# TASK CATALOGUE

## FOR THE

# 16th FAI WORLD MICROLIGHT CHAMPIONSHIPS

Nagykanizsa Airfield
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## 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.

## CONTENTS

**Key to symbols used in the task catalogue**

**Marker Symbols**

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

△ Π 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

H
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# 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.

# 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)
$Qh = 1000 \times H / Nh$

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:    $Q = Qh + Qt$     $P = 1000 \times Q / Qmax$

### 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 100% penalty will be imposed for backtacking. Backtracking is defined as either re-joining the active track line at a point prior to the point where the pilot departed from it or flying with an angle of greater than 90 degrees in respect to the intended flight direction within a corridor defined by the width used to score gates in the task. 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.
$Qt = \sum Ei$ (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 100% penalty will be imposed for backtacking. Backtracking is defined as either re-joining the active track line at a point prior to the point where the pilot departed from it or flying with an angle of greater than 90 degrees in respect to the intended flight direction within a corridor defined by the width used to score gates in the task. 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 a 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 – Ep
Qp = 1000 * (V / Vmax)

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.
Qt = Emax * 3 – Et

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

## Comments

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

A 100% penalty will be imposed for backtacking. Backtracking is defined as either re-joining the active track line at a point prior to the point where the pilot departed from it or flying with an angle of greater than 90 degrees in respect to the intended flight direction within a corridor defined by the width used to score gates in the task. 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.
Qh = Vh * Nh

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.
Qt = ∑ (Vt - Ei) (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:
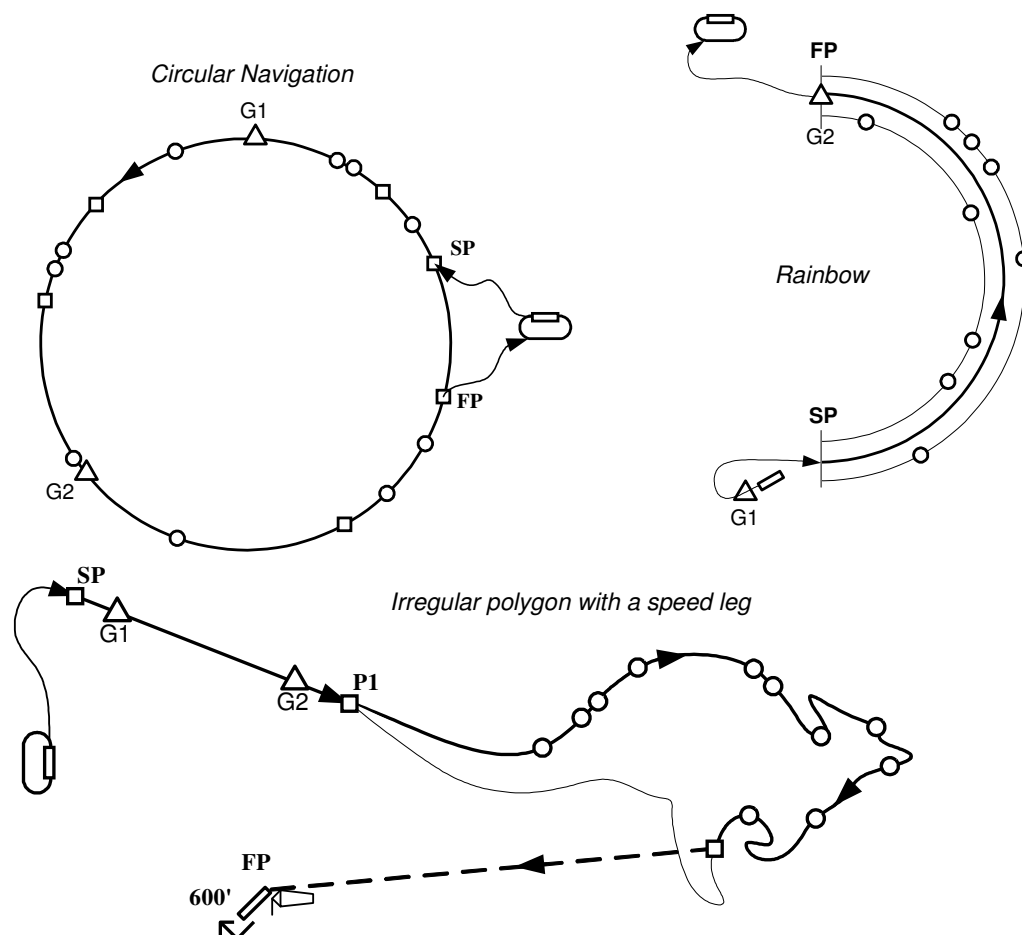
Backtracking against the task direction or crossing a hidden gate backwards: 100%

Breach of Quarantine: 100%

Crossing a hidden gate twice invalidates the gate.

