Official Rules 2027

ADMX

By the Technical Committee

Rev 00
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Table of Releases

REV	Description	Date
00	Initial Release	15/07/2026

Welcome to our 2027 edition!

Cargo Challenge

While maintaining the essence of the challenge that for years has put the design, efficiency, and payload capacity of each aircraft to the test, we are revamping the category's identity to introduce the CARGO Category. The name change is part of our effort to evolve the competition and refresh each edition with new details and opportunities.

Without setting aside traditional concepts such as Structural Efficiency, Empty Weight, and Payload Capacity, now more than ever, designing an aircraft that is capable of flying with and without a payload will define the teams' aspirations. In this edition, empty weight will be recorded for every flight—meaning every decision about configuration, preparation, and operation can directly impact your score.

Teams will have up to seven flight rounds and may perform their empty flight during any of them. Strategic timing is everything: know your aircraft, analyze the conditions, and strike when the advantage is yours.

The choice is yours. Make it count!

Drop Challenge

Are you a team interested in participating for the first time in ADMX or want to face a different challenge? Mission Drop comes as an experimental challenge in which teams must design an aircraft capable of releasing a capsule containing a fragile payload over a drop zone. The challenge evaluates precision, the protection of the delicate payload, the integration of the release system, and operational reliability.

Website

Be sure to visit our website, where you will find a clear and visual overview of all relevant information regarding each stage of our competition.

Finally, ADMX is the result of the work of volunteers who devote a great number of hours, driven by the sincere and rewarding satisfaction that comes from helping young people learn techniques that continue to inspire us today.

We wish each of you great success throughout the competition, and we are confident that you will know how to respect, enjoy, and truly experience another ADMX, just as every member of the Technical Committee has done in each of our competitions.

Technical Committee
ADMX

Contents

1. Registration

Any team wishing to participate in ADMX must comply with the following requirements.

1.1 Eligibility

Any person is eligible to participate under the following guidelines.

1.1.1 Student / Member

Any undergraduate student of legal age currently enrolled in a higher education institution during the competition, or any student who graduated from their institution after June 2026 and is properly registered for the event (payment and registration documents).

1.1.2 Faculty Advisor

Any person—other than a student—affiliated with the educational institution and named in the registration form, that will serve as a faculty advisor and university representative. They shall not design, build, or repair the prototype.

- Notes:
  - A maximum of two faculty advisors per team is permitted.
  - The physical presence of the Faculty Advisor is mandatory throughout the competition. No team may participate in any official event activity without the presence of its Faculty Advisor.

1.1.3 Volunteer Pilot

Any person with prior experience in radio-controlled flight and/or prototypes of this kind. Their experience must be demonstrated through membership in a flying club or graphic evidence proving such experience. If the team does not have a pilot, one may be requested at the registration desk on Day 1 of the competition.

1.2 Participant Definition

It is a mandatory requirement for any participant to have fully completed the registration process before taking part in any stage of the event. Such registration shall be considered valid once all required documentation has been submitted (see Section 1.5) and approved by the Technical Committee.

Failure to comply with, or the decision to omit, the foregoing may result in sanctions to the team, including, but not limited to:

1. Deduction or cancellation of points in the stage in which the participant took part.
2. Sanction for Code of Conduct (see Section 2.14).

1.3 Registration Fee

Each team must cover its registration fee as follows.

1.3.1 Registration – Phase 1

Concept	Detail
Base fee	$12,500.00 MXN
Additional member	$850.00 MXN
Dates	Aug/15/2026 to Sep/30/2026
Coverage	Covers 1 faculty advisor and 5 members

1.3.2 Registration – Phase 2

Concept	Detail
Base fee	$15,000.00 MXN
Additional member	$1,000.00 MXN
Dates	Oct/01/2026 to Nov/15/2026
Coverage	Covers 1 faculty advisor and 5 members

1.3.3 Notes

I. If a second faculty advisor is required, they must be registered (payment and documentation) as an additional member.

II. An additional member shall pay the amount required according to the date on which the Technical Committee is notified, regardless of whether the team was registered in a previous phase.

1.4 Payment Method

Payment options are listed on our official website: ADMX - Registration
For PayPal payments, the payment buttons will include the platform commission fee.

1.5 Registration Documents

Team registration shall be completed by submitting a `.zip` file containing the following:

Proof of payment: One or more PDF files with the corresponding payment evidence.

Registration form: PDF file containing the information of the team members.

Statement: PDF file with the signed statement of compliance, see Appendix A.

Student ID: PDF file verifying the academic status of the student.

Faculty Advisor ID: PDF document confirming the faculty advisor's current affiliation with the educational institution.

Logo: Team logo in PNG or JPG format.

The documents may be downloaded from our website.

1.5.1 Notes

I. If additional members need to be added to the team after the initial registration, the `.zip` file with the updated registration documents must be resubmitted within the timeframe of the 2 registration phases.

II. If the size of the `.zip` file prevents email submission, the size of the individual files must be reduced, or the Technical Committee must be notified.

1.6 Withdrawal Policy

The Withdrawal Policy is the mechanism through which a team will be disqualified if it fails to submit the registration or competition documents on time and in proper form.

A team will be disqualified if it submits the following after the deadline:

I. **Design Report:** 5 days late or not submitted, review section 5.2.

II. **Registration Documents:** final deadline: December 15, 2026.

Registration fees are non-refundable.

1.7 Awards

The 2027 edition will grant the following awards to the winners of each challenge.

Challenge	Amount (MXN)	Place
Cargo	$12,000	1st Overall
Drop	$8,000	1st Overall

1.7.1 Disclaimer

Prizes will only be awarded if at least 20 teams register for the event. Prizes will only be awarded in categories with a minimum of five registered teams.

2. General Requirements

The ADMX competition aims to provide engineering students a real-world engineering exercise. The competition rules have been developed by industry professionals to give participants insight into the different types of situations engineers face in real work environments.

2.1 General Authority

The competition organizers reserve the right to revise the schedule of all competitions and/or interpret or modify the competition rules at any time and in any manner that, in their judgment, is necessary for the proper operation of the event.

2.1.1 Official Rules

The rules are the responsibility of the Technical Committee. Official announcements made by the Technical Committee are considered part of, and have the same validity as, these rules.

Any ambiguities or questions regarding the meaning or intent of these rules will be resolved by the Technical Committee staff.

2.1.2 Rules in Effect

The rulebook published on the ADMX website, as well as the competition schedule, constitute the rules in effect for the competition. Rulebooks from past editions are not valid.

2.1.3 Statement of Compliance

By participating, team members, faculty advisors, and other university personnel agree to comply with and be bound by the rules and all interpretations of the rules or procedures issued and announced by the Technical Committee and the Organizing Committee.

2.1.4 Rulebook Loopholes

It is practically impossible for a set of rules to be broad enough to cover every possible question regarding aircraft design parameters or the development of the competition. If any loopholes exist, they will always be resolved in favor of event safety.

2.1.5 Competition Participants

Teams, team members as individuals, Faculty Advisors, and other representatives of a registered university participating in the competition shall be considered participants from the

moment they register in accordance with Section 1.1 of this document and until they leave the venue upon conclusion of the competition or by withdrawal.

2.1.6 Attempts to Violate a Rule

An attempt to violate a rule shall be considered a violation of the rule itself. Questions regarding the intent or meaning of a rule may be directed to the Technical Committee.

2.2 Measurement System

The **only permitted measurement system** is the **International System of Units (SI)**. The use of the **Imperial System** or **any other measurement system** different from the official one will **not receive points** in the deliverables.

2.3 Universities with Multiple Teams

A university may have more than one team; however, the members of each team may only belong to one team. This applies even if a team is participating in both challenges of the event.

