircraft is unable to taxi or take off unaided following the touchdown although failure to start the engine will not incur a penalty

Thus the score calculation will be $(P_S + P_D + P_T)$ with a maximum hypothetical score of 450

2.C5 PRECISION TOUCHDOWN - TIMED

Objectives

The objective is for the aircraft to touch down within a marked deck at a specific time, as close to the start of the deck as possible.

Summary

The deck is 6 metres long, 10 metres wide and is marked in four 1.5 metre strips which are scored from 200 to 50 points as shown. In order to score the main wheels must touch down in a particular strip as close to the start of the deck as possible. The lines will be defined by raked wet sand to ensure accurate scoring. Additional points may be scored if the scoring touchdown takes place at or near an exact full minute as indicated by the competition clock, eg 11:31:00 hrs is a full minute, 11:31 17 hrs is not.

Joining

This task will form part of another task. Instructions for joining will be provided at the briefing or in the instructions for the main task.

Landing

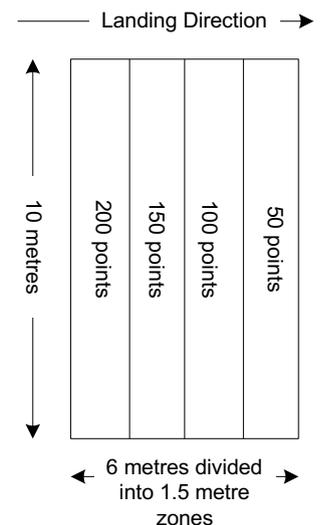
Once the aircraft has started its final approach no deviation of over 90 ° from the deck centreline is permitted. The pilot may choose whatever throttle setting he chooses or may switch off the engine unless otherwise instructed at the briefing. Once the touchdown is completed the pilot may immediately take off unless otherwise instructed at the task briefing.

Scoring

The score will be the value of the strip in which both main wheels touch down (PS). Touching down on a dividing line scores the higher of the two strips. If the aircraft touches down on a full minute, the time being taken from the official clock, ±5 seconds a further 50 points is scored (PT). This score will be reduced by 5 points for every second outside ±5 seconds from a full minute. The pilot will be scored zero if:

- Any part of the aircraft touches the ground before the deck
- The aircraft fails to touchdown within the limits of the deck
- The aircraft turns by more than 90 degrees from the deck centreline between starting the landing approach and coming to a standstill
- The aircraft is unable to taxi or take off unaided following the touchdown although failure to start the engine will not incur a penalty

Thus the score calculation will be (P_S + P_T) with a maximum score of 250



2.C6 DECK LANDING

Objectives

The objective is for the aircraft to land in a deck 125 metres long by 25 metres wide.

Summary

This task proves the short landing capability that is fundamental to the performance characteristics of a Microlight by demonstrating that the aircraft can land in 125 metres in still air at sea level. Deck length shall be adjusted according to the airfield elevation (S10 4.31.5). The width of the deck may be decreased to be adjusted to the width of the existing runway (S10 4.31.5). Where other local conditions, such as slope of the runway, will make a significant difference to landing runs the length of the deck may be adjusted accordingly.

Joining

This task will form the end of a task. Instructions for joining will be provided at the briefing or in the instructions for the prior task.

Landing

Once the aircraft has started its final approach no deviation of over 90 ° from the deck centreline either in the air or on the ground is permitted. The pilot may choose whatever engine setting he chooses or may switch off the engine unless otherwise instructed at the briefing. The aircraft must come to a complete standstill and must not move until instructed to do so by a marshal.

Scoring

There is no score for a deck landing but instead a 20% penalty will normally be applied to the main task if the aircraft fails to touch down and come to a halt within the deck. This penalty will normally apply if:

- Any part of the aircraft touches the ground before the deck.

- The aircraft turns by more than 90 degrees from the deck centreline between starting the landing approach and coming to a standstill.
- The aircraft does not stop within the limits of the deck.
- The aircraft moves from the deck before instructed to do so by a marshal.
- The aircraft is unable to taxi or take off unaided following the touchdown although failure to start the engine will not incur a penalty.

Annex 4, Part 3. Tasks for Paramotors

3.A1 PURE NAVIGATION

Objective

To fly a course between as many turn points or markers as possible within the time window and return to the deck.

Scoring

$$\text{Pilot score} = 1000 \times \frac{\text{NBp}}{\text{NBmax}}$$

Where, according to briefing;

Either:

NBp = The number of ground markers and/or turn points a pilot collects in the task

NBmax = The maximum number of markers and/or turn points collected in the task

OR

NBp = the distance flown by the pilot in the task.

NBMax = the maximum distance flown in the task.

3.A2 NAVIGATION WITH PRECISION ROUTE

Objective

This is a time-limited task in which the pilot must fly a course of their choosing from a given array of turn points, with the objective either to collect as many turn points as possible, or to cover as much distance as possible within the time limit, whilst flying as accurately as possible in straight line legs between turn points.

The pilot must cross a start gate and finish gate for the task, and may also be required to pass particular intermediate gates during the task, as specified at the briefing. There are no pre-declaration elements. Unless otherwise briefed, pilots will perform a free launch from their designated deck.

Landing

After crossing FP, pilots will proceed to land. Unless otherwise briefed, they will perform a standard deck landing at their designated decks.

After landing they will secure their aircraft and take their loggers to the download office.

Task-specific penalties

Landing out before passing the finish point of the course: 100% penalty

Landing out after passing the finish gate: no penalty.

Scoring

$$Dp = (Nlog - NDp) / NDp$$

$$Np = (500 * (NBp/NBmax)) + (500 * (Dpmin/Dp))$$

$$\text{Pilot score} = 1000 * (Np / Npmax)$$

Where, according to briefing;

Either:

NBp = The number of turn points a pilot collects in the task.

NBmax = The maximum number of turn points collected in the task.

OR

NBp = the distance flown by the pilot in the task as a straight line measured between the turn points collected.

NBMax = the maximum distance flown in the task.

NDp = the distance flown by the pilot in the task as a straight line measured between the turn points collected.

Nlog = the pilot's GPS logged track length between the start and finish gates

Np = the value used for normalised scoring after adjustment for track error.

3.A3 NAVIGATION, PRECISION & SPEED

Objective

To make a clean take-off from the deck, to fly a course between as many turn points or markers as possible within a given time, and to collect bonus points for landing at designated markers before returning to the deck.

