

# Powered Flight

## **The competition plane:**

The Delta Dart is a rubber band powered model airplane. The propeller provides the thrust from the potential energy stored in the twisted rubber band while the wings provide the lift. No other sources of thrust or lift are authorized.

Each team will field one airplane for the competition. You may use the model provided for the competition or an identical clone based on the original kit. Each plane entered will be evaluated against the specifications for the Delta Dart during the Preflight phase of the competition. Penalty points will be assessed against planes which deviate from the design specifications.

## **Specifications:**

*Wingspan:* 29.0 cm

*Wing Area:* 225 cm<sup>2</sup>

*Fuselage length:* 29.5 cm

*Propeller Diameter:* 14 cm

*Weight:* 12 grams including the rubber band

*Motor:* 50-52 cm rubber band tied into a closed loop 23 - 25 cm. The cross section of the rubber band is 1.0 mm thick x 3.2 mm width. Only one rubber band may be used on the airplane during the competition. A second rubber band is provided as a replacement.

## **Modifications to the plane**

The only modification allowed to the original design is/are the addition of trim-tabs used to control the direction of flight.

## **Restrictions/Limitations**

- 1) the plane may not be tethered during the flight phase
- 2) no electronic or remote control devices are authorized.

## **Flight Arena**

The flight arena consists of a space 4.0 m wide x 12.0 m long x 2.5 m in height.

## **Flight Performance**

The goal is for the plane to fly the length of the arena (12 m) without hitting the ceiling or flying out of bounds. Once the plane flies out of bounds or strikes the floor within the defined arena, the flight is over.

## **Preflight**

Each team will pick up a score sheet for their plane. Then bring the sheet with the plane to the judges position to be examined for compliance.

## **Launch/Flight Procedures**

- 1) The plane is to be hand launched along the longitudinal axis of the 12 m length.
- 2) The time and distance of each flight will measured and recorded
- 3) A flight is over:
  - a. if it crosses the 12 m line before striking the ground;
  - b. the first time it strikes the ground inside the arena; or
  - c. when it crosses either the left or right boundary lines before reaching the 12 m line.

## **Penalties**

- 1) Models outside of the design specifications: loss of 4 points
- 2) During the flight phase: models striking the ceiling loss of 4 points

## **Disqualification**

Any team member who interferes with a flight, be it their own or another teams, or willfully damages another teams plane before or during the competition, will be disqualified from the competition.

## **Scoring and Position**

- 1) The Raw Score = evaluation pts + flight distance pts - penalty pts non flying Plane 10 pt (unrepairable airplane);
- 2) flying plane 20 pt;
- 3) 2.5 points will be awarded for each meter flown. The total distance will be rounded to the nearest meter (e.g. 1.5 m = 2 m). The "distance flown" will be a line measured parallel to the longitudinal axis from the base line.
- 4) Each raw score will be ranked and adjusted to a 50 point scale, IAW the NSSL constitution. Flight time(s) will be used to break point ties. The faster airplane will be place ahead of the slower plane.

## **Contact:**

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