2.4 Liability Waiver and Medical Insurance

Participants must sign a liability waiver and must show evidence of individual medical insurance on the registration form.

2.5 Ringers

To maintain the integrity of the competition, the Faculty Advisor must prohibit assistance from ringers. A ringer is someone with exceptional skill related to the competition or to the craft of building model aircraft who does not meet the eligibility requirements.

2.6 Design and Manufacturing – External Advice

The aircraft must be designed and manufactured exclusively by the students. The involvement of external individuals in both stages is prohibited. Only their advisory role is permitted.

2.7 Original Design

Any aircraft presented at the competition must be an original design whose configuration has been conceived by the team members. Photographic scaling of an existing model is not permitted. The use of kit parts in major components such as the wing, fuselage, and empennage is prohibited.

2.8 Official Languages

The official languages of ADMX are English and Spanish. Documents, presentations, and any other resources submitted in different languages will not be scored.

2.9 Unique Design

If a university has two or more teams in one event challenge, each design must be significantly different from the others. If, in the opinion of the Technical Committee, the aircraft are not significantly different, they will be considered a single project for competition purposes, and one of the teams will not be allowed to continue participating. For any questions, contact the Technical Committee.

2.10 Duplicate Aircraft

When a team has an identical backup aircraft, both the primary aircraft and the backup aircraft must undergo technical inspection. See the Technical Inspection section (Section 7).

2.11 Aircraft Eligibility

An aircraft may only compete during the same academic year. An aircraft is considered to have participated once the documentation required by the rules has been submitted. If the aircraft does not fly at the event, it will still be ineligible for future events.

2.12 Rule Changes

The Technical Committee reserves the right to change deliverable deadlines or event dates, publish a revised version of the rulebook in order to improve the information contained herein, and make any necessary changes in the interest of attendee safety.

2.13 Appeals and Questions

This section explains the procedures for handling and resolving matters.

2.13.1 Questions

Prior to the event, any questions or comments regarding the rules must be brought to the attention of the Technical Committee through the official email: `comisiontecnica@aerodesign.mx`.

During the event, any questions may be addressed to the Technical Committee judges.

2.13.2 Appeal

A team may file an appeal if it considers itself affected. An appeal is any inconsistency in the scoring system, interpretation, or application of the rules during the event. Actions that have not caused substantial harm to a team are not grounds for appeal.

An Appeal Committee will handle the appeal. It shall consist of at least three members: a witness, the Organizer, the Chief Judge, and/or the Flight Boss. The decision of the Appeal Committee is final.

The appeal process shall be as follows:

1. The Team Captain and/or Faculty Advisor shall bring the situation to the attention of the Appeal Committee personnel for an informal preliminary review before filing an appeal.

2. The Appeal Committee shall identify the representatives and assess the appeal submitted. If the resolution requires a form, the team will be immediately asked to submit its appeal form — see Appendix B — properly justified and signed, placing 20 points at stake.

3. The Appeal Committee shall begin resolving the appeal. If a competition Official who witnessed the situation under appeal is required, such Official will be called by the Committee.

4. Once the review has been completed, an Official of the Appeal Committee shall communicate the resolution to the Team Captain and/or Faculty Advisor, affirming, reversing, or modifying the cause of the appeal.

5. The necessary actions shall be taken to implement the resolution of the appeal. This may include, but is not limited to, modifying points in the overall standings, applying a 20-point penalty if the appeal is not upheld, among other actions.

Appeal considerations shall be based on whether the official action was fair and consistent with the intent of the rulebook. The judges are the only parties who, for the benefit of the event, may modify the rules of the flight rounds due to force majeure, provided that such modification does not partially harm any given team.

The Appeal Committee will address appeals immediately and may communicate the resolution to the teams at any point during the competition.

2.14 Code of Conduct

The Technical Committee condemns any unethical or unsportsmanlike conduct during the event. Unsportsmanlike conduct is defined as any behavior that undermines the integrity of the competition and harms the activities, participants, and/or organizers. No conduct of this type will be overlooked.

2.14.1 Alcohol and Illegal Material

Bringing alcoholic beverages, weapons, drugs, or any illegal material into the event is prohibited. A violation of this rule will result in the immediate expulsion of the participant and the team. This also applies to public spectators.

2.14.2 Arguments with the Technical Committee

Participants must keep all discussions with the Technical Committee respectful. If they do not agree with the Technical Committee's position, they must use the appeal tools. An altercation may result in a warning or direct expulsion.

2.14.3 Unsportsmanlike Conduct

If unsportsmanlike conduct occurs, the Technical Committee will issue a first warning to the person and the team personnel. A second instance of unsportsmanlike conduct will result in the expulsion of the team from the competition, and the team will lose all points accumulated across all stages.

2.14.4 Personal Protective Measures

The team must comply with each of the personal protective measures.

1. Open-toe footwear is prohibited.
   (a) All participants, including faculty advisors and pilots, are required to wear closed-toe shoes during the flight competition.
2. Smoking is prohibited.
   (a) Smoking is prohibited at any stage of the event.
3. Safety glasses are required.
   (a) All participants involved in flight activities must wear safety glasses.
4. The use of lasers is prohibited.

3. General Aircraft Requirements

These general requirements must be met regardless of the challenge in which the team participates.

3.1 Identification

The aircraft must be properly identified and comply with the following requirements.

1. The team number assigned by the Technical Committee must be visible and present on the lower and upper surfaces of the wing, as well as on both sides of the vertical stabilizer. The number must have a minimum height of 100 millimeters.
2. The name of the educational institution must be displayed inside or outside the aircraft. The university initials or acronyms may substitute the full name. They must be recognizable.

3.2 Aircraft Type

Designs must be limited to fixed-wing aircraft only.

3.3 Center of Gravity

The aircraft must contain a CG symbol on both sides of the fuselage at the position indicating the empty CG. The symbol must have a minimum diameter of 25 millimeters. In the case of a Flying Wing configuration, the symbol must be located under the wing.

Figure 3.1: Center of Gravity Symbol

3.4 Maximum Takeoff Weight

The aircraft must not exceed eighteen (18) kilograms of maximum takeoff weight.

3.5 Control

The aircraft must be controllable in flight.

3.6 Radio Control

A 2.4 GHz radio control system must be used for each aircraft. The system must have the safety function enabled to reduce the throttle to zero if the radio signal is lost.

3.7 Metal Propellers

Metal propellers are prohibited.

3.8 Lead Prohibition

The use of lead in any part of the aircraft is prohibited, including the payload bay.

3.9 Spinners and Safety Nuts

Only a spinner is permitted as a securing device for the propeller. The use of double nuts, safety nuts, and 3D-printed devices is prohibited.

Figure 3.2: Permitted and prohibited devices to secure the propeller

3.10 Payload Bay

The payload bay must not contribute to the structural integrity of the aircraft. That is, the aircraft must be capable of flying without the payload bay installed inside.

3.11 Static Payload in the Payload Bay

All pieces comprising the solid payload inside the payload bay must be secured with fasteners or hardware that penetrate and fix them inside the payload bay as a single load, as defined for each challenge.

3.12 Ballast in Aircraft

The use of ballast in the aircraft is permitted. However, it may not be placed inside the payload bay. It must be mechanically secured in the location where it is used and it must be reported according sections 5.5.1 Aircraft Drawing (Cargo/Drop) and 5.5.2 Payload Bay Drawing (Cargo/Drop).

3.13 Control Surfaces

The control surfaces must not have excessive looseness or backlash.

3.14 Servo Sizing

The aircraft must be equipped with servos capable of handling the expected loads. Analyses and tests must be documented in the Design Report.

3.15 Clevis Keepers

All control surface pushrods must have mechanical retainers to prevent them from becoming detached in flight.

