

NATIONAL AERO-GENIUS COMPETITION (NAGC) - 2026

Fixed-Wing UAV Challenge

Competition Rules and Requirements

Organized by

Department of Aerospace Engineering
Aviation and Aerospace University, Bangladesh (AAUB)

Competition Date: 30-31 October 2026 | Venue: AAUB Campus, Lalmonirhat, Bangladesh

Registration Link: <https://event.aaub.edu.bd>

Introduction

The **National Aero-Genius Competition** is the first-of-its-kind event in Bangladesh, organized by and hosted on the campus of **Aviation & Aerospace University, Bangladesh**. In this event, teams from various universities will participate in the **National Aero-Genius Competition**, showcasing their hands-on skills and problem-solving capabilities.

Teams will design, manufacture, and demonstrate the flight capabilities of an electric-powered, remote-controlled fixed-wing UAV that best meets the specified mission profile. The goal is a balanced design possessing good flight handling qualities, practical and affordable manufacturing requirements, and demonstrable mission performance.

NOTE: Items critical to safety and rule compliance are mentioned throughout this document. It is the responsibility of all teams to know and follow all provided rules and all fly off day briefings.

Participating teams will be evaluated on three equally important pillars: their written Technical Design Report, successful passage of a rigorous Technical Inspection, and flight performance during the Competition Fly-off. The team achieving the highest overall score will be declared the winner.

This rule book will provide all the guidelines for this competition.

Contents

1. General Information	4
1.1 Team Requirements	4
1.2 General Rules.....	4
1.3 Team Pilot.....	4
1.4 Sportsmanship and Code of Conduct	5
2. Schedule and Registration Information	5
3. Aircraft and Mission Requirements	5
3.1 General Aircraft Requirements.....	5
3.2 Batteries and Power	6
3.3 Flight Course and Missions.....	6
Mission 1 – Maiden Flight.....	7
Mission 2 – Commercial Flight	7
Example Scoring Table.....	8
Example calculation for Group A.....	8
Step 1: Calculate achieved payload/time.....	8
Step 2: Apply the scoring formula	8
Example calculation for Group C.....	9
3.4 Re-Flight Conditions.....	9
4. Technical Inspection.....	9
4.1 Inspection Note	9
5. Design Report	10
5.1 Format Requirements.....	10
5.2 Submission Method	10
5.2 Required Technical Contents	10
5.3 Design Report Score	10
6. Competition Score	10
7. Tie Breakers	11
8 Penalties, Safety, and Disqualification	11
8.1 Major Disqualification Conditions	11
8.2 Scoring Penalty	11
9. Prize Money	11
10. Contact Information	12

1. General Information

1.1 Team Requirements

Participants can be students or affiliated with an academic institution (from high school to university) as well as hobbyists in the field of UAV. Industrial and/or military organizations are not eligible to compete.

- Teams shall consist of a maximum of four (4) members.
- A team may include no more than one (1) graduate student, counted within the four-member limit.
- Teams may have faculty and/or non-faculty advisors; advisors are not counted within the team composition.
- Teams formed from participants across different institutions are permitted.
- Each team must designate a Team Leader who will serve as the primary point of contact with the organizing committee.
- One participant may not be a member of more than one competing team of this event. S/he may be member of another team in another competition.
- There is no limit on the number of teams participating from a single institution.

1.2 General Rules

- The competition shall consist of 3 phases:
 - Design report submission,
 - Technical Inspection round, and
 - Fly-Off round.
- Each team shall submit its designed UAVs technical report before flight participation.
- No modifications to the aircraft design, structure, or control logic are allowed after the design report submission, except software-related adjustments specifically approved by the judges.
- Judges may request an explanation of any mechanism or subsystem and may inspect any relevant hardware or software.
- Official decisions of the judges are final.
- Each team is responsible for bringing all required support equipment, including batteries, chargers, tools, and laptops if needed.
- Trial runs on the official competition course are prohibited.
- The aircraft may not cross predefined safety boundaries, and the pilot shall remain in the designated pilot area.
- A team may bring one redundant aircraft, but only one aircraft may be used in the competition. Aircraft sharing between teams is prohibited.