A 100% penalty will be imposed for backtacking. Backtracking is defined as either re-joining the active track line at a point prior to the point where the pilot departed from it or flying with an angle of greater than 90 degrees in respect to the intended flight direction within a corridor defined by the width used to score gates in the task. 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



*Circular Navigation*

*Rainbow*

*Irregular polygon with a speed leg*

## 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 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:

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

$V_t$ = Gate value (e.g. 180)
$E_i$ = Absolute error in seconds in gate i.
   Maximum error is $V_t$.
   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):

$V_s$ = 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:

Backtracking against the task direction or crossing a hidden gate backwards: 100%
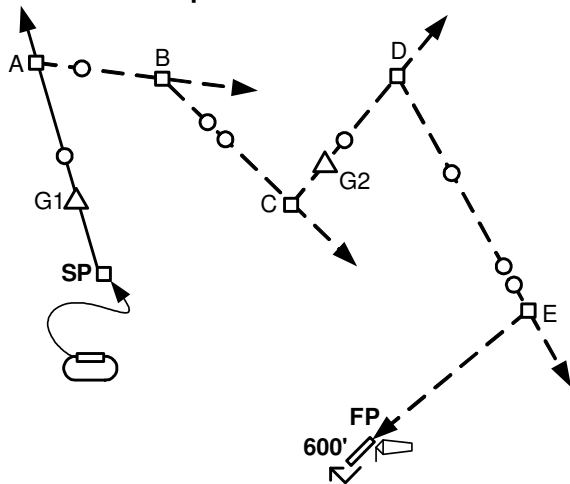
Breach of quarantine: 100%
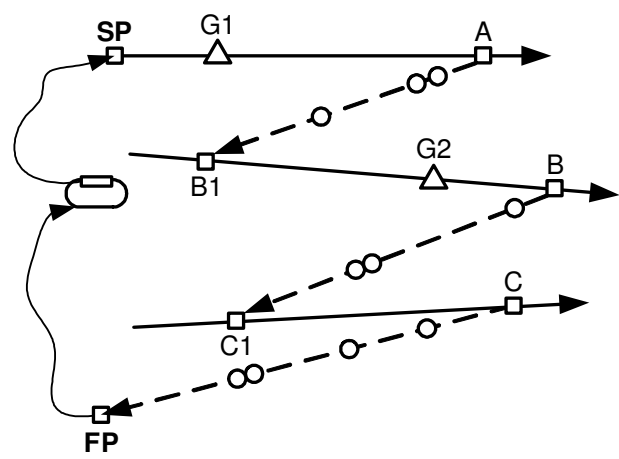
Crossing a hidden gate twice invalidates the gate.

A penalty will be specified for braking an envelope seal.

A 100% penalty will be imposed for backtacking. Backtracking is defined as either re-joining the active track line at a point prior to the point where the pilot departed from it or flying with an angle of greater than 90 degrees in respect to the intended flight direction within a corridor defined by the width used to score gates in the task. 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.
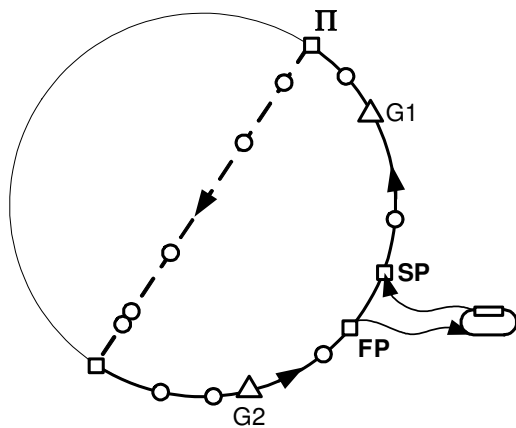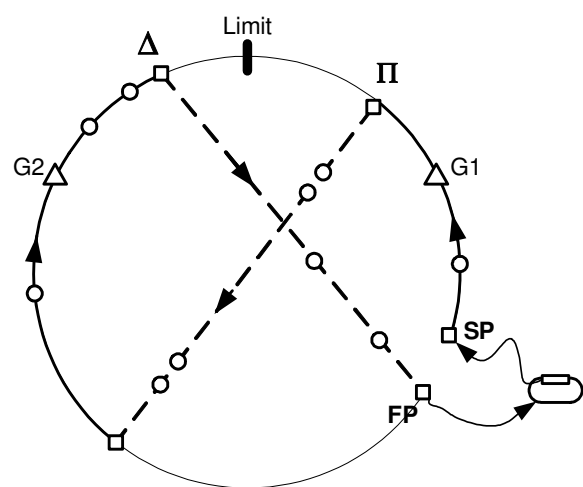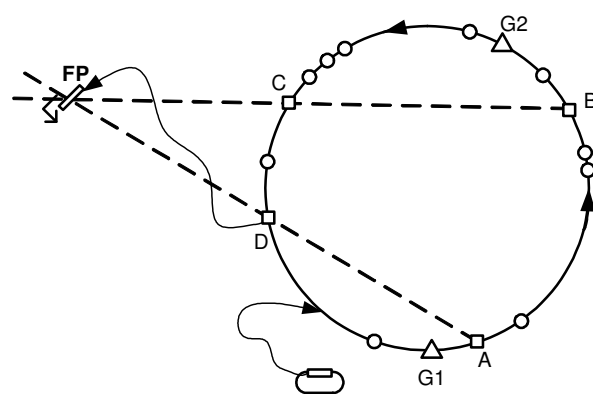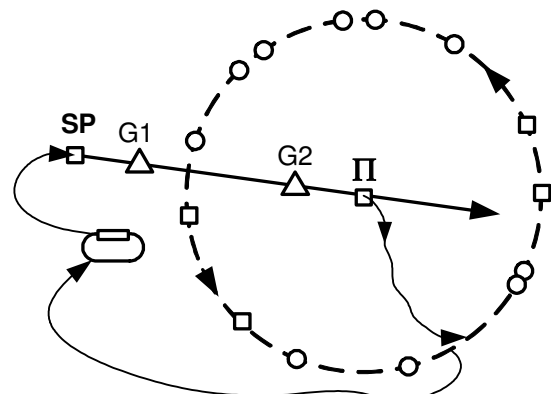
**Examples**