Special rules

- The clock starts the moment the marshal makes the signal to take off.
- At the start, the pilot scores 300 bonus points for a clean take off at the first attempt, 200 for the second, 100 for the third, zero for any attempts thereafter.
- In the case of landing markers, If the pilot elects to switch off his engine at least 5m above the marker and:

Makes a first touch on the marker: Landing bonus: 200 points

Misses the marker: landing bonus: 50 points

- If the pilot elects to not switch off his engine and:

Makes a first touch on the marker: Landing bonus: 100 points

- If the pilot falls over as a result of a landing: zero landing bonuses for that landing.
- If the pilot obstructs another competitor attempting to land at a landing marker penalties will apply.
- The clock stops the moment the pilot either crosses a line or lands back on the deck.
- Any outside assistance: Score zero.

Scoring

$$\text{Pilot score} = \left(500 \times \frac{\text{NBp}}{\text{NBMax}} \right) + \text{Bto} + \left(200 \times \frac{\text{Bld}}{\text{BldMax}} \right)$$

Where, according to briefing;

Either:

NBp = The number of ground markers and/or turn points a pilot collects in the task

NBmax = The maximum number of markers and/or turn points collected in the task

OR

NBp = the distance flown by the pilot in the task.

NBMax = the maximum distance flown in the task.

AND

Bto = Pilot's takeoff bonus points

Bld = Pilot's landing bonus points

BldMax = The maximum landing bonus points achieved.

3.A4 NAVIGATION / ESTIMATED SPEED

Objective

To fly a course between any combination of turn points, markers and gates as defined at the briefing having declared estimated flight times or estimated times of arrival as required at the briefing, and return to the deck.

Special rules

- The value of T, in seconds, will be given at the briefing.

Scoring

$$\text{Pilot score} = \left(700 \times \frac{\text{NBp}}{\text{NBMax}} \right) + (300 - T)$$

Where, according to briefing;

Either:

NBp = The number of ground markers and/or turn points a pilot collects in the task

NBmax = The maximum number of markers and/or turn points collected in the task

OR

NBp = the distance flown by the pilot in the task.

NBMax = the maximum distance flown in the task.

AND

T = The total difference in between pilot's estimated and actual times for all timed sectors. ($\geq 300 = 300$)

3.A5 NAVIGATION / ESTIMATED SPEED / PRECISION**Objective**

To fly a course between any combination of turn points, markers, landing markers and gates as defined at the briefing having declared estimated flight times as required at the briefing, and return to the deck.

Special rules

- The value of T, in seconds, will be given at the briefing.
- At the start, the pilot scores 150 bonus points for a clean take off at the first attempt, 100 for the second, 50 for the third, zero for any attempts thereafter.
- All landing markers may be attempted with engine on unless the marker is in the landing deck and is the final element in the task.
- If the pilot falls over as a result of a landing: zero landing score for that landing.
- If the pilot obstructs another competitor attempting to land at a landing marker penalties will apply.

Scoring

$$\text{Pilot score} = \left(400 \times \frac{\text{NBp}}{\text{NBMax}} \right) + (250 - T) + \text{Bto} + \left(200 \times \frac{\text{Bld}}{\text{BldMax}} \right)$$

Where, according to briefing;

Either:

NBp = The number of ground markers and/or turn points a pilot collects in the task

NBmax = The maximum number of markers and/or turn points collected in the task

OR

NBp = the distance flown by the pilot in the task.

NBMax = the maximum distance flown in the task.

AND

T = The total difference in between pilot's estimated and actual times for all timed sectors. ($\geq 250 = 250$)

Bto = Pilot's takeoff score

Bld = Pilot's landing points

BldMax = The maximum number of landing points achieved in the task.

3.A6 NAVIGATION OVER A KNOWN CIRCUIT

Follow a known circuit, finding markers or identifying ground features from photographs and locating their positions on a map or crossing hidden gates.

It may be required to distinguish between on-track and off-track markers and ground features.

There may be timing gates to take times if part of the task must be evaluated for time precision or for speed.

The task may finish with an outlanding.

Summary

Competitors will be given:

A series of headings to follow or lines drawn on a map or a description of the procedure to draw them.

The location of a start point (SP) before which no markers, ground features or gates will be found.

The time at which they must overfly the start point.

The location of a finish point (FP) after which no markers or ground features will be found.

Photos of any ground features or description of canvas markers to be identified.

If the task is to contain a speed prediction element before takeoff the competitor must either:

Declare the ground speed at which he plans to fly, or

Select a ground speed from those specified at the briefing, or

Declare crossing times at certain turn points.

The task will normally start and finish with a Deck Takeoff and Deck Landing and after completing the landing the competitor will be required to enter a Quarantine area for scoring.

Scoring

Spatial precision:

Vh = Value assigned to crossing a hidden gate or properly placing a mark on the map (e.g. 100)

Nh = Number of hidden gates correctly crossed or properly placed marks on the map (less than 2 mm error).

Markers placed between 2 and 5 mm error score ½ point.

More than 5 mm score zero.

Out of track marks score zero.

$Q_h = V_h * N_h$

Time precision (when included in the task):

Vt = Gate value (e.g. 180)

Ei = Absolute error in seconds in gate i.

Maximum error is Vt.

Time gates not crossed do not add error.

$Q_t = \sum (V_t - E_i)$ (sum of gate value minus time error each gate crossed)

Speed (when included in the task):

Vs = Relative value for the speed term

S = Pilot's speed in the speed section

$Q_v = V_s * S / S_{max}$

Total: $Q = Q_h + Q_t + Q_v$ $P = 1000 * Q / Q_{max}$

Penalties

Each photo or marker correctly identified and located on the map to within 2mm and any ground speed element will score as briefed. The following penalties will apply:

Takeoff deck penalty: 20%

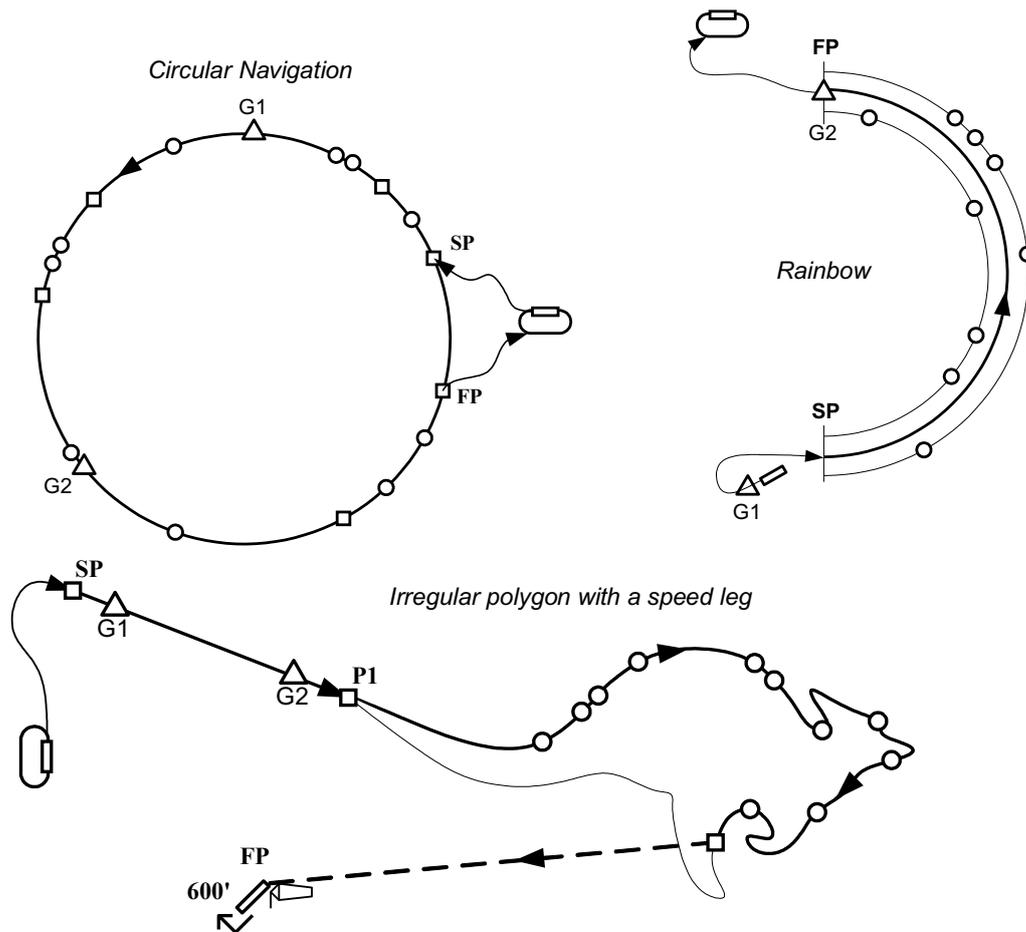
Landing deck penalty: 20%

Backtracking against the task direction or crossing a hidden gate backwards: 100%

Breach of Quarantine: 100%

Crossing a hidden gate twice invalidates the gate.

Examples



3.A7 NAVIGATION WITH UNKNOWN LEGS

Follow a series of headings or known lines, finding markers and identifying ground features from photographs, and locating their positions on a map or crossing hidden gates.

It may be required to distinguish between on-track and off-track markers and ground features.

Certain of the ground features or markers will indicate a change of heading or the start of a leg to another point.

There may be timing gates to take times if part of the task must be evaluated for time precision or for speed.

The task may finish with an outlanding.

Summary

Competitors will be given:

A series of headings to follow or lines drawn on a map or a description of the procedure to draw them.

The location of a start point (SP) before which no markers, ground features or gates will be found.

Details of which markers or ground features indicate a point from which a new line must be drawn.

The location of a finish point (FP) after which no markers or ground features will be found

Depending on the specific task design, competitors may be given:

Sealed instructions giving the location of next turn points or outlanding sites.

The time at which they must overfly the start point.

Photos of any ground features or description of canvas markers to be identified.

If the task is to contain a speed prediction element before takeoff the competitor must either:

Declare the ground speed at which he plans to fly, or;

Select a ground speed from those specified at the briefing.

Declare crossing times at certain turn points.

The task will normally start and finish with a Deck Takeoff and Deck Landing and after completing the landing the competitor will be required to enter a Quarantine area for scoring.

Scoring

Spatial precision:

Vh = Value assigned to crossing a hidden gate or properly placing a mark on the map (e.g. 100)

Nh = Number of hidden gates correctly crossed or properly placed marks on the map (less than 2 mm error).

Markers placed between 2 and 5 mm error score ½ point.

More than 5 mm score zero.

Out of track marks score zero.

$Q_h = V_h * N_h$

Time precision (when included in the task):

Vt = Gate value (e.g. 180)

Ei = Absolute error in seconds in gate i.

Maximum error is Vt.

Time gates not crossed do not add error.

$Q_t = \sum (V_t - E_i)$ (sum of gate value minus time error each gate crossed)

Speed (when included in the task):

Vs = Relative value for the speed term

S = Pilot's speed in the speed section

$Q_v = V_s * S / S_{max}$

Total: $Q = Q_h + Q_t + Q_v$ $P = 1000 * Q / Q_{max}$

Penalties

Each photo or marker correctly identified and located on the map to within 2mm and any ground speed element will score as briefed. The following penalties will apply:

Take-off deck penalty: 20%.

Landing deck penalty: 20%.

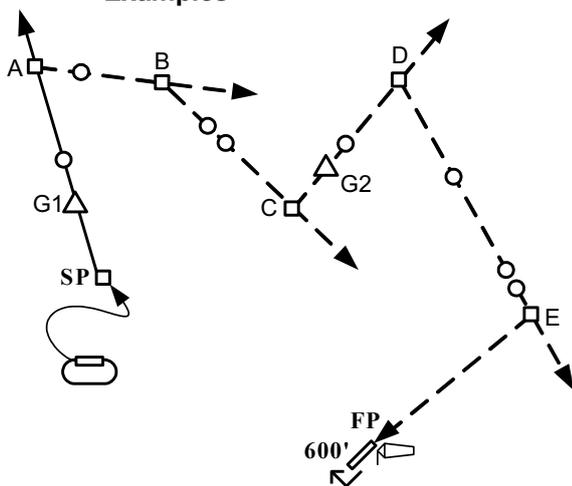
Backtracking against the task direction or crossing a hidden gate backwards: 100%

Breach of quarantine: 100%

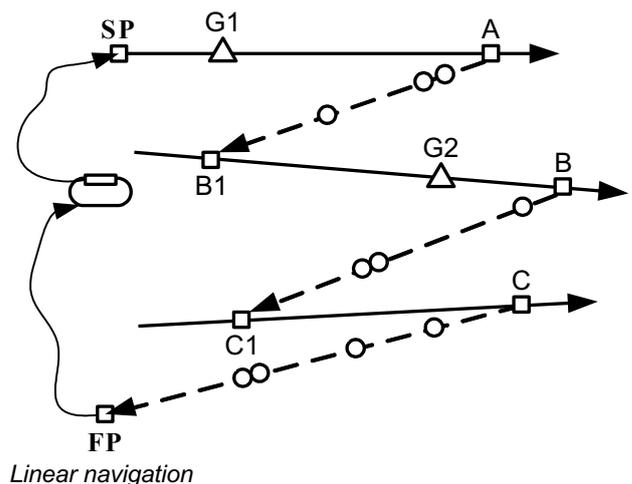
Crossing a hidden gate twice invalidates the gate.

A penalty will be specified for braking an envelope seal.