1.3 Team Pilot

The pilot may be a team member or a non-student designee; however, all pilots must be experienced in manual fixed-wing RC aircraft flight. Pilots must sign in with the competition officials through the team leader on the day of the fly-off. The organizing committee may provide volunteer pilots on an as-available basis to teams whose designated pilot is unable to attend; teams requiring this assistance must coordinate through the organizing committee at least 72 hours in advance.

1.4 Sportsmanship and Code of Conduct

All teams and participants are expected to uphold the highest standards of sportsmanship during the competition. Attempts to intentionally violate the rules or negatively impact the performance of other teams will not be tolerated. Penalties for violations will be decided by the Contest Administration and may range from a warning and loss of a mission score to full disqualification from the current and future competitions.

- Displays of disrespect toward judges, volunteers, security personnel, or opposing teams will lead to disqualification.
- Threats, misbehavior, or any actions intended to create disturbances or conspiracies will result in immediate disqualification.
- Teams failing to arrive at the venue within the designated time slot will be disqualified.
- Any damage caused to AAUB's arena infrastructure or equipment by a team's UAV may result in immediate disqualification and financial liability.

2. Schedule and Registration Information

Teams that will be selected for the flyoff after the Design Report submission will be required to pay the Flyoff registration fee.

Item	Date / Requirement
Pre-registration	<i>15 August 2026</i>
Technical Report Submission Deadline	<i>01 October 2026</i>
Notification of Technical Report Result	<i>10 October 2026</i>
Registration Deadline (with payment)	<i>15 October 2026</i>
Registration Fee	<i>BDT 1000 per selected team for the fly off</i>

3. Aircraft and Mission Requirements

3.1 General Aircraft Requirements

- The aircraft shall be a fixed-wing, electric-powered, remotely piloted UAV.
- Commercial-off-the-shelf (COTS) complete UAV platforms are not permitted.
- Only COTS electric motors are permitted.

- The maximum wingspan shall be 1.2 m.
- The maximum allowable Wingspan to fuselage length ratio will be 0.8 (For a 1.2m wingspan, max allowable fuselage length will be 0.96m)
- The total allowable weight, including payload and onboard components, shall not exceed 4.0 kg.
- The aircraft shall be capable of carrying a payload equal to at least 10% of the aircraft's empty weight.

3.2 Batteries and Power

- Battery packs must be unaltered and commercially procured (COTS). Custom-assembled battery packs are not allowed.
- Maximum of one battery pack is allowed to be connected in the propulsion system.
- The original manufacturer's label must be clearly visible on all battery packs, clearly stating chemistry, capacity (mAh), and voltage (V).
- Propulsion battery packs are limited to a maximum of 6S (cell) configuration.
- Total propulsion pack energy must not exceed 70 Wh. Avionics batteries are considered separately and have no Wh restriction.
- Different batteries and propellers may be used for each flight attempt, provided that all batteries used in a single attempt are of the same cell configuration (e.g., all 4S, or all 6S).
- Propeller diameter and pitch may vary between mission attempts.
- Autopilots, flight controllers, and rate gyros are not allowed. Flight control shall occur only through direct pilot command from the radio transmitter to the receiver.

Battery Parameter	Requirement
Max propulsion battery cell count	6S
Max propulsion pack energy (total)	70 Wh
Avionics battery	No restriction
Battery chemistry	NiCAD, NiMH, or Lithium-based
COTS batteries only	Yes -custom packs not permitted

3.3 Flight Course and Missions

The flight course is shown below. The orientation of the course may be adjusted on competition day based on prevailing wind conditions, at the sole discretion of the Flight Line Judge. The course will be positioned to maximize safety to personnel and ground infrastructure.

