



2018 Rules for BHPFC Icarus cup competition At Sywell Northampton

14th to 22nd July 2018, hosted by Sywell Aerodrome

1. Introduction

The aim of the BHPFC (British Human Powered Flying Club) is to promote human powered flight both technically and as a sport; potentially at some time in the future an Olympic sport. The following rules and regulations have been based on experience gained in the 2012 and 2013 Royal Aeronautical Society Icarus Cup events, and the 2014 Rally.

The BHPFC is affiliated to the BHPA (British Hang gliding and Paragliding Association - www.bhpa.co.uk). Competing pilots must be flying members of the BHPA and hence be covered by their insurance – see Appendix 1. Non-flying team members are not required to have this cover. Experience has shown that most minor injuries happen to ground handlers and marshals from situations such as falling off bicycles or tripping over or falling onto aircraft. At least one first aider will be present at all competitions, but in addition to this, all teams are strongly advised to have one team member who has a certificate in basic first aid.

A competition fee of £200 for the team and an entrance fee of £150 per aircraft will be charged and will include access to the airfield for up to 8 named team members. Any guests will incur a small extra charge of £10 per guest. A registration fee on the day will also be charged at £50.

For further information, including any future updates to the competition rules, please visit the BHPFC website at: <http://www.bhpfc.org.uk>.

The prizes at the 2018 BHPFC Icarus Cup Competition in Sywell are divided into two categories:

- 1) The Royal Aeronautical Society Human Powered flight Group (HPFG) will present the Icarus cup to the winning pilot and a cheque for £1,000 is awarded to the winning team.
- 2) The Jacobson Figure of Eight Prizes. The first prize will be awarded to the aircraft that completes the course and accumulates the highest number of points. The second prize will be awarded to the aircraft with the second highest number of points. The third prize will be awarded to the aircraft with the third highest number of points. If two aircraft have the same number of points the aircraft that has flown farthest will win first prize.

Certificates of participation will be presented to all registered participants at the competition.

2. Competition Tasks

- 1) Duration
- 2) 200m time trial
- 3) 1km time trial
- 4) 500m slalom course
- 5) Distance around a triangular course
- 6) Unassisted takeoff performance
- 7) Landing accuracy
- 8) Takeoff from grass
- 9) 200m time trial with takeoff from grass
- 10) Jacobson Figure of Eight

3. Applicability

The competition is open to aircraft which are solely human powered by the pilot. The following are **not** permitted:

- 1) Energy storage except for powering avionics and controls.
- 2) Lighter than air devices.
- 3) Towing, winching, or kite assistance.
- 4) Control of the aircraft by persons other than the pilot.

The following are permitted:

- 1) Auto stabilization
- 2) An autopilot which can be overridden and turned on or off by the pilot.
- 3) Takeoff assistance from up to 3 runners except in Section 2 item (6) above, where only one assistant is allowed, to stabilize but not propel the aircraft.

4. Competition Scoring

The competition is scored according to a points system awarded to the pilot for each task. For the whole event there will be a winning team and an individual winning pilot. The points system is detailed in section 5.6.

- 1) The winner is the individual pilot who accumulates the most points during the competition.
- 2) Any number of pilot entrants is permitted for each team's aircraft, up to a maximum of eight which is the total number of permitted team members. NB: Each pilot must have insurance from BHPA, as per Section 5.1 below.

- 3) The winning team is that which has accumulated the highest total score, which shall be calculated by adding together the best score achieved for each task over the duration of the competition.
- 4) The organisers must be notified before any significant configuration changes are made to an aircraft during the event, and reserve the right to consider such a change to result in a different aircraft.

There may also be a winning team for the best design and construction, which shall be judged on overall merit at the discretion of the organisers.

5. Rules and Regulations

Each aircraft team must appoint a leader who is responsible for ensuring that the team complies with the safety regulations in sections 5.1 and 5.2.

5.1 - Aircraft

- 1) The aircraft must have been flight tested before any competition task is attempted.
- 2) The aircraft must be free of unprotected sharp protrusions in the cockpit.

5.2 - Pilot

- 1) All pilots must wear crash helmets – an approved bicycle helmet is sufficient.
- 2) All pilots must carry third party insurance (see Appendix 1).
- 3) The pilot must be satisfied that the aircraft is fit for flight before takeoff including a full, free and correct sense controls check.
- 4) The pilot must not intentionally fly more than 7.5m above ground level.
- 5) The pilot must have had some relevant flying experience before attempting a competition task.
- 6) The pilot must have completed the event entry form and agree to abide by the rules and regulations.