*Sequential navigation*

*Linear navigation*

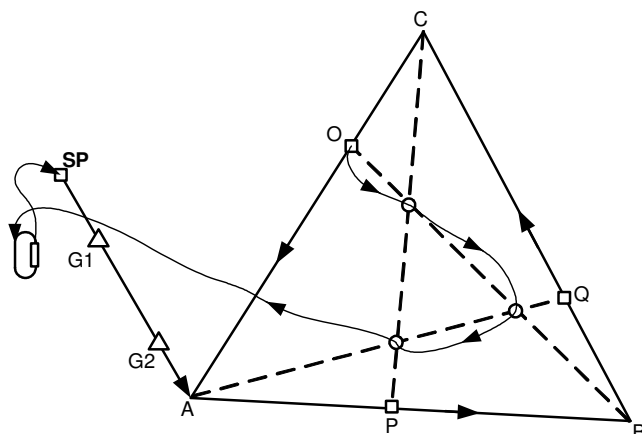*Circular navigation and diameter*

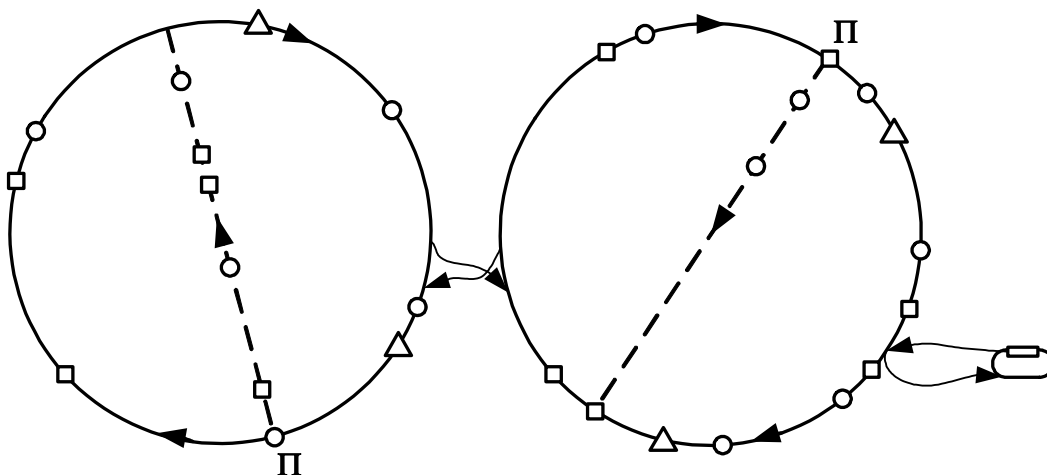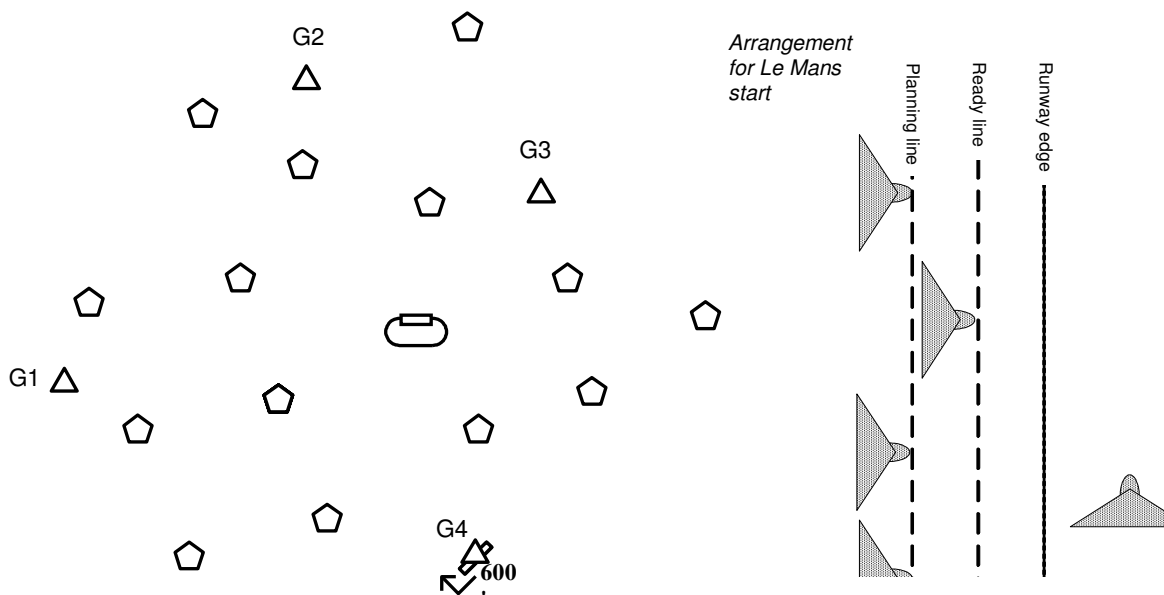*Circular navigation, diameter and reverse.*