3.16 External Propulsion Restriction

The aircraft must be powered only by the motor installed on the aircraft. No other internal or external source is permitted, such as rubber bands or the use of CO_2.

3.17 Battery Restriction

I. All batteries must be commercially available. Homemade batteries are not permitted.

II. All batteries must be secured in such a way that they cannot move during flight.

III. The battery compartment in the aircraft must be free of any hardware or element that could cut, damage, or penetrate the battery in the event of a flight accident.

3.18 Use of Lasers

The use of lasers to mark the landing zone or the navigation direction of an aircraft toward the landing zone is prohibited.

3.19 Power Limiter

The limiter is an optional device that can be integrated to the electrical circuit only if it is installed in a position that follows the diagram shown on figures 8.1 and 9.1 . If the team decides to use a limiter, it can be either personalized or store-bought (neuracing.us or others) .

In case of using a commercial limiter, follow these guidelines:

1. Repairs or modifications to the power limiter are prohibited.
2. The limiter must be fully visible and easy to inspect.

Note: Use the limiter in accordance with the supplier's Operations Manual.

In case of using a personalized limiter, follow these guidelines:

1. The limiter must withstand a higher voltage than the indicated for the corresponding category.
2. The team is responsible to deliver both technical and graphic information about the limiter to: comisiontecnica@aerodesign.mx.
3. The team must receive written approval for its limiter from the Technical Committee.

Disclaimer: ADMX is not responsible for stock availability or the functioning of the limiter. The purchase, use, and care of these devices are the responsibility of the teams.

3.20 Arming Switches

The aircraft must have an arming switch, hereafter referred to as an *Arm Plug* or *Shunt Plug*.

1. The *Arm Plug* must be located and accessible according to the aircraft configuration. See Figure 3.3.

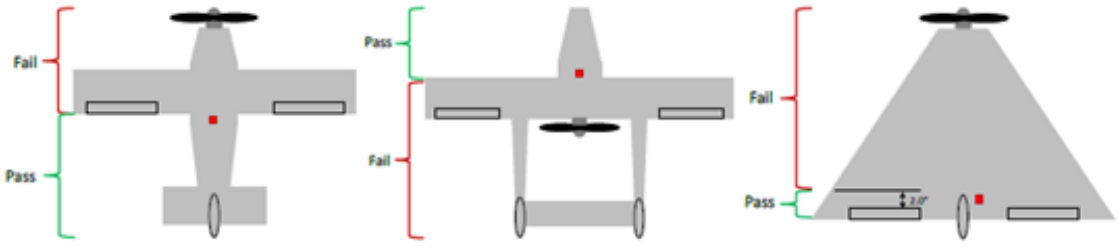

Figure 3.3: Arming switch localization diagram.

2. The *Arm Plug* connector must be located outside the fuselage or wing of the aircraft.

3. The *Arm Plug* must be integrated into the electrical circuit between the *Watt Meter* and the *Electronic Speed Control* (ESC).
4. Activation or deactivation using wiring only is prohibited. The *Arm Plug* must be used.
5. The non-removable portion of the *Arm Plug* must not have more than one male-type connection and must have a mechanical attachment to the aircraft structure, as shown in Figure 3.4.

Figure 3.4: Example of connector with screw attachment.

Note: Homemade switches must be approved by the Technical Committee via email prior to the competition days.

3.21 Landing Gear Wheels

The wheels installed on the landing gear must ensure that the aircraft remains on the runway while taxiing and must allow the pilot to correct its direction easily. Additionally, they must maintain their integrity throughout the entire flight round, including taxi, takeoff, and landing.

Wheel integrity is understood as the preservation of the geometry and location of the components that comprise them in accordance with the drawings. Any change in these characteristics due to detachment or failure before, during, or after the flight, and that does not ensure the airworthiness of the aircraft, may result in the invalidation of the flight.

3.22 Repairs During Flight Competition

In case of damage, the aircraft may be repaired and must adhere to its original design. Any deviation from the original design or repair of critical components must be reported through an Engineering Change Request, which appears in Appendix C

3.23 Alterations During Flight Competition

At all times, any alteration to the original design must be reported to the Technical Committee through the Engineering Change Request, which appears in Appendix C.

4. Mission Requirements

This section describes all mission characteristics and participation roles.

4.1 Flight Boss

The Flight Boss is a qualified official who will manage the flight competition process. This person will be introduced during the pre-flight briefing. Their responsibilities are as follows:

1. Promote safety on the flight line by maintaining orderly and controlled operations.
2. Be responsible for recording successful and unsuccessful flights, interpreting the takeoff and landing rules.
3. Declare the termination of a flight attempt if the time limit is exceeded.
4. Assess extreme wind conditions or other extraordinary conditions and pause or resume flights.
5. Make any necessary decision if the safety of the event so requires.

4.2 Pilot Zone

The pilot zone will be defined during the pre-flight briefing. Pilots must fly the aircraft from the assigned area.

4.3 Flight Attempts

Teams may perform one (1) flight per round. The number of rounds that may be flown is not guaranteed; it will depend on local conditions.

1. A team may have more than one opportunity to become airborne, provided it remains within the designated time limit.
2. The first attempt in which the aircraft becomes airborne shall be considered the flight.

4.4 Motor Runup

For all event challenges, the aircraft may be throttled up before takeoff, provided that:

1. One team member (*holder*) holds the aircraft in its starting position before the takeoff roll.
2. The *holder* must not push the aircraft upon release.
3. The main landing gear must touch the starting line of the takeoff limit.

4.5 Aircraft Configuration – Takeoff and Landing

The aircraft must remain intact throughout the flight circuit in order to receive flight round points. A flight circuit is considered the sequence of the following activities:

1. Positioning the aircraft on the takeoff line.
2. Taxi.
3. Takeoff.
4. Flight pattern.
5. Landing.
6. Valid post-flight inspection.

4.6 Flight Circuit Requirements

Considerations for the flight circuit:

1. During takeoff and landing, the pilot must not fly in a pattern that could place the aircraft in no-fly zones.
2. Aerobatic maneuvers are not permitted at any time during the flight competition. This includes, but is not limited to, *loops*, figure eights, any type of maneuver, and inverted flight.

4.7 Time Limits

Considerations for managing each team's round time:

1. The team's time will begin once the aircraft is placed on the takeoff starting line.
2. Multiple takeoff attempts are allowed within the time limit for each challenge, provided the aircraft has not become airborne; that is, provided the landing gear has not lifted off the ground.
3. If an aircraft returns to the ground after becoming airborne and touches the ground beyond the takeoff distance limit, the flight attempt will be disqualified.

4.8 On-Deck and Preparation Area

When a team is awaiting its flight turn and has passed technical inspection, it will be placed in a specific on-deck area. In that zone, the following must be observed:

1. The on-deck area is the only place where the propeller may be installed after technical inspection.
2. Control surfaces may be checked if the team so wishes.
3. Installing the Arm Plug and energizing the aircraft motor are prohibited.
4. No testing or modifications of any kind are permitted once in the on-deck area.

4.9 Takeoff

Takeoff is defined as the point at which the main landing gear wheels leave the ground (Cargo/Drop Challenge).

1. The aircraft must begin its takeoff roll from rest on the takeoff line.
2. The aircraft must remain on the runway during the takeoff attempt.
3. Bouncing is permitted as long as it occurs within the takeoff distance.
4. The aircraft must remain intact during takeoff. No parts may fall off.
5. The takeoff distances are as follows:

Challenge	**Takeoff Distance**	**Turn Distance**	**Description**
Cargo	60 m	120 m	The aircraft must become airborne within the takeoff distance.
Drop	50 m	120 m	The aircraft must become airborne within the takeoff distance.