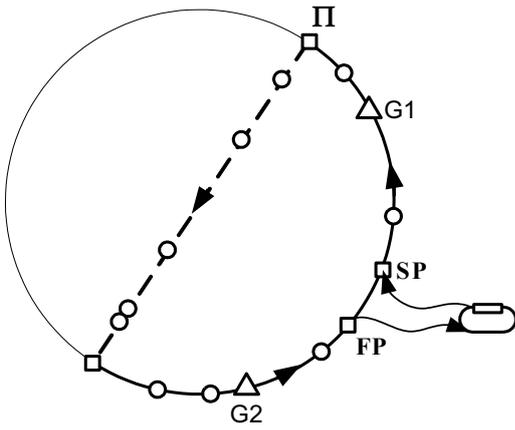
Examples



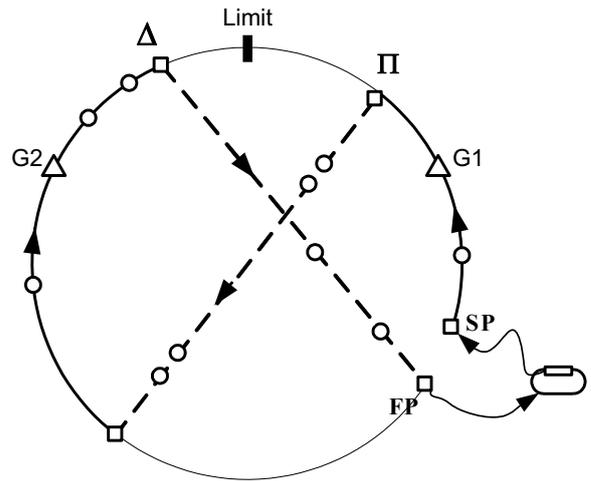
Sequential navigation



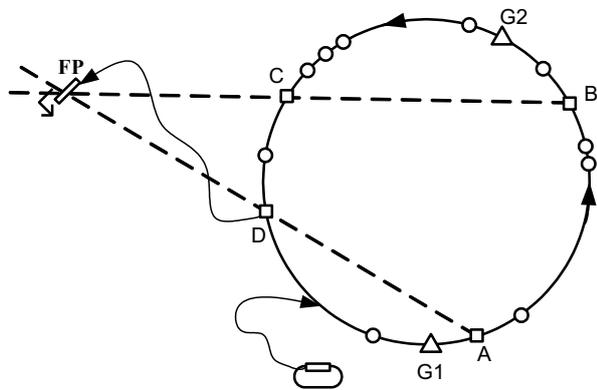
Linear navigation



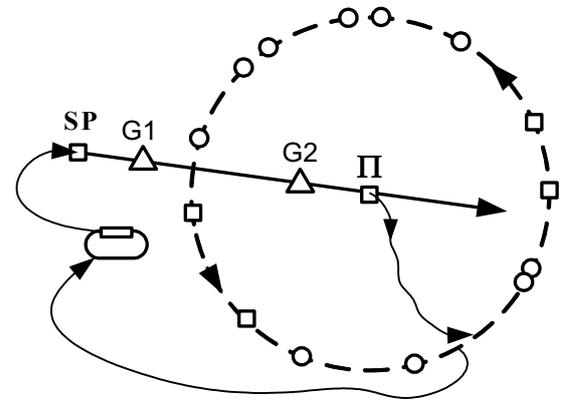
Circular navigation and diameter



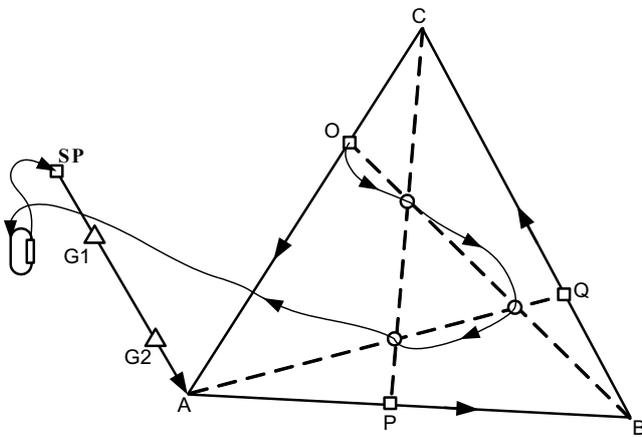
Circular navigation, diameter and reverse.



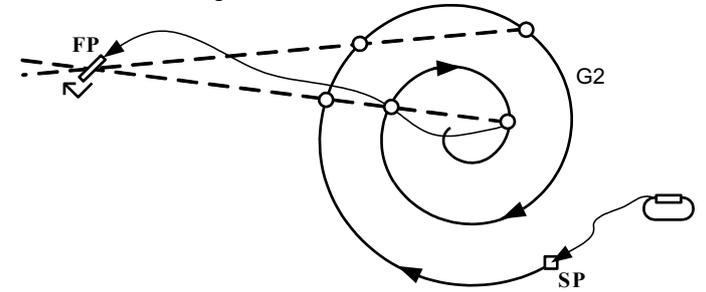
Circle and two lines



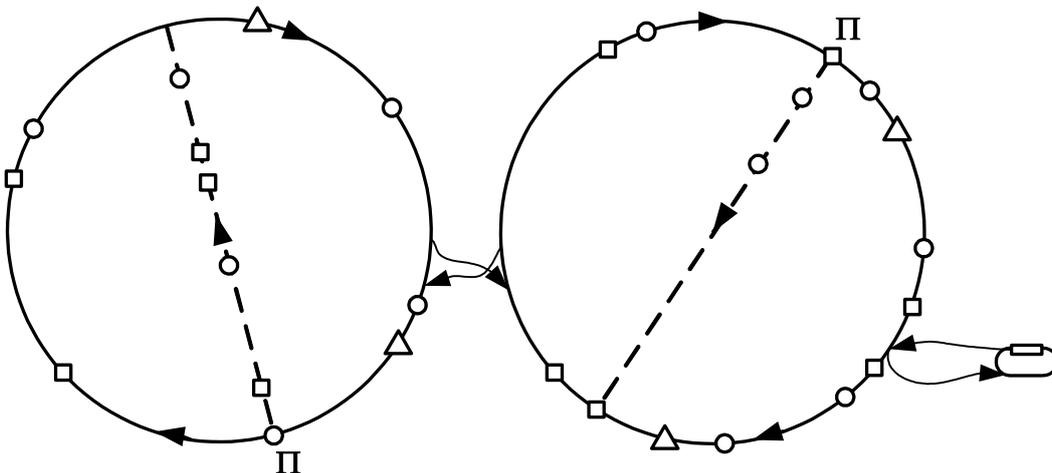
Drawn circular navigation



Triangle and three lines



Speed spiral and two lines



Double circular navigation

3.B1. PURE ECONOMY

Objective

Take-off with a measured quantity of fuel and stay airborne for as long as possible and return to the deck.