*Circle and two lines*

*Drawn circular navigation*

*Speed spiral and two lines*

*Triangle and three 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.

*Arrangement for Le Mans start*

Planning line

Ready line

Runway edge

G2

G3

G1

G4
600

### 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 overflown

- 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

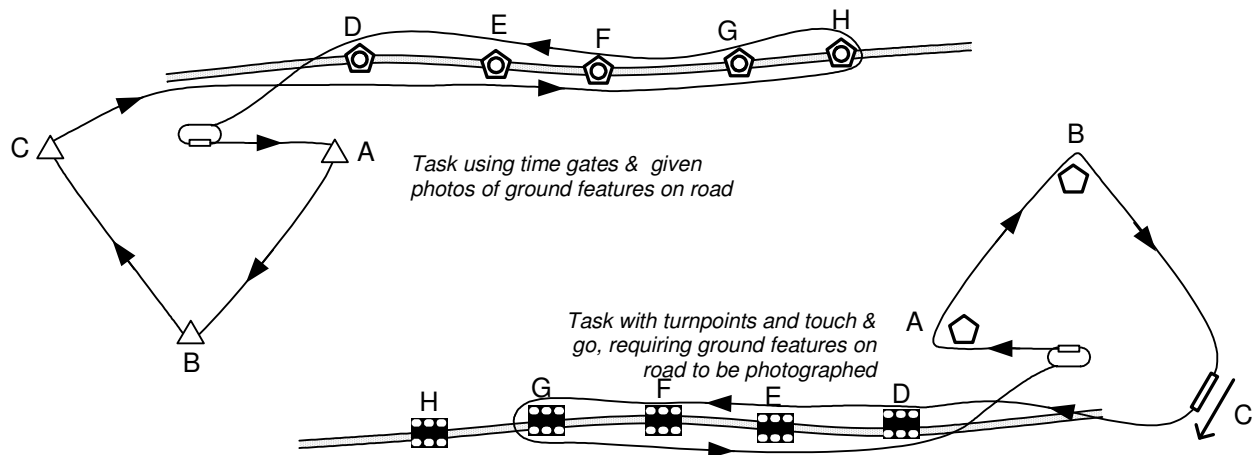Typically each photo will score 100 points, each time gate 200 points and an additional score will be awarded if the full and correct turnpoint and gate sequence is achieved.  The following penalties will apply:

- 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.B1     SPEED TRIANGLE OUT-AND-RETURN**

### Objectives

With limited fuel, to fly around a triangular circuit in the shortest possible time, then to return to the deck or pass through a gate, and finally, with the remaining fuel, to fly in a given direction as far as possible and return to the deck.