Table 4.1: Takeoff information

4.10 Landing

Landing is defined as the safe and controlled maneuver by which the aircraft returns to the ground. The area assigned for this activity is the runway (Cargo/Drop Challenge).

1. The aircraft may bounce during landing, provided it lands within the limits of the landing zone during that attempt. Failure to do so will result in a failed attempt.

2. Landing zones will be marked, and it is the pilot's responsibility to identify them.
3. The aircraft must land and be in a condition that allows it to perform the mission again without any adjustment, however minor. No part may have fallen off or broken.
   (a) Detachment of adhesive tape or *tape* does not apply, provided airworthiness is not compromised.
4. The landing distance is 120 meters. Beyond this limit, rolling without bouncing is permitted. Likewise, the aircraft may roll laterally without bouncing.

Challenge	**Landing Distance**	**Description**
Cargo/Drop	120 m	The aircraft must land in the same direction as takeoff, unless the Flight Boss indicates otherwise.

Table 4.2: Landing information

4.11 Grounding Non-Compliant Aircraft

An aircraft will be grounded if the Flight Boss considers the prototype to be non-airworthy or non-compliant with the flight rules. Therefore, it may not participate in the flight competition until its non-conforming condition has been corrected in accordance with this document.

4.12 No-Fly Zones

Any area where the aircraft may not be present for safety reasons is defined as a no-fly zone.

1. Entering a no-fly zone will result in a first warning and the flight attempt will be invalidated.
2. A repeated offense will result in disqualification and loss of all points.

The Flight Boss may request that the aircraft be intentionally crashed or that the flight pattern be modified if the presence of the aircraft in a no-fly zone is considered a risk. Flying over spectators is mandatory prohibited.

4.13 Flight Rules

These are the rules that define the procedures for the flight rounds. They will be announced during the flight round briefing. The Flying Club may have unique requirements that conflict with the rules set forth herein; the resolution will be communicated to the teams.

4.14 Rule Violations

Violation of the flight rules will result in a penalty, warning, or expulsion, as applicable.

4.15 Flying Club Local Rules

In addition to the competition rules, the Flying Club may have additional rules.

1. The additional rules of the Flying Club must be obeyed by the teams.
2. If the rules of the Flying Club conflict with the competition rules, it is the responsibility of the Team Captain or *Faculty Advisor* to bring the matter to the attention of the Technical Committee so that it may resolve the issue and announce the resolution to all teams.

4.16 Competition Scoring

The final score of a team is composed of the scores from the following categories:

1. Design Report.
2. Technical Presentation.
3. Flight Competition.
4. Total Bonuses.
5. Total Penalties.

4.17 Aircraft Empty Weight

The empty weight of an aircraft is defined as the total weight of all components comprising the aircraft in its final, ready-to-fly configuration, excluding the payload bay or capsule, as applicable. Any ballast used shall be considered part of the aircraft's empty weight and shall be reported in accordance with Sections 3.12, *Aircraft Ballast*; 5.5.1, *Aircraft Drawing (Cargo / Drop)*; and 5.5.2, *Payload Bay Drawing (Cargo / Drop)*.

Any discrepancies resulting from repairs or modifications, as described in Sections 3.22 and 3.23, shall be reported through an Engineering Change Request in accordance with Appendix C.

5. Design Report

The team must explain its processes, philosophy, and conclusions through the Design Report.

5.1 Areas

The areas to be covered within the deliverable are the following:

Area	Points
Systems Integration	20 points
Aerodynamics	20 points
Performance	20 points
Stability and Control	20 points
Structures	20 points
Manufacturing	20 points
Electrical Project	20 points
2D Drawings	20 points

Table 5.1: Design Report evaluation areas

The report must not be limited to the topics above.

5.2 PDF Submission

One (1) single PDF document must be submitted no later than January 29, 2027, at 23:59 Mexico City time, via email to `comisiontecnica@aerodesign.mx`. The email subject line must follow the format `Reporte_TeamName_ADMX27`. For example, if the team's name is Aero Tlaloc, the subject line must be `Reporte_AeroTlaloc_ADMX27`.

The PDF file must be named using the following format: `TeamNumber_TeamName_ADMX27.pdf`. For example, Team 05, Aero Tlaloc, must name its file `05_AeroTlaloc_ADMX27.pdf`.

The file must contain the following:

I. Cover Page

II. Statement of Compliance

III. Design Report

IV. 2D Drawings

V. Payload Prediction – Cargo Challenge

The Technical Committee is not responsible for delays or misdirected documents.

5.2.1 Penalties

- A penalty of 5 points per late submission day shall apply. Submissions will be accepted up to 5 days late; otherwise, the Withdrawal Policy will apply, see Section 1.6 .
- A penalty of 5 points shall apply for submitting separate files. All documents must be consolidated into a single file.

5.3 Original Work

The report, drawings, and any added information must be original. Resubmissions or significant excerpts from reports from previous years will not be accepted. It is recommended to cite any references included in the deliverable.

5.4 Format and Organization

The Design Report must comply with each of the following points:

1. It must include a cover page with the team name, number, and university.
2. It must contain the signed Statement of Compliance attached on page number 2.
3. It must be digitally typewritten.
4. It must use a 12-point font or have 10 characters per inch.
5. It must comply with the required margins:
   (a) Left: 2.50 centimeters.
   (b) Right: 1.25 centimeters.
   (c) Top / Bottom: 2.50 centimeters.
6. It must have all pages numbered.
7. It must be sectioned, according to the challenge, as follows:

Section	Pages	Cargo	Drop
Cover Page	1	Applies	Applies
Statement of Compliance	1	Applies	Applies
Design Report	≤ 40	Applies	Applies
2D Drawings	2	Applies	Applies
Payload Prediction	1	Applies	Not applicable
Total	45		

Table 5.2: Design Report sections

8. It must be in Letter / ANSI A size.
9. To the extent possible, tables, figures, and acronyms must be referenced.
10. It must be in single-column format. Multiple columns are not permitted.

5.5 Drawings

These consist of two separate drawings detailing the Aircraft (Cargo/Drop) and the Payload Bay (Cargo) or Drop Capsule (Drop).

5.5.1 Aircraft Drawing (Cargo / Drop)

Drawing of the prototype with 3 standard aeronautical views.

I. Left side view located in the lower left corner.

II. Top view or plan view, located above and aligned with the left side view.

III. Front view located in the lower right corner.

The drawing must contain the following information:

a. Wingspan, root chord, and tip chord of all lifting surfaces.

b. Aircraft datum and aircraft empty weight.

c. The indicated tolerances must be bilateral with a value less than or equal to 10 millimeters.

d. Weight and balance table including at least: motor, battery, payload, ballast, and electronics.

e. Location of the center of gravity with payload and empty, as well as the forward and aft limits.

5.5.2 Payload Bay Drawing (Cargo) or Drop Capsule Drawing (Drop)

Drawing of the payload bay (Cargo) or drop capsule (Drop).

Cargo Challenge

I. General view and detail views of the aircraft interface areas.

II. Detailed view of the overall dimensions and frontal area of the payload bay.

III. The indicated tolerances must be bilateral with a value less than or equal to 10 millimeters.

IV. Location of the payload bay center of gravity in relation to the payload prediction.

V. If applicable, location of the ballast required to balance the aircraft when empty.

Drop Challenge

I. General view of the drop capsule, including its dimensions, estimated mass, and complete configuration in ready-for-release condition.

II. Internal view of the egg protection system, showing the egg location, cushioning materials, and retention components.

III. View of the interface between the drop capsule and the aircraft, including attachment points, the release mechanism, and a clear distinction between fixed and releasable components.

IV. Main materials and bilateral tolerances less than or equal to 10 millimeters.

5.5.3 Format

Each drawing must be in International System units, PDF format, ANSI B size or similar. In addition, they must be labeled with the team name, team number, and university name.

