

Payload Drop Competition

Aerial Payload Design & Precision Challenge

Ingenium — IIT Indore

Competition Overview

The objective of the **Payload Drop Competition** is to design a fixed-wing remote-controlled aircraft capable of carrying, sustaining, and accurately dropping payloads.

The competition emphasizes structural strength, flight stability, payload integration, and precision during payload release.

Stage 1: Design & Mechanism Submission

Mode: Online

Timeline: Before the end of February

Teams must submit detailed documentation covering the following aspects:

- Aircraft design and payload integration strategy
- Payload dropping mechanism design
- Strength and structural analysis
- Materials and electronics selection
- Compliance with thrust-to-weight ratio and size constraints
- Cost analysis (Bill of Materials)

Innovative payload deployment mechanisms and strong structural justification will receive higher evaluation scores.

Stage 2: Payload Carrying Qualification & Scoring

Mode: Offline

Schedule: During Ingenium (Daytime)

Payloads Provided by Organizers:

- Golf balls
- Average radius: 42 mm
- Weight: 45 g

Round Format:

- Aircraft must complete a 30-second flight while carrying payload
- Payload dropping mechanism will be inspected
- Payload drop is not allowed during this stage
- Higher payload count or total payload weight carried results in a higher score

Stage 3: Final Payload Drop Round

Mode: Offline

Schedule: During Ingenium (Daytime)

- Aircraft must fly for 30 seconds while carrying payload
- A target arena of 10-meter diameter will be marked
- Teams must drop payloads within the marked target area

Scoring Rules

- Only payloads landing inside the target arena are considered valid
- Payloads that bounce or land outside the arena are not counted
- Negative points are awarded if payload is dropped within the first 30 seconds

Total Score Calculation:

$$\text{Total Score} = \text{Stage 1 Score} + \text{Stage 2 Score} + \text{Stage 3 Score}$$

Judging

All stages contribute to the final score. The decision of the organising committee is final and binding.