

Balsa Glider



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1. Introduction

People have always understood that flight was possible from observing birds, but it took thousands of years to actually achieve and there were many hurdles along the way. Perhaps, Gliding is the most elegant and easy way that humans can get airborne. It is an exciting way to fly, soaring on the same rising currents of air that the birds use, with no roaring engine to spoil the peace. This experience is a perfect introduction to gliding, giving you the chance to really get to grips with it. We present to you the IGNUS 2K18, where we shall reuse the principles of aerodynamics as applied to gliders, by implementing them to design and fabricate hand-made unmanned Balsa gliders. Flight is achieved by the interaction of a vehicle with the air surrounding it. As an aircraft moves through the air the flying surfaces deflect air downwards creating a force which can be resolved into components perpendicular to its motion i.e. lift, and parallel to its motion i.e. drag. At the same time the flow of air past the wings and body of the craft is slowed by friction and changes in pressure caused by the shape. A well-trimmed glider flies in a straight line at almost constant speed, necessarily in a slightly downward direction, by balancing the forces of lift and drag with that of its weight. All the aerodynamics is based on the *Newton's Laws of motion* & *Bernoulli's theorem*, so design of your balsa glider matters a lot.

2. Problem Statement

Design and build an unpowered glider that glides in air with the objectives of traversing maximum distance and stays in air for maximum time. Points will be awarded based on design, range and maximum time of flight.

3. Event Rules and Specifications

3.1. Team Size

- A team should not exceed more than 3 members.
- The students must carry valid student ID cards of their college which they will be required to produce at the time of registration.

3.2. Eligibility

Any student from a recognized institute/college can participate in this event.

3.3. Rules

1. Teams need to use only balsa wood to make their glider. NOTE: Teams will not be provided with any kind of resources and no extra time will be given for any kind of modification after the event starts.
2. The glider should be hand launched, use of catapult or mechanical launch is strictly not allowed.
3. The glider should not contain any power source or propellant such as engine, motor, propeller, balloon etc.
4. The teams will be provided an elevated platform (approx. 2.5 feet high) to launch their glider.
5. Each team will be given 1 free try (if wanted) which will not be counted for scoring.
6. Two final trials will be given for scoring.
7. The team with the maximum possible points will be the winner.
8. Only handmade gliders are allowed to take part in the competition.
9. You and your team is responsible if the glider is lost or damaged.
10. For the point system look in judging section.
11. Points will strictly be given according to the criteria given in judging section.

12. The decision of coordinator will be final and should be taken in best spirit by all the teams.

3.4. Specifications

1. Glider and any of its components should be handmade. Ready-made models are strictly not allowed.
2. Maximum wing span allowed is 40 cm.
3. Maximum weight allowed is 50 grams

4. Judging Criteria

Point's distribution

1. Distance travelled
 - (i) 5 pts/meter (0-20 m)
 - (ii) 7pts/meter (after 20m & applicable for distance after 20m only)
2. Time of flight – 10pt per sec
3. Vertical loop – 30 pts for 1st loop, for more than 1 loop in same flight 40pts/loop (if vertical loop is more than one than 40pts/loop will be applicable for first loop also instead of 30pts for first loop)
4. Side loop= 20 pts/loop
5. Smooth Landing 10 pts. (No damage in nose or any other part)

NOTE: Any loop must be fine and clearly visible. A stopwatch will be used to measure the time of flight. The duration shall include the time when the glider is launched and until it touches the ground in the first instance. The time for the motion of the glider after touching the ground once is not included. The team with greater points will be awarded superior rank.

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