5.3 - Team

- 1) The maximum number of team members permitted is eight. Any number of these eight persons may pilot the aircraft for competition tasks, provided that they have the appropriate insurance.
- 2) The team leader will ensure that the competition rules are followed and that takeoffs will be stopped if any safety concerns are apparent, until such concerns are resolved.
- 3) The team leader is strongly advised to ensure that at least one team member holds a current first aid certificate and has a first aid kit available.
- 4) The team leader is responsible for ensuring that the team complies with all site regulations.
- 5) The team must follow the instructions of the competition marshals where it is safe to do so.

- 6) The team leader will conduct a risk assessment (example shown in Appendix 2).

5.4 - Organisers

- 1) Flying may be suspended at any time e.g. due to weather conditions, airborne or other traffic, at the Competition Director's discretion.
- 2) The judges' decisions regarding scoring are final and cannot be challenged.
- 3) An independent adjudicator will be appointed to assist the judges.

5.5 - Tasks

Setting of the tasks is at the discretion of the Competition Director and can be any selection, order or at any time, according to the weather, aircraft available, pilot experience etc.

- 1) No points are to be awarded unless the aircraft is serviceable after the task. If there is any doubt, a takeoff shall be demonstrated within one hour.
- 2) Each competitor must start within 10 minutes of the allotted time or go to the back of the launch queue.
- 3) Up to 3 launch assistants are allowed to assist the aircraft for takeoff, except for the unassisted takeoff performance task where one assistant is permitted for stabilization only.
- 4) At the Competition Director's discretion, multiple tasks may be carried out during one flight e.g. duration plus slalom plus speed.
- 5) The highest score for a task achieved by the team over the whole competition counts for the overall team points.
- 6) The task will count if, in the opinion of the Competition Director, more than one aircraft is capable of attempting it in the conditions prevailing.

5.6 - Points and Scoring

- 1) **Duration**

Duration is measured according to the time the whole aircraft remains airborne.

5 points scored per second up to a maximum of 1500 points (5 minutes).

- 2) **200m Time Trial**

Each trial will be measured with a flying start and finish over a 0.75m high marker at the beginning and end of the measured distance. The starting position is at the pilot's discretion. Points are scored according to the cube of the ground speed as measured by elapsed time over the markers.

- 3) **1km Time Trial**

For the 1km trial, points are scored according to $V^{3.25}$

4) **Slalom**

The slalom is measured over a 500m course beginning and ending with a 0.75m high marker. It will be scored by the number of times the aircraft fuselage crosses the course centreline before the course ends. If the aircraft lands before the 500m marker, the score is still counted. 200 points are awarded per crossing.

5) **Distance Around a Triangular Course**

The distance task will be measured around a 1.5km perimeter triangular course by the number of pylons passed. The aircraft must be continuously airborne and the centreline of the fuselage must pass outside each pylon. 500 points are scored for passing each scoring line as defined in Diagram 1. There is no limit to the number of laps of the course.

The aircraft must clear a height of 0.75m the first time it passes the start line.