Special rules

- Free take-off within the time window.
- Departure from view of the marshals or egress from the permitted flight area will incur penalties.
- Land outside the airfield boundary: Score zero.
- Land inside the airfield boundary but outside the deck: 20% penalty.
- PL2 class shall be excluded from this task.

Scoring

$$\text{Pilot score} = 1000 \times \frac{T_p}{T_{\max}}$$

Where:

T_p = The pilot's time,

T_{\max} = The longest time taken to complete the task

3.B2 ECONOMY & DISTANCE

Objective

To take off from the deck with a given quantity of fuel, fly as many sections as possible around a course of one or more sections and land in a landing deck.

Description

Each section must be approximately 1Km in length and must contain a landing deck. Lines of no return are arranged to prevent aircraft flying in the reverse direction to the general flow of traffic.

Special rules

- Pilots must not exceed 200ft height at any time.
- Exceeding the height limitations or failure of the complete aircraft to round a pylon does not score that section.
- Pilots should overtake on the outside of the course, they may overtake on the inside but will not score that section if the manoeuvre is considered to be overly aggressive.
- If the pilot or any part of his Paramotor touches the ground during the task and takes off again, score zero.
- Flying back across a 'line of no return' score zero.
- Failure to land in a landing deck: 20% penalty.

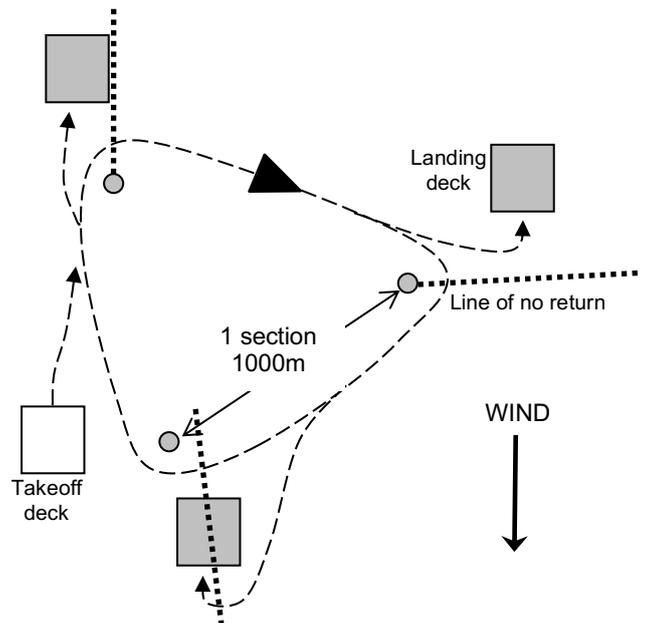
Scoring

$$\text{Pilot score} = 1000 \times \frac{L_p}{L_{\max}}$$

Where:

L_p = The number of whole sections completed by the pilot

L_{\max} = The maximum number of whole sections achieved in the task.



3.B3 ECONOMY & NAVIGATION**Objective**

To take off with a given quantity of fuel and locate an unknown number of markers within defined sectors and return to the deck.

Description

Each sector will contain a given IP (initial point) and a FP (finishing point) which may be a turn point, marker or gate. The pilot flies a given track between the IP and FP. An unknown number of markers may be distributed along the track.

Special rules

- Outlanding: Score zero.
- (for PL2 only): returning with less fuel than the specified residual amount: score zero

Scoring

$$\text{Pilot score} = 1000 \times \frac{\text{NBp}}{\text{NBmax}}$$

Where:

NBp = The number of ground markers and/or turn points a pilot collects in the task

NBmax = The maximum number of markers and/or turn points collected in the task

3.B4. ECONOMY & PRECISION**Objective**

To make a clean take-off in the time window with a given quantity of fuel, stay airborne as long as possible within a defined area and land on landing markers situated within the deck before the end of the time window.

Special rules

- The pilot scores 300 bonus points for a clean take off at the first attempt, 200 for the second, 100 for the third, zero for any attempts thereafter.
- Departure from view of the marshals or egress from the permitted flight area will incur penalties.
- When landing, If the pilot elects to switch off his engine at least 5m above a marker and:

Makes a first touch on the marker: Landing bonus: 200 points

If the pilot elects to not switch off his engine and:

Makes a first touch on the marker: Landing bonus: 50 points

- If the pilot falls over as a result of the landing: zero landing bonus.
- If the pilot obstructs another competitor attempting to land at a landing marker penalties will apply.
- (for PL2 only): returning with less fuel than the specified residual amount: score zero

Scoring

$$\text{Pilot score} = \left(500 \times \frac{\text{Tp}}{\text{Tmax}} \right) + \text{Bto} + \text{Bld}$$

Where:

TP = The pilot's time

Tmax = The longest time taken to complete the task

Bto = Takeoff bonus points

Bld = Landing bonus points

3.B5 SPEED TRIANGLE AND OUT AND RETURN

Objective

With limited fuel, to fly around a circuit in the shortest possible time, return to the deck, and then, with the pilots remaining fuel fly in a given direction as far as possible and return to the deck.

Description

Fuel quantity allowed: (Suggested: 6 litres)

Part 1: Speed; The pilot take off time is noted. The pilot flies to one or more turnpoints and returns to the deck where he is timed.

Part 2: Distance; The pilot then flies in a given direction to a point of pilot choice and returns to the deck.

Special rules

- Land out before completing part 1: Score zero.
- Land out before completing part 2: Score zero for part 2.
- Failure to takeoff or land entirely in the deck: 20% penalty.
- (for PL2 only): returning from part 2 with less fuel than the specified residual amount: score zero

Scoring

$$\text{Pilot score} = \left(500 \times \frac{t_{\text{Min}}}{t_p} \right) + \left(500 \times \frac{d_p}{d_{\text{Max}}} \right)$$

Where:

t_p = the pilot's time,

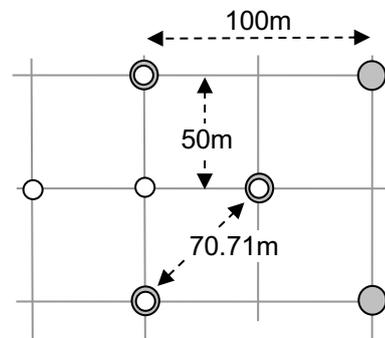
t_{Min} = The best time (Part 1)

d_p = the pilot's distance

d_{Max} = the greatest distance (Part 2)

A note about Paramotor precision tasks

Most precision tasks with slalom poles and/or pylons are designed to be run in either a 50m grid, a 70.71m grid or a 100m grid. It is then convenient for the organizer to set up the task area according to the grid in the drawing which gives the maximum flexibility in any wind direction with the minimum of hole-digging.