*Task using time gates & given photos of ground features on road*

*Task with turnpoints and touch & go, requiring ground features on road to be photographed*

### Summary

Competitors will be given:

- The location of the three turnpoints or time gates that form the triangle

- A line or linear ground feature such as a road, river, railway or power-lines to be followed

- The location of or photographs of known ground features

- A specified weight or volume of fuel

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 any scoring

### Scores

The following penalties will apply:

- Backtracking against the task direction: 100% Backtracking is defined as either re-joining the active track line at a point prior to the point where the pilot departed from it or flying with an angle of greater than 90 degrees in respect to the intended flight direction within a corridor defined by the width used to score gates in the task. 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.

- Failing to pass around the outside of the turnpoints or overfly gates:100%

- Returning with less than minimum specified fuel: 100%

The task score calculation will be:

$$\text{Pilot score} = \left(500 \times \frac{\text{tMin}}{\text{tp}}\right) + \left(500 \times \frac{\text{dp}}{\text{dMax}}\right) + \text{T}$$

Where:

tp = the pilot's time,

tMin = The best time (Part 1)
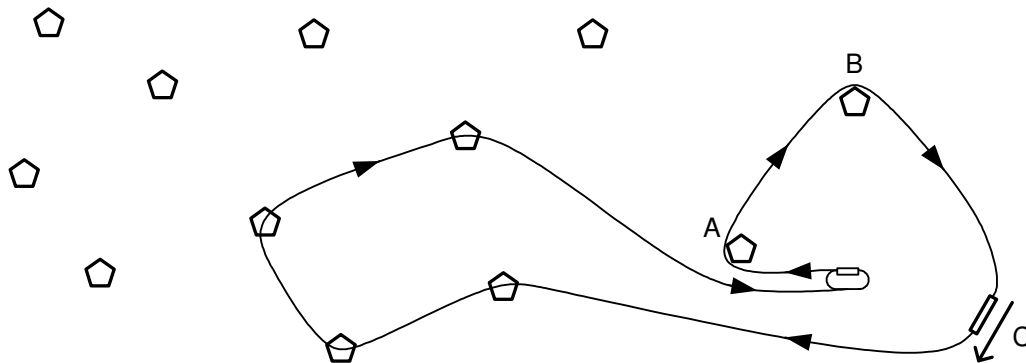
dp = the pilot's distance

dMax = the greatest distance  (Part 2)

T= touch & go score

## 2.B2     SPEED TRIANGLE & TURNPOINT HUNT

### Objectives

With limited fuel, to fly around a triangular circuit in the shortest possible time, then to complete a precision touchdown, and finally, with the remaining fuel, to fly to as many turnpoints as possible and identify ground features from a given photograph before returning to the deck.



### Summary

Competitors will be given:

- The location of the two turnpoints or time gates and the airstrip that form the triangle

- The location and photographs of known ground features

- A specified weight or volume of fuel

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 any scoring

### Scores

The following penalties will apply:

- Backtracking against the task direction: 100% Backtracking is defined as either re-joining the active track line at a point prior to the point where the pilot departed from it or flying with an angle of greater than 90 degrees in respect to the intended flight direction within a corridor defined by the width used to score gates in the task. 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.

- Failing to pass around the outside of the triangle turnpoints or overfly gates: 100%

- Photo wrongly identified on the map: Distance reduced as if turnpoint missed

- Returning with less than minimum specified fuel: 100%

The task score calculation will be:

Pilot score = $\left(500 \times \dfrac{\text{tMin}}{\text{tp}}\right) + \left(500 \times \dfrac{\text{dp}}{\text{dMax}}\right) + \text{T}$

Where:

tp = the pilot's time,

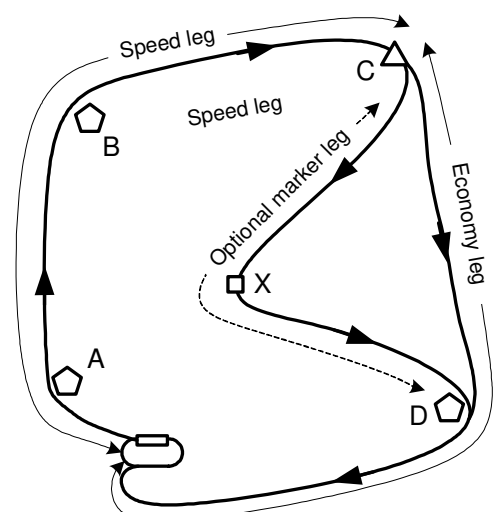tMin = The best time (Part 1)

dp = the pilot's distance

dMax = the greatest distance  (Part 2)

T= touch & go score

## 2.B3     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 as either re-joining the active track line at a point prior to the point where the pilot departed from it or flying with an angle of greater than 90 degrees in respect to the intended flight direction within a corridor defined by the width used to score gates in the task. 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:

Pilot score = $\left(450 \times \dfrac{tMin}{tp}\right) + \left(450 \times \dfrac{fMin}{fp}\right) + X$

Where:

tp = the pilot's time,

tMin = the best time (Part 1)

fp = the pilot's fuel

fMin = the least fuel  (Part 2)

X = marker score of 100 points

## 2.B4    FUEL & SPEED TRIANGLE

### Objectives

To fly around a triangular circuit at speed on limited fuel having accurately predicted the time to each corner of the triangle.