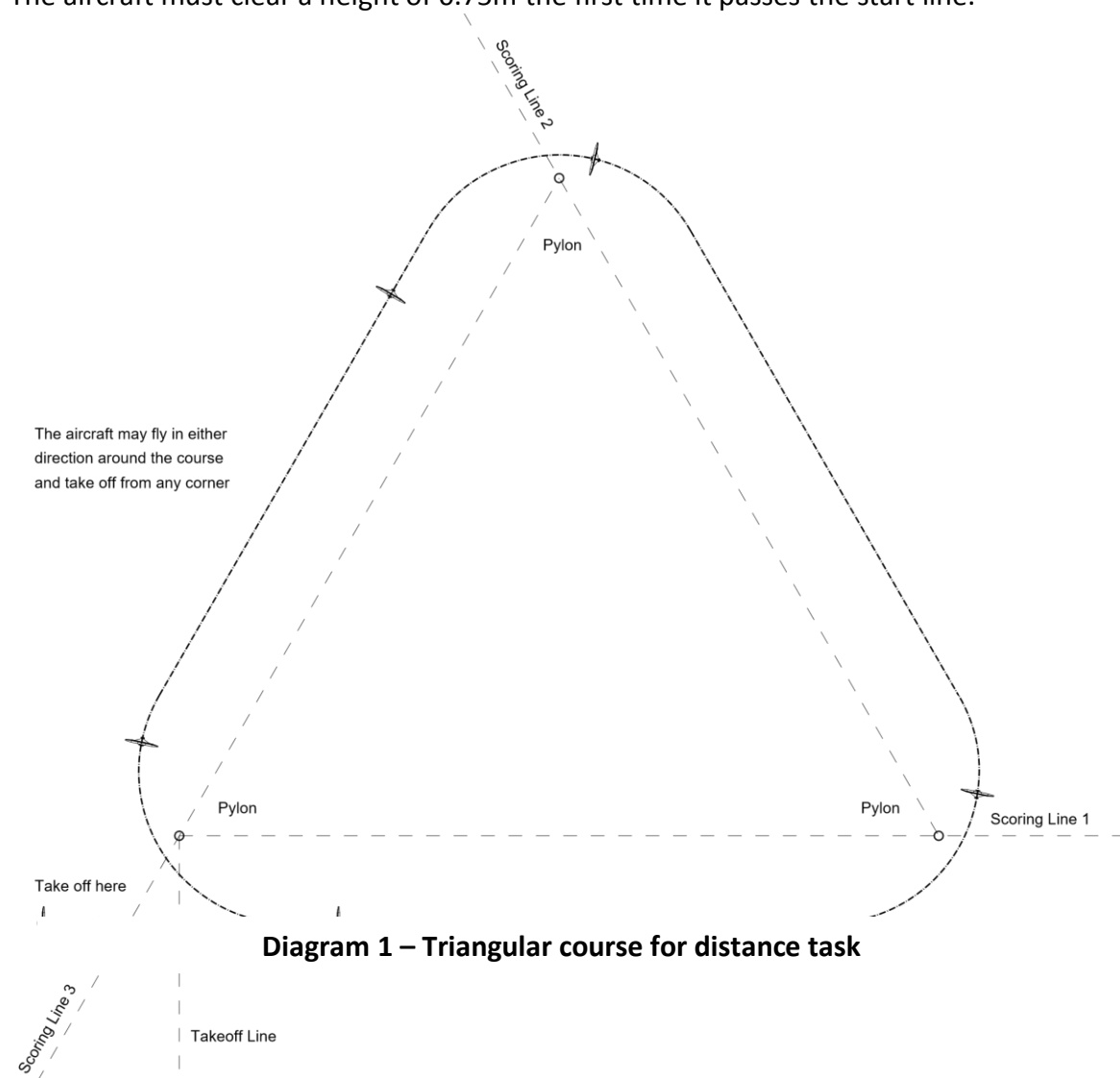


Diagram 1 – Triangular course for distance task

6) **Unassisted Take-off Performance**

This task is measured according to the distance for the whole aircraft to leave the ground from a standing start, solely under pilot power.

Points are scored according to:

$$(150 - \text{takeoff distance (m)}) \times 10$$

7) **Landing Accuracy**

Landing accuracy is scored by distance of touchdown from a landing line, after the aircraft has passed a 0.75m high marker 50m before the landing line.

Points are scored according to:

$$(33.3 - \text{distance (m)}) \times 6$$

8) **Take-off from Grass**

This task is measured according to the distance for the whole aircraft to leave the ground, with the takeoff run entirely grass. Take off assistance is permitted from up to 3 team members. Points are scored according to:

$$(150 - \text{takeoff distance (m)}) \times 10$$

9) **200m Time Trial with Takeoff from Grass**

Each trial will be measured with a flying start and finish over a 0.75m high marker at the beginning and end of the measured distance. The starting position is at the pilot's discretion, but must be on grass. The entire take off run must be completed on grass. Points are scored according to the cube of the ground speed as measured by elapsed time over the markers.

10) **The Jacobson Figure of Eight prize**

The prizes will be awarded for the aircraft that fly furthest around a figure of eight course with turning points 350 m apart.

The competition will be held annually at the BHPFC Icarus Cup.

The First prize is £1,000, Second prize £700 and third prize £300

See Appendix 3 for the full details of the course and prize.

11) **Restrictions and conditions on airside and at Sywell aerodrome**

Motorised vehicle on airside must obtain 3rd party insurance cover for that vehicle to operate on airside.

Battery operated bicycles are allowed.

No flying or testing is permitted on the taxiway.

Model aircraft / RC vehicles / Drones are strictly not allowed to operate anywhere within the airfield's boundaries.

Participants and their guests will keep all areas around the airfield, camping area and hotel facilities neat and tidy at all times.

Participants and their guests are reminded that this is an operating airfield and must keep this in mind at all times and behave accordingly.

These restrictions and conditions must be strictly adhered to.

Appendix 1 - Insurance

All pilots must be insured against third party risks for a minimum of £2million. Proof of insurance must be provided by all pilots to the Vice Chairman Hania Mohiuddin.

3rd party insurance for flying human powered aircraft is available by taking up flying membership of the BHPA (British Hang gliding and Paragliding Association, 8 Merus Court, Meridian Business Park, Leicester, LE19 1RJ, UK). See: <http://www.bhpa.co.uk/sport/bhpa/join.php>

The aircraft must be registered with the BHPA.