3.C1. PRECISION TAKE-OFF AND LANDING

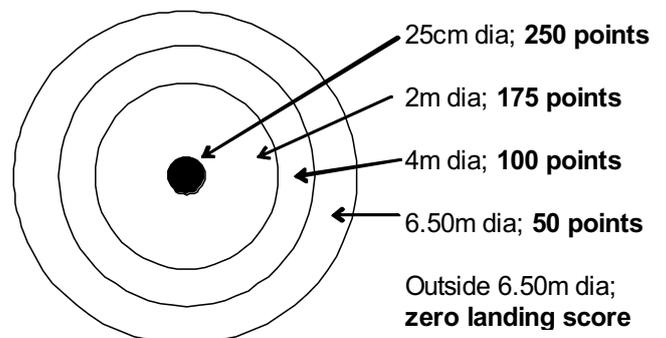
Objective

To make a clean take off at the first attempt in the deck, and subsequently land as near as possible to a target.

Description

The pilot is permitted four takeoff attempts, climbs to 500ft overhead the target, cuts the engine before passing through a gate and tries to make a first touch as near as possible to the centre of a target consisting of:

- A series of concentric circles for PF1 and PF2 classes.
- A series of 5m wide parallel strips for PL1 and PL2 classes



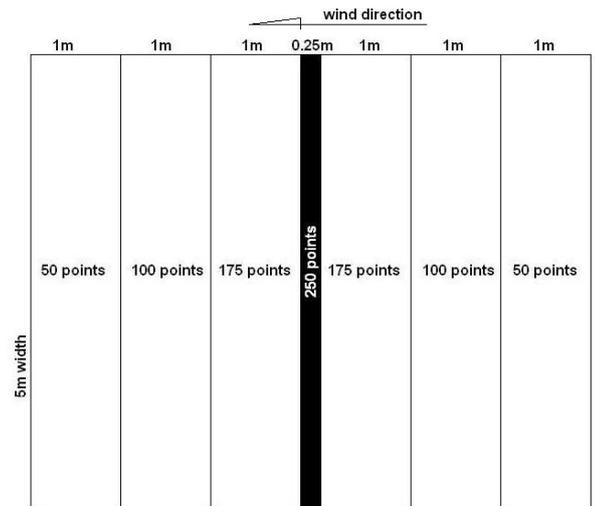
Special rules

- The pilot scores 250 points for a clean take off at the first attempt, 170 for the second, 90 for the third, zero for the fourth.
- The circuit to be flown will be detailed at briefing.
- The first touch of the ground by the pilot's foot (PF) or the aircraft wheels (PL) is the point from which the pilot's score will be derived. A first touch on the line scores the higher score. When more than one PL wheel touches simultaneously, the point chosen is the one in favour of the pilot.
- Contestants will be awarded a zero score if the pilot or any part of the aircraft touching the ground outside the deck while undertaking the task.
- Contestants will be awarded a zero landing score for:

Engine not stopped before the gate.

Gate not passed correctly.

Falling over as a result of the landing.



Outside rectangle; zero landing score

Scoring

Pilot score = (Bto + Bld)

Where:

Bto = Takeoff points

Bld = Landing points

3.C2 THE FOUR STICKS

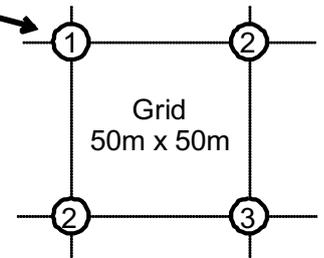
Objective

This task is intended as a small break task between elements of an overall task.

Description

There are 4 standard kicking sticks set at the corners of a 50m x 50m square. The pilot must kick 3 of the 4 sticks. The first stick the pilot kicks may be any of the 4 sticks. The third stick the pilot kicks must be diagonally opposite the first, the second stick may be either of the two other sticks.

Approach from direction of pilot's choice



Special rules

- If this task is used to take a time for the purposes of an element of the overall task then the time shall be taken the moment the pilot strikes the first stick.
- The pilot may have as many attempts as necessary at striking the first stick.
- Only ONE attempt is allowed at kicking both the second and third sticks.
- There shall be one group of 4 sticks for every 15 competitors in the task.
- On approach to the task, pilots should choose a "free" group of sticks. However if, in the opinion of the marshals on duty a conflict with another aircraft existed (depending on the overall task, for example if there is a timing involved) both should kick only one stick and then depart on the rest of the overall task. Both pilots will then be given the opportunity to have ONE further attempt at this task as soon as possible after the end of the overall task.

Scoring

The scoring should be integrated into the overall task as NQ. If the pilot fails to kick either the second or third stick then for each stick then the penalty shall be no more than 5% of the overall task score.

3.C3 PRECISION TAKE-OFF AND LANDING

Objective

To make a clean take off at the first attempt in the deck, and subsequently land as near as possible to a target which is:

- A point for PF1 and PF2 classes
- A 5 m long line marked on the ground perpendicular to the wind direction for PL1 and PL2 classes.

Description

The pilot is permitted four takeoff attempts, climbs to 500ft overhead the target, cuts the engine before passing through a gate and tries to make a first touch as near as possible to the centre of a target.

Special rules

- The pilot scores 250 points for a clean take off at the first attempt, 170 for the second, 90 for the third, zero for the fourth.
- The circuit to be flown will be detailed at briefing.
- The first touch of the ground by the pilot's foot (PF) or the aircraft wheels (PL) is the point from which the pilot's score will be derived. When more than one PL wheel touches simultaneously the point chosen is the one in favour of the pilot.
- Zero score if the pilot or any part of the aircraft touches the ground outside the deck while undertaking the task.

Contestants will be awarded a zero landing score for:

- Engine not stopped before the gate.
- Gate not passed correctly.
- Falling over as a result of the landing.

Scoring

$$\text{Pilot score} = \text{Bto} + \left(250 \times \frac{\text{Dp}}{\text{Dmin}} \right)$$

Where

Bto = Pilot's takeoff score.

Dmin = x - the closest distance to the target achieved by any pilot.

Dp = x - the pilot's distance to the target (> x m = zero landing score).

The value of x, in metres will be given at briefing but may be between 10 and 25 metres depending on the meteorological conditions. This outer zone should be marked by cones or some other visual indication in the form of:

- A circle for PF1 and PF2 classes,
- Two 5m long lines parallel to the target for PL1 and PL2 classes.

3.C4 SHORT TAKE-OFF OVER A FENCE

Objective

To take off and clear a fence from as short a distance as possible. This task is intended to be included as a small element of another task.

Description

A fence 2m high and 10m long is manoeuvred into a position of pilot choice.

When takeoff permission is granted, pilots takes off and tries to fly over the fence. Maximum distance of pilot's feet on the ground to the fence is scored.