5.6 Payload Prediction

Payload prediction is the theoretical calculation of the aircraft payload capacity.

5.6.1 Solid Payload Prediction

General guidelines for solid payload prediction:

I. A linear graph with slope must be presented:

$$y = mx + b \tag{5.1}$$

Where:

Symbol	Description
y	Payload (kg)
x	Density altitude (m)
m	Linear slope
b	Y-intercept

Table 5.3: Payload prediction equation variables

II. Only one line and one equation may be presented. If the line values and the equation values do not match, the equation value will be assumed. The graph axes must be in International System units.

III. A brief explanation of the payload prediction must be included in the Design Report.

5.6.2 Examples

Below is an example of the payload prediction equation and graph.

Equation

$$Y = -0.0025x + 12 \tag{5.2}$$

Example of payload prediction equation.

Graph

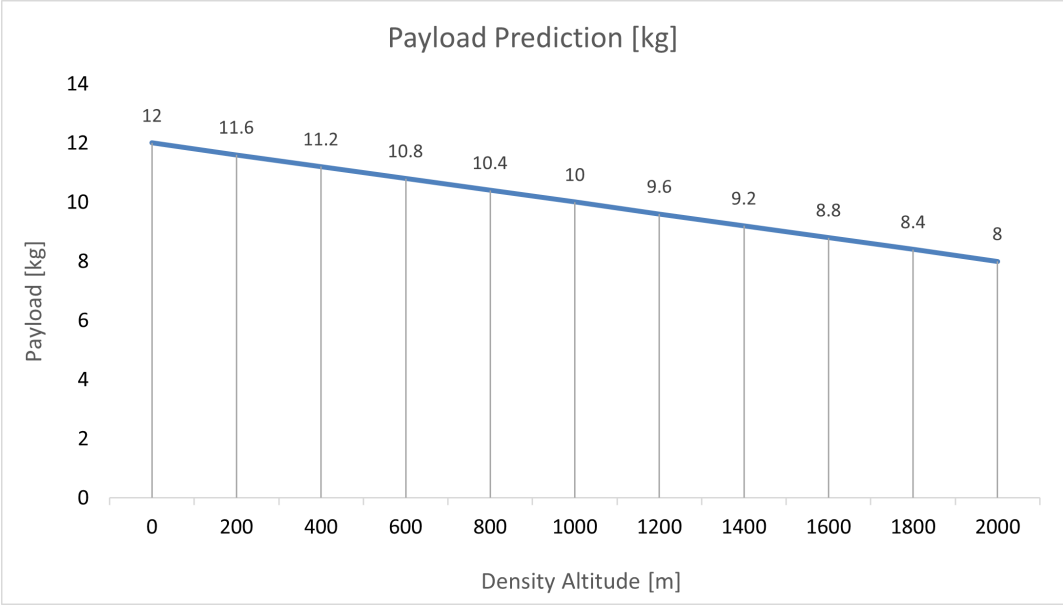

Figure 5.1: Example of Payload Prediction

6. Technical Presentation

This is a virtual event through which the design, construction, and testing process is communicated. The presentation will award up to fifty (50) points and will evaluate both technical content and visual content.

6.1 Generalities

The team must comply, without exception, with each of the following points:

1. Ten (10) minute limit. Afterwards, a questions and answers session will be held.
2. Two team members may act as presenters.
3. Any team member may answer during the questions and answers session.
4. Every question must be answered. Omission is not permitted.
5. The presentation may be delivered in any of the official competition languages: Spanish or English.
6. Only team members may participate.
7. Videos must not exceed one (1) minute in length and must not be accompanied by pre-recorded narration.
8. If the facilities of the presenting team allow, it is highly recommended that the aircraft be present.

6.2 Procedure

Each virtual presentation room will have a lead judge responsible for ensuring proper flow and compliance with the presentation rules.

Activity	**Duration**
Presentation setup	2 minutes
Technical presentation	10 minutes
Questions and answers	10 minutes

Table 6.1: Duration of the technical presentation stages

I. The lead judge will notify the presenter when one (1) minute remains.

II. If the presentation exceeds ten (10) minutes, a five (5)-point penalty will be applied.

III. The presentation will be stopped once eleven (11) minutes are reached.

6.3 Date

The technical presentations will be held on February 27 and 28, 2027, in accordance with the official competition schedule and the order assigned by the Technical Committee. The link to access the session will be provided by the Technical Committee through the competition's official communication channels.

Notes

- Each team is responsible for confirming the time assigned to its Technical Presentation.
- A maximum grace period of 5 minutes will be allowed for the presentation to begin. Once this period has elapsed, the Technical Committee may decide not to hold the corresponding presentation.
- The presence of Faculty Advisor is mandatory throughout the Technical Presentation.
- Technical Presentation speakers must be students listed on the team's official registration form. Individuals who are not registered will not be permitted to participate as speakers.
- Only students listed on the team's official registration form may participate in the question-and-answer session.

7. Technical Inspection

The technical and safety inspection aims to ensure the aircraft's conformity with all general, design, and airworthiness requirements. Every aircraft must pass inspection in order to access the flight rounds. At any extraordinary time, a Committee judge may request a technical re-inspection.

7.1 Conformity

The aircraft will be inspected in accordance with the "Aircraft Drawing" and the "Payload Bay Drawing" or "Drop Capsule Drawing", as applicable.

I. At a minimum, the aircraft's wingspan, length, height, and center of gravity (CG) location will be inspected. In addition, all electronic components must match the submitted documentation.

II. The team must have a printed physical copy of its drawings available during the inspection.

III. Any change to the aircraft's dimensions or design must be reported using an Engineering Change Request (ECR). A copy of the ECR must be submitted during the technical inspection. Only one change may be reported per ECR form. See Appendix C.

   a. The penalty will be determined by the Technical Committee based on the reported change.

   b. Any unreported change will result in an additional 3-point penalty.

7.2 Deviation from 2D Drawings

Any deviation between the built aircraft and the 2D drawing must be reported in writing. In the both challenges, no deviation must be reported if the following applies:

$$|L_{actual} - L_{drawing}| + |W_{actual} - W_{drawing}| + |H_{actual} - H_{drawing}| \leq 3 \text{ centimeters} \tag{7.1}$$

7.3 Safety and Airworthiness Criteria

Aspects that ensure safety and airworthiness during the mission will be inspected. The inspection will include, but will not be limited to:

I. Alignment of control surfaces.

II. Unintentional wing buckling.

III. Response of the control surfaces to transmitter input.

IV. Structural rigidity of the prototype.

7.4 Spare Components

A spare component is any aircraft part that is available to be integrated into the aircraft in the event of irreparable damage to an original part. Therefore, it must have passed its own technical inspection in order to be valid.

I. Any spare component must undergo inspection together with the primary aircraft.

II. If a spare aircraft exists, it will be treated in the same manner as a component.

7.5 The Aircraft Must Remain Compliant Throughout the Event

The aircraft must comply with the Technical Inspection requirements at all times. Any Technical Committee official may require a re-inspection if any problem or anomaly is perceived in the aircraft at any time during the event. This includes errors or omissions made by any Technical Committee official during inspection.

7.6 Penalties

Penalties are consequences of errors or non-conformities found during the technical inspection process.

I. Sizing or design not in conformity with the aircraft reported in the documentation.

II. Changes reported in the Engineering Change Request.

III. Failure in the loading and unloading demonstration.

7.7 Inspection Failure

If the aircraft does not pass technical inspection, the team must proceed as follows:

I. The team will move to the end of the existing line at that moment. It will not have priority.

II. If the day ends without re-inspection, the team must report first thing on the flight day.

7.8 Load Demonstration

This is a timed activity in which two (2) registered team members must perform the loading and unloading of the payload.