Pilots agree to fly at their own personal risk and that life cover is at their discretion.

Appendix 2 - Risk Assessment

	Hazard	Control measure
1	Weather too gusty or too strong a wind (10kt+)	Suspend flying
2	Structural failure	Static load tests, preflight inspection
3	Loss of control in flight	Load testing and inspection of control system. Full, free and correct sense (including battery charge) checks before flight. Preflight check of aircraft rigging and balance. Limitation of height to 7.5m maximum AGL. Carry airspeed indicator or stall warner.
4	Loss of control on takeoff	Stop pedalling. Assess wind direction.
5	Pilot experience	All pilots must have some actual or simulated relevant flying experience.
6	Ground handling hazards	Brief ground handlers on what to hold and how to control the aircraft on the ground. Brief on trip/damage hazards of propeller and cables.
7	Risk of injury from falling from height	7.5 metres maximum.

Appendix 3: 2018 Rules for the Jacobson Figure of Eight Prize

The prizes will be awarded for the aircraft that fly furthest around a figure of eight course with turning points 350 m apart.

The competition will be held annually at the BHPFC Icarus Cup.

The First prize is £1,000, Second prize £700 and third prize £300

1. Eligibility

The competition is international and is open to individuals or teams from any part of the world. It will be governed by the Sporting Code of the FAI and these Regulations and Conditions.

2. Conditions of Entry

- (a) The aircraft shall be a heavier than air machine and the use of lighter than air gases shall be prohibited.
- (b) The aircraft shall be propelled entirely by human power. No device for the storage or supply of energy may be used.
- (c) No drugs or stimulants, including oxygen, shall be permitted. In this respect each entrant flying as a crew member may be required to take such tests as approved by the WADA after any successful attempt at the competition
- (d) No part of the aircraft shall be jettisoned during any part of the flight, including take-off and landing.
- (e) The aircraft shall be controlled only by the airborne crew of the aircraft.

3. The Course

- (a) The Course (see diagram) shall be around two turning points which shall be 350 metres apart and will be clearly marked. The Course will include the take-off and landing runs and the 'completed flight' includes both the take-off and the landing.
- (b) A start line, A-B, will be set at right angles to the line joining the turning points with its centre at one of the turning points, and will be suitably marked. (It is anticipated that the turning radius of the aircraft will be around 100 m and the course has been designed

with this in mind. Although there are no restrictions imposed on the turning radius of the aircraft.)

- (c) The fuselage of the aircraft shall pass outside each turning point during the flight.
- (d) The course may be flown in either direction.
- (e) The aircraft must be flown at a height of not more than 7.5 metres above the ground to the lowest point of the aircraft as measured with the aircraft in horizontal flight.
- (f) Prior to take-off, the aircraft will be at rest and positioned so that the nose of the aircraft is behind the start line. The flight shall start from rest and will commence with the aircraft airborne as the nose of the aircraft crosses the Start Line A-B, it then flies a figure of eight around the turning points crossing the mid point line C-D roughly at its centre. The flight shall end when the aircraft touches down. The flight is complete when the pilot lands the aircraft and brings it to rest to the satisfaction of the Official Observers. The aircraft shall be serviceable after the flight. If there is any doubt, a take off shall be demonstrated within one hour.
- (g) The aircraft must be in continuous flight over the course. The completed flight will comprise the takeoff climb, one complete circuit of the course, and thereafter as many further complete or partially complete circuits of the course as can be flown.
- (h) Points are awarded each time the aircraft crosses one of the lines, A-B, C-D, E-F. Thus the first complete figure of eight scores 7 points. Each subsequent crossing of one of the lines scores an additional point.
- (i) The first prize will be given to the aircraft that completes the course and accumulates the highest number of points at the BHPFC Icarus Cup.
- (j) The second prize will be given to the aircraft with the second highest number of points at the BHPFC Icarus Cup.
- (k) The third prize will be given to the aircraft with the third highest number of points at the BHPFC Icarus Cup.
- (l) If two aircraft have the same number of points at the end of an Icarus Cup the aircraft that has flown farthest will win first prize.
- (m) Partial circuits shall be measured from the nearest turning point to the point where the aircraft touches down.

4. Observation

- (a) Every official flight shall be observed by official observers appointed by the BHPFC.
- (b) The agreed course and the observation of the flight shall be conducted by its observers in accordance with the provisions of the Sporting Code of the FAI, and these Regulations and Conditions.
- (c) The flight shall be observed by BHPFC officials throughout the entire flight.

5. General Conditions

Insurance: Refer to “2018 Rules for BHPFC Icarus Cup Competition” Appendix I.

The Jacobson Figure of Eight Course