Special rules

- If the pilot's feet have not left the ground and the line of the fence is not reached at the first attempt then one second attempt is permitted.
- Zero fence score for breaking the fence or weaving.

Scoring

The scoring should be integrated into the overall task scoring as F. If the pilot fails to clear the fence then the penalty shall be no more than 10% of the overall task score.

$$\text{Pilot score} = \left(100 \times \frac{F_{\min}}{F_p} \right)$$

Where

F_{\min} = The shortest distance in metres for a takeoff over the fence

F_p = The pilot's takeoff distance to clear the fence.

Notes

A fence may simply be 2 kicking sticks with a plastic tape between.

To prevent unnecessary delay the fence should only be brought to the pilot when he is ready to take off.

The pilot should not be told the distance he is from the fence, the distance should be at the sole visual judgement of the pilot.

The distance measured is the maximum distance the pilot is away from the fence whilst touching the ground, thus if the pilot steps away from the fence during launch then this distance shall be included.

The job of holding the two poles supporting the fence can be quite hazardous; it should be entrusted to marshals experienced in Paramotor operations.

3.C5 SHORTEST TAKE-OFF

Objective

To take off in as short distance as possible. This task is intended to be included as a small element of another task.

Description

Takeoff permission is granted after the pilot has indicated he is ready to take off. The maximum distance on the ground, from where the pilot's feet or aircraft wheels have been since the start signal, to where the pilot's feet or aircraft wheels permanently leave the ground will be measured and scored. (permanently is defined as aircraft is airborne for more than 10 sec.)

Special rules

- There will be time and distance limits established at briefing according to the weather conditions. If not otherwise briefed, the time limit for this task is 1 min. No restrictions on number of attempts within the time limit. No penalties for the wing touching the ground on each attempt. If not otherwise briefed, the distance limit is 30 m. Exceeding either time or distance limits will be signaled with red flag and scored zero.

Scoring

$$\text{Pilot score} = 100 \times (S_{\min} / S_p)$$

Where

S_{\min} = The shortest distance in metres for a takeoff.

S_p = The pilot's takeoff distance.

The scoring can be done separately or may be integrated into the overall task scoring as S. If the pilot scores 0 then the penalty shall be no more than 10% of the overall task score.

Notes

Marking pilot's footsteps or wheels on the ground can be a tricky task for marshals. Using 2-3 m long rods (sail battens, fishing rods or similar) has proven to be effective to help in fixing visual observation results on the ground before they are measured.

Alternative methods can be developed and used for more precise measurements

3.C9 FAST / SLOW SPEED**Objective**

To fly a course as fast as possible and then as slow as possible (or vice versa).

Description

A straight course consisting of four equally spaced 'kicking sticks' between 150m and 300m long is laid out facing approximately into wind.

The course shall be flown twice. The order will be briefed (fast then slow or slow then fast).

The pilot makes a timed pass along the first course, returns to the start, and makes a second timed pass in the same direction.

There may be two courses but they must be of equal dimensions and orientation and separated by at least 200m flying distance.

Special rules

- A valid strike on a stick is:

EITHER one where the pilot or any part of the Paramotor has been clearly observed to touch it.

OR when electronic 'kick stick' sensors which have been shown to meet the standard tests are used, a valid strike is one which is recorded by the device.

- For each course, the clock starts the moment the pilot kicks the first stick and stops the moment he kicks the fourth stick.
- The pilot may have 3 attempts at kicking the first stick on each run.
- If the pilot misses the second or third stick then he is considered 'too high', penalty 50% course score for each stick missed.
- The maximum time allowed for a pilot to complete each course is 5 minutes.

In the slow course;

- If the pilot or any part of his Paramotor touches the ground or the fourth stick is missed: $V_{p2} = \text{null}$ and $E_p = \text{zero}$
- If the pilot zigzags: Score zero.

In the fast course;

- If the pilot or any part of his Paramotor touches the ground: $V_{p1} = \text{zero}$ and $E_p = \text{zero}$
- The pilot may have three attempts at kicking the fourth stick.

$$\text{Pilot score} = \left(0.25 \times Q \times \frac{V_{p1}}{V_{\text{max}}} \right) + \left(0.25 \times Q \times \frac{V_{\text{min}}}{V_{p2}} \right) + \left(0.5 \times Q \times \frac{E_p}{E_{\text{Max}}} \right)$$

Where:

Q = Maximum task score between 500 and 1000 points, as briefed.

V_{max} = The highest speed achieved in the fast course without penalties, in Km/H

V_{p1} = The speed of the pilot in Km/H in the fast course.

V_{min} = The lowest speed achieved in the slow course without penalties, in Km/H

V_{p2} = The speed of the pilot in Km/H in the slow course.

E_p = The difference between the pilot's slowest and fastest speeds, in Km/H

E_{max} = The maximum difference between scored slowest and fastest speeds after penalties, in Km/H

3.C12 BOWLING LANDING**Objective**

Land without engine, hitting as many pins as possible.

Description

5 pins are placed along a line into wind in the landing area at regular intervals between 1 and 2 m.

The pins are 50 cm high for PF classes and 100 cm high for PL classes and they are covered by dense foam. They can simply stand on the ground or can be attached to a spring system like that of the kicking sticks. A pin is said to be hit when it is clearly seen by a marshal or electronic sensor, or when the pin falls down.

Pilots will fly to 500ft and cut the engine before crossing a briefed gate.

They will fly a minimum of 60 seconds and will try to hit as many pins as possible before touching the ground. Each pin hit before touching the ground will score 50 points (maximum 250 points).

This task may be combined with a precision take-off.

Scoring

PId = 50 points for each pin hit (maximum of 250 points)

Penalties

Not crossing the gate or crossing it engine on: zero landing score.

Flying less than 60 seconds with no engine: zero landing score.

Falling over during landing or two knees on the ground: zero landing score.

Wind
↓



Landing pins

3.C13 PRECISION PARABALL**Objective**

Deliver balls to a target (basket or hole) or as close to the target as possible, either by carrying or hitting with feet, as quickly as possible.

Description

The target is a hole or basket between 0.5-2m in diameter. The optimum is a hybrid of hole and basket; a hole with edges between 20-50cm above ground. Construction should be light for safety reasons but strong enough to hold the force of a flying ball and to keep balls inside.

Between 3-5 soft or half-empty balls of different sizes are placed downwind from the target on marked start positions. The distance between the balls and the target should be between 20–50m.

The pilot approaches a ball, collects it with his feet and carries it to the basket. Alternatively the pilot can kick the ball towards the target. This is repeated with the other balls until all the balls are in the basket or time is up.

A maximum task time limit is set. Timing starts with the touch of the first ball, the first attempt to touch a ball or when passing the first ball. Timing ends when the last ball enters the target (or when the maximum time limit is reached).