Failure to comply with the below will result in a 5-point penalty for each demonstration.

The load demonstration is a mandatory activity with only one attempt and must be performed regardless of whether the aircraft passes or fails Technical Inspection.

7.8.1 Cargo Challenge

Cargo Challenge aircraft must perform the demonstration with 3.000 kilograms of payload.

I. Load the solid payload within one (1) minute.

   a. The aircraft must be in its *ready to fly* configuration.

   b. The payload bay shall be separated from the aircraft.

   c. The activity ends when the bay is secured inside the aircraft.

II. Unload the solid payload within one (1) minute.

   a. It will begin immediately after the loading test with the bay installed inside.

   b. The activity ends when the bay is removed from the aircraft and placed in its original position. The aircraft must return to its *ready to fly* configuration.

7.8.2 Drop Challenge

The team must demonstrate that the drop capsule release mechanism operates properly in a configuration representative of flight. The demonstration must include all components required for the mechanism's operation during flight.

I. Install the main and secondary payload to the aircraft, and arm the complete release mechanism within one (1) minute.

   a. At the beginning of the demonstration, the egg must be outside the drop capsule, the secondary payload must be outside the aircraft, and the release mechanism must be unarmed.

   b. The team must place the egg inside the drop capsule and properly secure it.

   c. The team must install and secure the secondary payload inside the aircraft.

   d. The team must install the drop capsule on the aircraft and arm the complete release mechanism.

e. The activity ends when the aircraft, drop capsule, egg, and secondary payload are in their complete *ready-to-fly* configuration.

f. Once the mechanism has been armed, the judge will verify that the drop capsule and secondary payload are properly secured and that the aircraft is in its *ready-to-fly* configuration.

II. Activate the drop capsule release mechanism and remove the egg and secondary payload within one (1) minute.

a. This activity will begin immediately after the judge confirms that the drop capsule and secondary payload are properly secured and the release mechanism is armed.

b. The team must activate the release mechanism while the aircraft remains stationary.

c. The drop capsule must be completely released from the aircraft and allowed to free-fall for a minimum vertical distance of 50 cm before being caught by another registered team member.

d. After catching the drop capsule, the team member must open it and remove the egg.

e. The team must also remove the secondary payload from the aircraft within the same one-minute period.

f. The egg and secondary payload must be presented to the judge for inspection.

g. The activity ends when the egg has been removed from the drop capsule, the secondary payload has been removed from the aircraft, and the integrity of the egg has been verified by the judge.

Note: The installation and removal of the drop capsule and the secondary payload may be performed in any order, at the team's discretion, provided that all required activities are completed within their respective one-minute time limits.

8. Cargo Challenge

In this edition, the Cargo Challenge will be multipurpose and will require performing two types of flights: empty and solid payload. The aircraft shall focus its design on Structural Efficiency, Empty Weight, and Payload Capacity to achieve the greatest possible success in the flight rounds.

8.1 Sizing

The aircraft in its *ready-to-fly* configuration must comply with the following rules:

1. The height of the aircraft must be equal to or less than 0.48 meters.

$$h \leq 0.48\,\text{m} \tag{8.1}$$

Where:

- h: maximum height of the aircraft.

Exclusions:

I. Propellers are excluded from the dimensional rule.

If:

a) The aircraft is more than 1 linear centimeter outside the dimensional rule, it will be disqualified from the event and will not be allowed to participate in flight activities.

b) The aircraft is between 0.1 and 1 linear centimeter outside the dimensional rule, a 30-point penalty will be applied.

8.2 Restrictions

Restrictions applicable to the Cargo Challenge.

8.2.1 Rubber Bands and/or Elastic Materials

The use of elastic material to retain the wing or the solid payload plates to the fuselage is prohibited.

8.2.2 Gyroscopic Stabilizers

The use of gyroscopes or any type of flight stabilizer is prohibited.

8.2.3 Wing Section Assembly

Wing sections must be mechanically joined. The use of *tape* as the sole method of attachment is not permitted.

8.3 Requirements

The aircraft must be powered by one (1) electric motor and one (1) non-metallic propeller. There is no restriction on brand or model.

8.3.1 Battery

The propulsion system must use one (1) commercially available Lithium-Polymer battery.

a) Homemade batteries are not permitted.

b) Swollen batteries are not permitted.

c) Battery with 4 or 6 cells.

d) Minimum requirements: 3000 mAh, 20C.

8.3.2 Power Limit

The propulsion system will be limited to an electrical power of up to 850 watts.

1. The aircraft must have an ADMX Watt Meter model (ADMX V1 / V2) installed in its electrical circuit.
    a. The Watt Meter must be visible during aircraft operation.
    b. Alterations or modifications to the Watt Meter are prohibited.
        I. If there are signs of violation of the Watt Meter's integrity, the Committee will require the aircraft to remain grounded until the observed condition is clarified.
    c. The electronic circuit must install the Watt Meter according to the figure 8.1.
2. Any excess above 850 watts will be penalized according to Appendix D.
    a. Any value above 1000 watts will not score in the flight round.

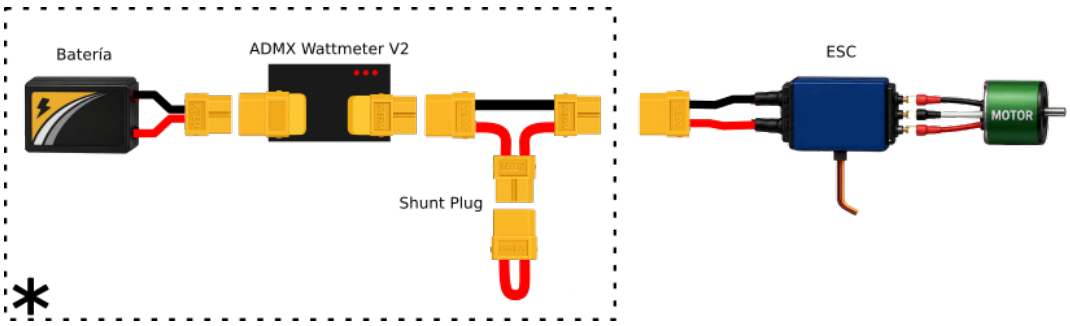

Figure 8.1: Power circuit diagram (the sequence of the components enclosed within the box must remain unchanged).

8.4 Payload

The payload of the Cargo Challenge will consist of a solid payload and its payload bay.

1. The total weight (kg) resulting from the sum of the solid payload and the payload bay are the recordable values for calculating the score per round.

   a. The maximum payload limit is the payload prediction (see Section 5.6) or reaching the maximum gross weight (see Section 3.4), whichever occurs first.

8.4.1 Solid Payload

Solid payload is considered to be the load contained inside the bay.

1. It consists of plates or bars of solid material and a support structure for retaining them during the mission.
2. The selection of the solid payload material is unrestricted.
3. The payload must be mechanically retained. Do not use tapes, Velcro, rubber bands, and/or similar materials.
4. The team is responsible for bringing its own payload.
5. The payload shall have a density of less than 7,600 kg/m^3.

8.4.2 Payload Bay

It consists of a single structurally enclosed payload bay within the body of the aircraft capable of carrying the solid payload in each flight round.

1. The payload bay must be sized such that:

a. It is a rectangular prism.

b. It has a volume that achieves a density equal to or less than 7,600 kg/m^3 with the selected payload prediction. See example in Appendix E.

2. It must be constructed from materials that maintain its geometric shape.

3. It must not be a structural component of the fuselage or any other aircraft component.

4. It must be shown in detail through the 2D drawings.

5. It must not contribute to aircraft balance.

8.5 Mission

This section describes the mission of the Cargo Challenge.