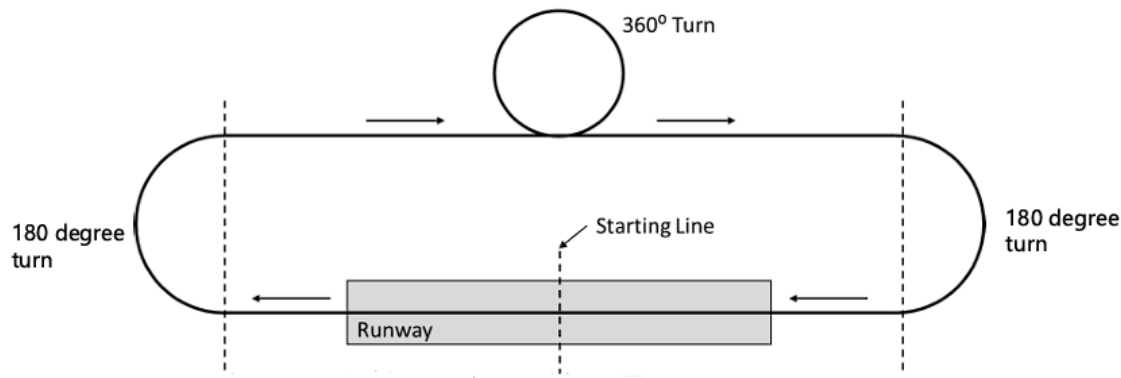


Fig: Flight Course

After takeoff, the UAV must execute a 360-degree turn followed by two 180-degree turns and then return to the start/finish line to complete one lap. The airplane must cruise between 200-400 ft right after takeoff before taking its first 360-degree turn, and must continue this flight altitude throughout the flight course except before landing.

There is no limitation on takeoff and landing distance.

Mission 1 – Maiden Flight

- The aircraft shall complete three (3) laps of the prescribed flight course within 4 minutes of flight time.
- A lap is counted when the aircraft passes over the start/finish line in the air.
- Time starts when the throttle is advanced for the first take-off attempt.
- Landing is not part of the mission time window.
- A successful landing is required for the mission to receive a score.
- Minimum altitude requirements and course safety requirements shall be enforced by the Flight Line Judge.

Scoring: 100 for a successful mission.

Mission 2 – Commercial Flight

- The Aircraft must take off carrying a payload as minimum 10% of its declared maximum takeoff weight
- The payload can be of anything (Example: Water, sand, nuts, and bolts, etc.) except any explosive elements.
- The airplane is required to perform 3 laps within 4 minutes flight time window while carrying the declared payload.
- The payload can be carried externally or internally. The attachment mechanism of the payload must go through rigorous tech inspection in order to ensure that they are strong enough to withstand in-flight loads.

- The score will be a function of the time consumed to complete 3 laps and the total payload weight.
- Landing is not part of the mission time window.

Scoring:

$$M2 = \left[1 + \frac{\text{Achieved}(\text{Payload weight/time})}{\text{Max}(\text{Payload weight/time})} \right] \times 100$$

Where, Max_(payload weight/time) is the highest (payload/weight) achieved by a team among all the participating teams.

Example Scoring Table

Group	Declared MTOW	Minimum payload required: 10% MTOW	Actual payload carried	Time for 3 laps	Payload/time ratio	Mission valid?	M2 score
Group A	12 kg	1.20 kg	2.40 kg	180 s	0.01333 kg/s	Yes	193.33
Group B	10 kg	1.00 kg	2.00 kg	150 s	0.01333 kg/s	Yes	193.33
Group C	15 kg	1.50 kg	3.00 kg	210 s	0.01429 kg/s	Yes	200.00
Group D	8 kg	0.80 kg	1.60 kg	200 s	0.00800 kg/s	Yes	156.00

The highest payload-to-time ratio is achieved by Group C:

$$K_{\text{vs}} = \frac{3.00}{210} = 0.01429 \text{ i e-q}$$

Example calculation for Group A

Step 1: Calculate achieved payload/time

$$\frac{2.40}{180} = 0.01333 \text{ i e-q}$$

Step 2: Apply the scoring formula

$$M2 = \left[1 + \frac{0.01333}{0.01429} \right] \times 100$$

$$M2 = (1 + 0.9333) \times 100$$

$$M2 = 193.33$$

Example calculation for Group C

Since Group C has the maximum payload-to-time ratio:

$$M2 = \left[1 + \frac{0.01429}{0.01429} \right] \times 100$$

$$M2 = (1 + 1) \times 100$$

$$M2 = 200$$

NOTE: An individual team will be granted another flight attempt to increase their M2 scoring if it can successfully complete their first attempt of M2.