### Summary

Competitors will be given:

- The location of the three time gates that form the triangle
- The weight or volume of fuel specified by the competitor
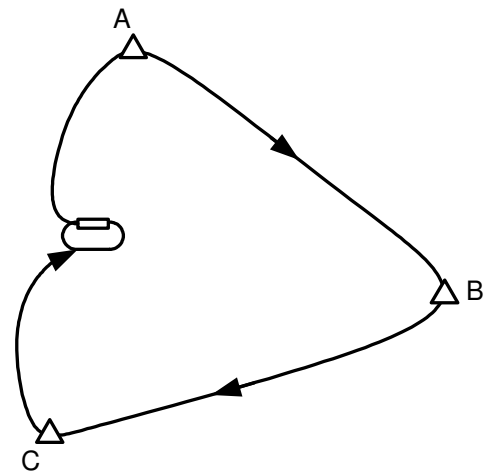
Before takeoff the competitor must:

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

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.

### Scores

Typically, each timing gate overflown within 10 seconds of the predicted time will score 100 points.  The following penalties will apply:

- Failing to pass through the triangle timing gates: 100%
- Backtracking against the task direction: 100% Backtracking is defined as either re-joining the active track line at a point prior to the point where the pilot departed from it or flying with an angle of greater than 90 degrees in respect to the intended flight direction within a corridor defined by the width used to score gates in the task. 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%
- Timing gate error >10 seconds from prediction: 5 points/second

The typical task score calculation will be:

$$\text{Pilot score} = \left(350 \times \frac{\text{tMin}}{\text{tp}}\right) + \left(350 \times \frac{\text{fMin}}{\text{fp}}\right) + X_A + X_B + X_C$$

Where:

tp = the pilot's time,

tMin = the shortest time achieved by a scoring competitor

fp = the pilot's fuel

fMin = the least fuel used by a scoring competitor

X = gate score of 100 points

### 2.B5      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 overflown 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 overflown

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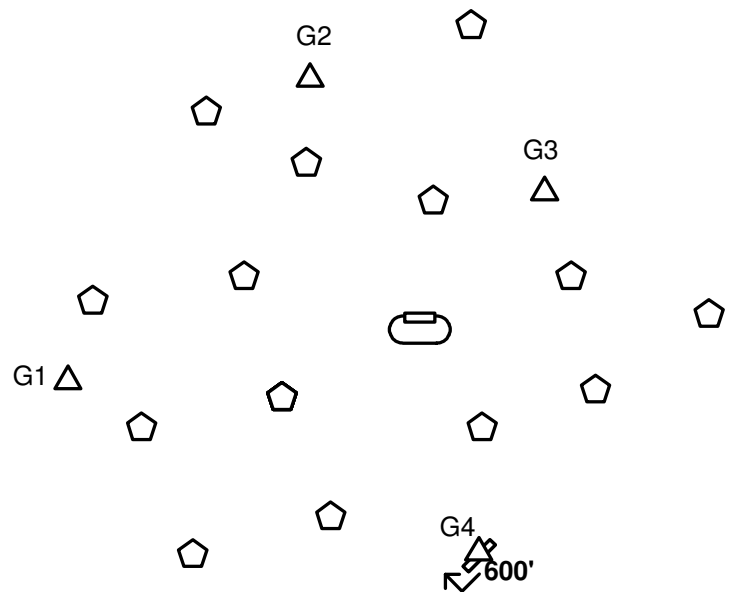
#### Safety

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.B6      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.B7    DURATION & SPEED

### Objectives

Given a limited amount of fuel, competitors must stay airborne for as long as possible, leaving enough fuel for a precision touch-and-go followed by a fast leg flown at a speed to be predicted by the competitor
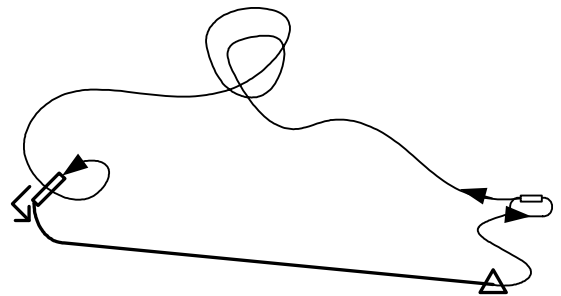
### Summary

Competitors will be given:

- A specified weight or volume of fuel

- The location of the airstrip for the precision touch-and-go

- The location of the gate at the end of the speed leg

Before takeoff the competitor must:

- Declare the predicted time for the speed leg

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%

- Predicted ground speed error: To be briefed

The typical task score calculation will be:

$$\text{Pilot score} = \left(400\times \frac{\text{tdp}}{\text{tdMax}}\right)+\left(400\times \frac{\text{tsMin}}{\text{tsp}}\right)+\left(200-\text{t}\Delta\text{p}\right)$$

Where:

tdp =    the pilot's time achieved on the duration leg

tdMax = the longest time achieved on the duration leg by a scoring competitor

tsp =    the pilot's time achieved on the speed leg

tsMin = the shortest time achieved on the speed leg by a scoring competitor

t $\Delta$ p= the speed leg time error in excess of allowed 10 secs at 1 point/second (max 200)
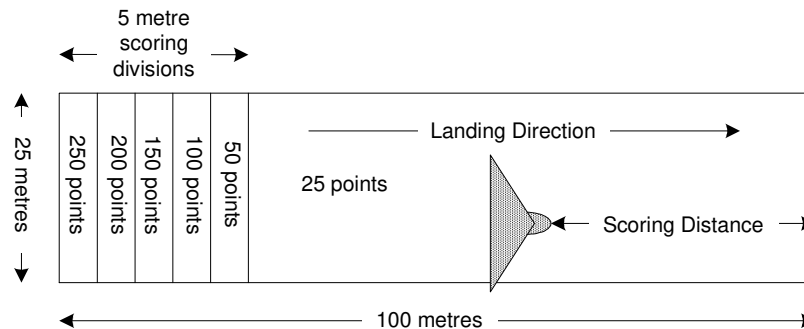
### 2.C1     SPOT LANDING

#### 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 100 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 100-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
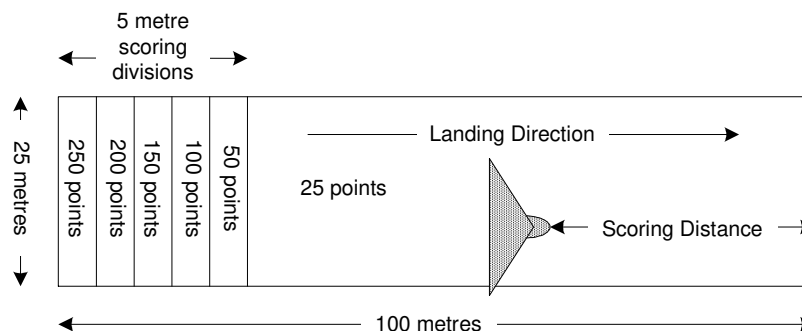
### 2.C2      SPOT LANDING - TIMED

#### 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 100 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 100-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

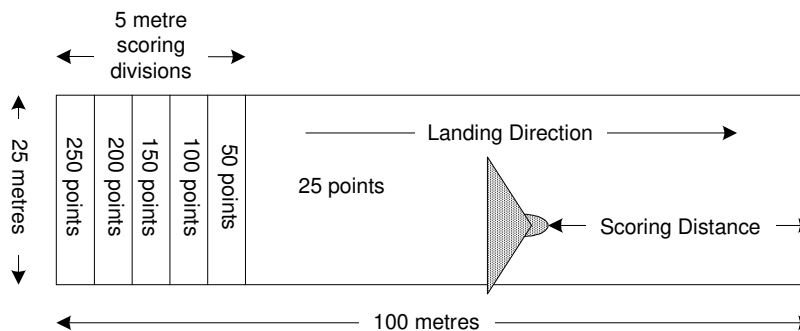Thus the score calculation will be (PS+PD+PT) with a maximum score of 450

## 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 100 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 100-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
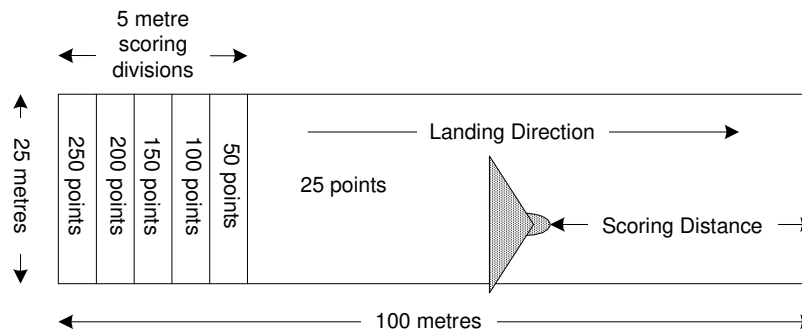
## 2.C4     POWERED PRECISION LANDING - TIMED