8.5.1 Generalities

The aircraft must, without exception, attempt 2 types of flight.

VEV: Empty flight.

VCS: Solid payload flight.

8.5.2 Basic Rules

Basic rules for Cargo Challenge circuits.

I. During flight, all aircraft must fly through the takeoff limit, turn approximately 180°, and fly beyond the beginning of the landing zone before landing.

II. During takeoff and landing approach, the pilot must not fly the aircraft in patterns that allow the aircraft to enter the no-fly zones.

III. More than one circuit lap is permitted, provided the circuit is completed within the regulatory 3 minutes.

IV. No aerobatic maneuver will be permitted in any flight round. This includes, but is not limited to: rolls, barrel rolls, figure eights, or inverted flight.

8.5.3 Distances

The distance limits must be respected.

Stage	Distance (m)
Takeoff	60
Landing	120

Table 8.1: Distance limits

8.5.4 Flight Attempts

The team is allowed one (1) flight per round.

I. The team may have multiple attempts to take off within the time limit.

8.5.5 Time Limit

Aircraft must comply with the time limit rules.

I. Multiple takeoff attempts are allowed within a three-minute window, provided the aircraft has not taken off during the aborted attempt.

II. Once airborne and outside the takeoff limits, the aircraft must complete the flight circuit in less than 3 minutes.

8.5.6 Motor Acceleration

The use of a helper (*holder*) is allowed to hold the aircraft while the motor is accelerated before release for takeoff.

I. The helper may not push the aircraft at any time. The flight will be invalidated.

II. The wheels of the aircraft's main landing gear must be positioned on the takeoff line.

III. The aircraft must begin its takeoff roll from rest on the takeoff line.

8.5.7 Competition Circuit

According to the flight to be performed (VEV or VCS), the team must comply with the specific requirements applicable to each flight type. The aircraft shall complete a 360° circuit within the runway and designated flight area limits.

a. The team must present the aircraft without any payload installed.

b. The aircraft shall be weighed after each flight round. The recorded weight shall be used as the basis for calculating structural efficiency.

c. The payload bay intended for the corresponding flight round shall be weighed.

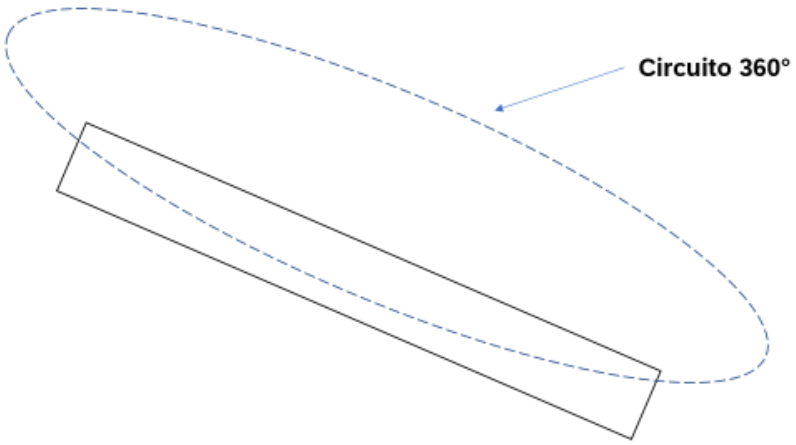

Figure 8.2: 360° circuit.

8.6 Total Scoring

The total scoring formula is:

$$PT = RD + PO + PRV + BVV + BLW + BV_{\text{mkt}} + BPCU - \sum D \tag{8.2}$$

Where:

Symbol	Description
PT	Total Score
RD	Design Report
PO	Technical Presentation
PRV	Flight Round Score
BVV	Flight Video Bonus
BLW	Watt Meter Log Score
BV_{mkt}	Marketing Video Bonus
$BPCU$	Predicted Payload Bonus
$\sum D$	Sum of Penalties

Table 8.2: Total scoring variables

8.6.1 Flight Round Score (PRV)

It is the total sum of all round scores, bonuses, and penalties.

$$PRV = PVV + \sum PC + \sum BD + \sum BA \tag{8.3}$$

Where:

Symbol	Description
PRV	Total Flight Round Score
PVV	Empty Flight Score
$\sum PC$	Sum of Payload Flights
$\sum BD$	Takeoff Bonuses
$\sum BA$	Landing Bonuses

Table 8.3: Flight round score variables

8.6.2 Payload Flight Round Score (PC)

The score per round will be calculated with the following equation:

$$PC = \sum_{n=1}^{N} (100\, EE_n - 80\, EE_{n-1}) \tag{8.4}$$

Where:

Symbol	Description
EE_n	Structural Efficiency of the current round
EE_{n-1}	Structural Efficiency of the previous round
n	Current round number
N	Number of possible payload rounds

Table 8.4: Payload round score variables

$$N = 7 - i - f \tag{8.5}$$

Where:

Symbol	Description
i	Number of empty flight attempts
f	Number of failed payload flights

Table 8.5: Variables for the number of possible rounds

Note: The value of PC may result in a negative score that will be deducted from the accumulated total.

Structural Efficiency

Structural efficiency is defined as the ratio between the payload of the current round and the empty weight of the aircraft.

$$EE = \frac{CU}{W_{\text{EMPTY}}} \tag{8.6}$$

Where:

Symbol	Description
CU	Payload
W_{EMPTY}	Empty mass of the aircraft [kg]

Table 8.6: Structural efficiency variables

The first payload round, EE_{n-1}, is defined as follows:

$$EE_0 = 0 \tag{8.7}$$

Example

See Appendix G for a solved numerical example.

8.6.3 Empty Flight Score (PVV)

It is the quotient obtained by dividing 200 by the empty weight recorded in the VEV circuit (empty flight).

$$PVV = \frac{200}{W_{\text{EMPTY}}} \tag{8.8}$$

Where:

Symbol	Description
W_{EMPTY}	Empty mass of the aircraft [kg]

Table 8.7: Empty flight score variable

A team may perform solid payload flights before successfully completing an empty flight. However, any points earned during those flights shall be valid only if the team successfully completes an empty flight before the end of the flight rounds. Only the first successful empty flight will be scored.

This score is awarded only once; subsequent no-payload attempts do not award points.

8.6.4 Takeoff Bonus

The aircraft may obtain a bonus per round if it successfully takes off in accordance with Section 4.9, within a distance shorter than the one indicated in Section 8.5.3.

Points	Criterion
10	The aircraft took off before the 50-meter distance.
0	The aircraft took off after the 50-meter distance.

Table 8.8: Takeoff bonus

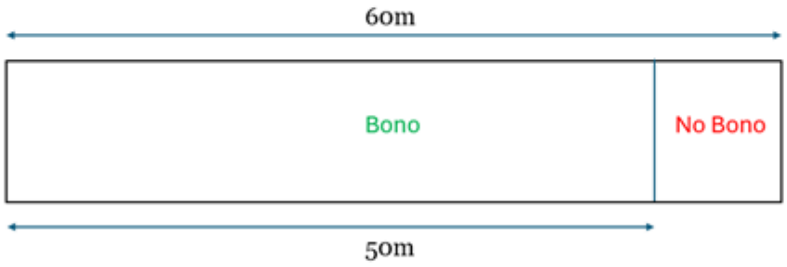

Figure 8.3: Example of takeoff bonus.

8.6.5 Landing Bonus

The aircraft may obtain a bonus per round if it successfully lands in accordance with Section 4.10, within a distance shorter than the one indicated in Section 8.5.3. Conversely, a penalty will be applied if the landing is not performed in the declared zone.

The landing runway (120 meters) will be divided into two quadrants: S1 and S2, of 60 meters each.