3.4 Re-Flight Conditions

- A re-flight may be granted if a flight is interrupted by weather or another unexpected cause clearly beyond the pilot's control.
- A re-flight may also be granted if the course or an obstacle is accidentally damaged in a way that invalidates the attempt.

4. Technical Inspection

Each team aircraft, together with relevant payload hardware and batteries, shall undergo a technical inspection before any official flight attempt. The purpose of a technical inspection is to confirm safety, structural integrity, mission compliance, and scoring eligibility. The queue of Technical Inspection will be based on the Design Report Result. The maximum total score for tech inspection is 100.

Inspection Item	Points
Overall structural integrity test	30
Electrical component test	20
Payload mounting mechanism test	30
Wing-tip load test	10
Center-of-gravity verification	10

4.1 Inspection Note

- The inspection result shall be used both as a safety gate and as a scored component of the competition.
- Judges may require teams to demonstrate operation of control surfaces, payload mounting, structural stiffness, and CG marking or balance consistency.
- Any team that fails inspection may be required to correct deficiencies and return to the inspection queue.

5. Design Report

Each team is required to submit its Design Report to participate in the fly-off contest.

5.1 Format Requirements

- Maximum length: 10 pages.
- Font Name: Arial
- Line spacing: 1.15.
- Minimum font: 11-pt Arial.
- Page size: 8.5 in × 11 in.
- The team name and the institution/institutions name shall appear on the title page.

5.2 Submission Method

- Electronic report files must be named: “2026_NAGC_Fixed-wing_[Team name]_[Institution Name].pdf.
- Technical Report Submission Link: nagc@aub.edu.bd (The email Subject will be ‘National Aero-Genius Competition (NAGC) 2026 Fixed-wing’)

5.2 Required Technical Contents

- Airfoil selection.
- Wing parameters specification (Aspect ratio, taper ratio, Chord length etc.)
- Thrust-to-weight ratio.
- Propulsion system type and configuration.
- Wing mounting arrangement with the fuselage.
- Tail configuration (Horizontal and Vertical tail size analysis)
- Landing gear configuration.
- Manufacturing logic and build approach.
- Any assumptions or design trade-offs that directly affect mission performance.
- Design Report must document all major dimensions of the designed UAV either in a single table or in a Computer-Aided Design View (CAD).

5.3 Design Report Score

The Technical Overview Report shall be scored out of 100 points for completeness, technical quality, format compliance, and clarity.

6. Competition Score

Each Team’s total score will be computed from their Design Report score, Total mission Score, Technical Inspection score, and Participation score using the following formula:

$$\text{Competition Score} = \text{Total Mission Score} + \text{Design Report Score} + \text{Tech Inspection Score}$$

Scoring Section	Max Points Allotted
Total Mission Score	$M1 + M2 = 100 + 200 = 300$
Design Report Score	100
Tech Inspection Score	100
Maximum Total Score	500

So, the total maximum Achievable score is 500, and the team achieving the highest competition score among all teams will be announced as the winner of the competition.

7. Tie Breakers

- In the event of a tie, the higher payload weight carrying team will be announced as the winning team.
- If still tied, then the team which took the lesser time to complete 3 laps in M2 will be announced as the winning team.

8 Penalties, Safety, and Disqualification

8.1 Major Disqualification Conditions

- Unsafe or hazardous flights judged to endanger people or property.
- Damage caused to the arena or competition infrastructure by a team's aircraft.
- Any harm caused to event attendees through negligent operation.
- Misconduct, threats, or disrespect toward judges, officials, volunteers, security personnel, or other teams.
- Failure to report within the designated time when called, if such delay materially disrupts the competition flow.

8.2 Scoring Penalty

- Non-compliance with dimensional or weight requirements (20 marks will be deducted from the total competition score)
- Exceeding the maximum page limit or formatting requirements of the report (2 marks will be deducted for exceeding each 1 page beyond the set page limit)

9. Prize Money

Place	Prize
1st Prize	BDT 80,000
2nd Prize	BDT 60,000

10. Contact Information

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