### 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 100 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 100-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
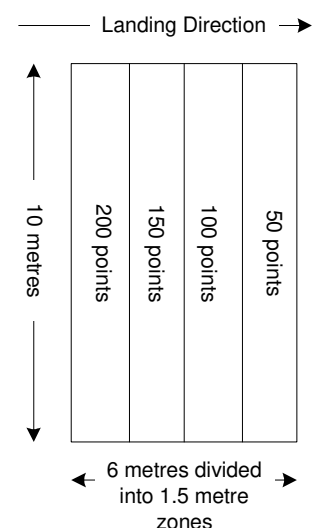
## 2.C5      PRECISION TOUCHDOWN - TIMED

### 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

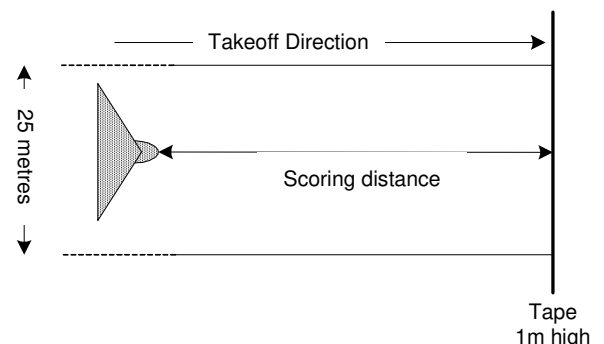Thus the score calculation will be $(P_S + P_T)$ with a maximum score of 250

## 2.C6      SHORT TAKEOFF OVER AN OBSTACLE

### Objectives

The objective is for the aircraft to take off over and clear an obstacle, starting the takeoff run as close to the obstacle as possible.

### Summary

This task simulates a short field takeoff over a hedge, the hedge being represented by a tape stretched across the runway 1 metre above the ground.  The pilot may position his aircraft on the runway as close as he wishes to the tape.  This distance will be measured from the centre of the foremost wheel and rounded up to the nearest 0.1 metre.  The aircraft must the take off over the tape without breaking it.



### Takeoff

The takeoff order will be specified at the task briefing. The pilot may position his aircraft as close to the tape as he wishes 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.

### Procedure after Takeoff

The procedure to be flown after takeoff will be specified at the briefing.

### Scoring

The competitor in each class that starts the takeoff run closest to the tape (DMIN) and clears the tape without breaking it will score 250 points.  Other competitors will be awarded scores based on their distance from the tape at the start of their takeoff run (DP) relative to DMIN.  The competitor will be scored zero if:

- The aircraft commences takeoff before stationary

- The aircraft commences takeoff before instructed to do so by the marshal

- The aircraft fails to fly over the tape

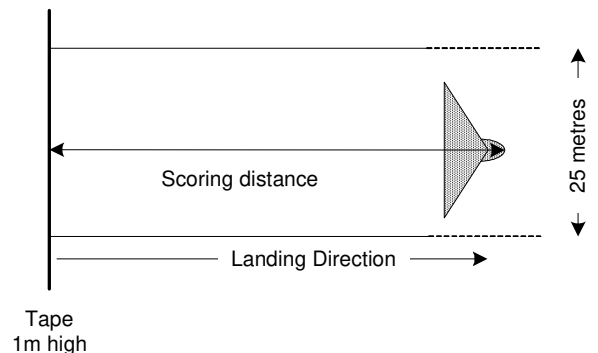- Any part of the aircraft breaks the tape

Thus the score calculation will be $(250 \times D_{MIN} / D_P)$ with a maximum score of 250

**2.C7    SHORT LANDING OVER AN OBSTACLE**

### Objectives

The objective is for the aircraft to fly over and clear an obstacle, to land and come to a standstill as close to the obstacle as possible.

### Summary

This task simulates a short field landing over a hedge, the hedge being represented by a tape stretched across the runway 1 metre above the ground. The pilot must land over the tape and stop. This distance will be measured from the centre of the foremost wheel and rounded up to the nearest 0.1 metre.



25 metres

Scoring distance

Landing Direction

Tape
1m high

### Joining

This task may 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 centreline of the runway 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 competitor in each class that comes to a standstill closest to the tape (DMIN) having cleared the tape without breaking it will score 250 points. Other competitors will be awarded scores based on their distance from the tape when they stop (DP) relative to DMIN. The competitor will be scored zero if:

- The aircraft fails to fly over the tape
- Any part of the aircraft touches the ground before the tape
- Any part of the aircraft breaks the tape
- The aircraft turns by more than 90 degrees from the runway 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 $(250 \times D_{MIN} / D_P)$ with a maximum score of 250

**2.C8    DECK LANDING**

### Objectives

The objective is for the aircraft to land in a deck 100 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 100 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.