Scoring is based on the time taken from start of task until all balls are in the target. If the maximum time limit is reached, the number of balls in the target is counted and the distances of the remaining balls from the target are measured.

Special rules

There are no limitations to the number, angle, speed or height of approaches to the balls and the technique for hitting or carrying the balls.

Balls must stay in the target. Bouncing out from the target will give the result according to the distance from the target.

The pilot may contact, and move on, the ground but the wing may not touch the ground before time is up. The penalty if the wing touches the ground before the end of the time limit = score 0 for time.

The maximum time limit assigned to this task depends on the amount of balls, distances, the balls' properties, target size and weather conditions. For example, with 3 balls a suitable time limit is 3 or 4 minutes.

The maximum time limit is signalled by a marshal with an appropriate (red) flag and a whistle. Results are then measured from this state. If a pilot is carrying a ball when the time limit is reached, he is allowed up to 30 seconds extra time to deliver the ball to the target. This extra time finishes when the pilot next drops the ball, giving the pilot one chance to deliver the ball to the target.

Pilots must land in the landing deck immediately after the task is performed. Pilots must then remove all of their equipment from the task area immediately.

Details and changes to these rules will be briefed.

3.C14 PRECISION WING CONTROL

Objective

Land and display precise control of the wing before taking off again.

Description

This task will normally be flown in wind conditions in which a reverse launch is possible. A straight course consisting of two sticks is laid out facing approximately into wind. The precise distance between the sticks is arbitrary but they should be a minimum of 100m apart. The pilot enters the course into wind. They must kick the first stick to start their time. They must then land in between the two sticks, bringing the wing down such that the trailing edge is clearly seen to touch the ground.

When a marshal has confirmed that wing has touched the ground they will show a green flag as a signal that the pilot may take off again.

The pilot will then launch and kick the second stick to stop the timer.

Special rules

A valid strike on a stick is:

EITHER one where the pilot or any part of the Paramotor has been clearly observed to touch it.

OR when electronic 'kick stick' sensors which have been shown to meet the standard tests are used, a valid strike is one which is recorded by the device.

- The clock starts the moment the pilot kicks the first stick and stops the moment he kicks the second stick.
- The pilot may have 3 attempts at kicking each stick.
- If the pilot relaunched the wing before being shown a green flag by the marshal they will incur 100% penalty for the task.
- If a launch fails the pilot may make as many attempts as they need to relaunch the wing, within the specified time limit.
- The maximum time allowed for a pilot to complete the course is 3 minutes.

Scoring

$$Q = (T_{best}/T_{pil})$$

Where

T_{pil} = the pilots time

T_{best} = the best time

Q = the task value before normalization

3.C15 PRECISION WING CONTROL – GROUND HANDLING

Objective

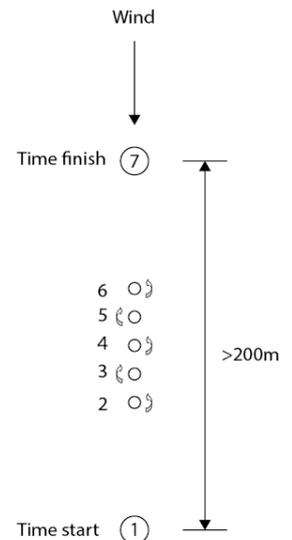
Land and display precise control of the wing before taking off again.

Description

A straight course consisting of two sticks is laid out facing approximately into wind. The precise distance between the sticks is arbitrary but they should be a minimum of 200m apart.

At the center point between the sticks a minimum of five pins are placed in line with the sticks. The pins are small plastic cones of the type used in sports training. The task director will specify the distance between each pin at the briefing. The pilot enters the course into wind. They must kick the first stick to start their time. They must then land before the first pin, keeping the wing flying in the air above them.

Whilst kiting the wing, they should walk or run through the course of pins, turning in alternate directions around each one to follow a slalom course. The body of the pilot must be clearly observed to pass outside of the line of pins when making each turn, and they must not touch any of the pins. After the pilot has passed the final pin, they will then launch as quickly as possible and kick the second stick to stop the timer.



Special rules

- A valid strike on a stick is: EITHER one where the pilot or any part of the Paramotor has been clearly observed to touch it. OR when electronic 'kick stick' sensors which have been shown to meet the standard tests are used, a valid strike is one which is recorded by the device. - The clock starts the moment the pilot kicks the first stick and stops the moment he kicks the second stick.
- The pilot may have 3 attempts at kicking each stick.
- The pilot may turn either to the left or to the right when rounding the first of the pins, so long as they alternate the turn direction on each subsequent pin. - If the wing drops to the ground whilst the pilot is running through the slalom course they may relaunch it as many times as they need within the specified time limit.
- The maximum time allowed for a pilot to complete the course is 3 minutes
- Each pin that is touched by the body of the pilot in the course counts as a missed target.
- Each time the pilot fails to turn outside the line of pins it counts as a missed target.

Scoring

$t_{pen} = t_{pil} + m * v_{pen}$
 $Q = (T_{best} / T_{pen})$
 Where
 t_{pil} = the measured pilots time (seconds)
 m = the number of missed targets
 v_{pen} = the time penalty for each missed target (seconds)
 t_{pen} = the pilots time (after penalties for missed targets)
 t_{best} = the best time (after penalties for missed targets)
 Q = the task value before normalization

3.N1 NOISE IN CLIMB

Objective

From a stationary position on the ground in front of a line and using a fixed throttle (and propeller pitch) setting of pilot choice, the pilot takes off and climbs in a straight line over a microphone set 300m distant from the line. The max noise in dBA of the aircraft is measured.

Special rules

- Weaving, failure to fly directly over the microphone, changing throttle or propeller pitch setting: Zero score.

Scoring

Pilot score = $500 \times \left(\frac{nMin}{nP} \right)$

Where:

nMin = The minimum noise in dBA achieved in the class

nP = The noise achieved by the pilot in dBA

3.N2 MINIMUM NOISE IN LEVEL FLIGHT**Objective**

To fly two legs of a course in opposite directions as quietly as possible.

Description

The course is between two points 300m apart and must be flown in a straight line at a height of 25ft (\pm 10ft). at a pilot selected constant throttle and propeller pitch setting. The microphone is positioned 100m offset from the centreline and equidistant from the two points.

Special rules

- Weaving, changing height, throttle or propeller pitch setting whilst in the course: Zero score for that run.

Scoring

$$\text{Pilot score} = \left(250 \times \left(\frac{n\text{Min}_1}{nP_1} \right) \right) + \left(250 \times \left(\frac{n\text{Min}_2}{nP_2} \right) \right)$$

Where:

nMin1 and nMin2 = The minimum noise in dBA achieved on each run in the class.

nP1 and nP2 = The noise achieved by the pilot in dBA on each run.