Points	Criterion
10	The aircraft landed successfully and stopped within the first runway quadrant.
0	The aircraft landed successfully but used two runway quadrants.
-10	The aircraft landed but departed the runway laterally or longitudinally.

Table 8.9: Landing bonus

Figure 8.4: Graphic example of bonus application.

8.6.6 Payload Prediction Bonus

The bonus formula is:

$$BPCU = 30\left\{1 - \left|\left(\frac{CU_{PRED} - CU_{MAX}}{CU_{PRED}}\right)^{0.35}\right|\right\} \tag{8.9}$$

Where:

Symbol	Description
$BPCU$	Solid Payload Prediction Bonus
CU_{PRED}	Solid Payload Prediction (kg)
CU_{MAX}	Maximum Solid Payload in the last valid flight round

Table 8.10: Payload prediction bonus variables

If the value is negative, the bonus will be 0.

8.6.7 Video Bonus

To qualify for the Video Bonus, or BV_V, the team must comply with the following requirements:

1. Record an uninterrupted video, with no scene cuts, showing the competition prototype completing a 360° circuit within the runway limits and complying with all mission rules and takeoff limits.

   Payload: 4 kilograms, including the payload bay and solid payload.

2. The video must show the following:

   a. Startup, takeoff, circuit, landing, verification of the aircraft's integrity, verification that the Watt Meter is installed and operating, payload removal, and payload weighing.

3. The video must be published on YouTube, be publicly accessible, and have no privacy restrictions. The video URL must be submitted via email to `comisiontecnica@aerodesign.mx`, using the subject line `Video_Cargo_TeamName_ADMX27`, no later than February 22, 2027, at 23:59 Mexico City time.

   Upon compliance with these requirements, the team will be awarded 20 points.

8.6.8 Watt Meter Log Bonus

To qualify for the Watt Meter Log Bonus, or BLW, the team must comply with the following requirements:

1. During the flight shown in the video, the team must use the official ADMX Watt Meter (V1 or V2), with a microSD card properly installed and configured to store the recorded sensor data.

2. The team must submit the data log generated during the flight in its original `.txt` format. The log must correspond to the same flight submitted for the Video Bonus described in Subsection 8.6.7 and must contain valid data throughout the mission.

3. The submission must include the following:

   a. Flight data log in `.txt` format.

   b. Voltage (V) versus Timestamp (ms) graph.

   c. Current (A) versus Timestamp (ms) graph.

   d. Power (W) versus Timestamp (ms) graph.

4. To process the data and generate the required graphs, teams may use the Python or MATLAB scripts available in the official ADMX Watt Meter repository:

   https://github.com/axelavv/wattmeteraeromx

   Teams may also use software or scripts developed by the team, provided that the required graphs are legible, use the specified units, and correspond to the data contained in the original log file.

5. The `.txt` file and the three graphs must be included in a single compressed `.zip` file. The file must be named using the following format:

   `Logs_Wattmeter_TeamName_ADMX27.zip`

6. The `.zip` file must be submitted via email to `comisiontecnica@aerodesign.mx`, using the subject line `Logs_Wattmeter_TeamName_ADMX27`, no later than February 22, 2027, at 23:59 Mexico City time.

Incomplete, illegible, or corrupted files, as well as files that do not correspond to the flight shown in the submitted video, will not be considered for the bonus.

Upon compliance with these requirements, the team will be awarded 20 points.

8.6.9 Marketing Video Bonus

Objective

Teams may obtain up to 15 points if they publish a video on TikTok or Instagram (≤ 60 seconds) that creatively promotes their aircraft, highlighting:

- Technical innovation (e.g.: quick assembly system).
- Competitive advantages (e.g.: lightweight, structural efficiency).
- Team spirit and design process.

Requirements

- Duration: ≤ 60 seconds.
- Content:
  - Flight demonstration, whether simulated or using previous footage.
  - Mention of at least 2 technical specifications (e.g.: wingspan, maximum payload).
  - Mandatory hashtag: `#ADMX2027`
- Deadline: February 28, 2027, 23:59 hours Mexico City time.
- Format: public link (TikTok/Instagram Reels) sent to `comisiontecnica@aerodesign.mx`.

Content Criteria

Concept	Points
Creativity / Originality	5
Technical Clarity	4
Audiovisual Element	3
Engagement *	3

Table 8.11: Concepts to be evaluated in the marketing video

* Minimum 600 likes and 60 interactions to validate *engagement*.

Restrictions

Effects that distort the real capabilities of the aircraft are not permitted (e.g.: filters that simulate stable flight).

At least 1 team member must appear in the video.

9. Drop Challenge

The objective of the Drop Challenge is to evaluate the capability of a fixed-wing aircraft to transport a secondary payload of a specified volume and perform the aerial delivery of a fragile payload into a designated target area with precision.

9.1 Aircraft Sizing

The aircraft, in its *Ready-to-Fly* configuration, shall comply with the following dimensional restriction:

$$L + B + H \leq 3.50 \text{ m} \tag{9.1}$$

Where:

Table 9.1: Sizing variables

Variable	Description
L	Total aircraft length, measured from the spinner to the rearmost measurable point in the longitudinal direction.
B	Total wingspan, measured from wingtip to wingtip.
H	Total aircraft height, measured from the ground to the highest point of the aircraft, excluding the propeller.

The measurement shall be performed with the aircraft in *Ready-to-Fly* configuration, including landing gear, control surfaces, release system, permanent supports, batteries, electronics, installed capsule, and any other fixed element required for the mission.

If the dimensional restriction is not met, the following criteria shall apply:

1. If $L + B + H$ exceeds the limit by more than 1.0 cm, the aircraft will not be allowed to participate in flight activities.
2. If $L + B + H$ exceeds the limit by more than 0.1 cm and up to 1.0 cm, a 30-point penalty will be applied.

9.2 Constraints

9.2.1 Rubber Bands

The use of rubber bands or elastic material as the sole method to retain the wing, payload, capsule, or any mission-critical component is prohibited.

9.2.2 Navigation Systems

Autopilots, autonomous navigation systems, or any system that automatically controls the aircraft flight path or independently determines the payload release point are prohibited.

The aircraft shall be manually controlled by radio control throughout the entire mission.

9.2.3 Wing Section Attachment

Wing sections shall be joined using mechanical fasteners. Tape may not be used as the sole method of joining wing sections.

9.3 Requirements

The aircraft shall be fixed-wing and powered by one (1) electric motor and one (1) non-metallic propeller. There are no restrictions on brand or model. External propulsion systems or takeoff assistance other than the aircraft installed motor are prohibited.

9.3.1 Battery

The primary propulsion battery shall be a commercial Lithium-Polymer (LiPo) battery and shall not exceed:

$$4S - \quad 2{,}200 \text{ mAh}$$

Homemade, damaged, or swollen batteries are not permitted.

Teams may use independent batteries (NiCd, LiPo, LiFe, LiFePo y Li-Ion) for auxiliary aircraft systems or capsule systems, provided that they are declared during Technical Inspection, properly secured, and do not exceed four (4) cells.

9.3.2 Power Limit

The propulsion system is limited to a maximum electrical power of 500 Watts.

1. The aircraft shall have the official ADMX Watt Meter installed in its electrical circuit. See Appendix F
    a. The Watt Meter shall remain visible during aircraft operation.
    b. Alterations or modifications to the Watt Meter are prohibited.
    c. If there is evidence that the integrity of the Watt Meter has been compromised, the Technical Committee may require the aircraft to remain grounded until the issue is resolved.
    d. The electrical circuit shall install the Watt Meter according to the corresponding wiring diagram.

2. Any power exceeding 500 W will be penalized according to Appendix J.
3. Any recorded value equal to or greater than 600 W will result in zero flight-round score.

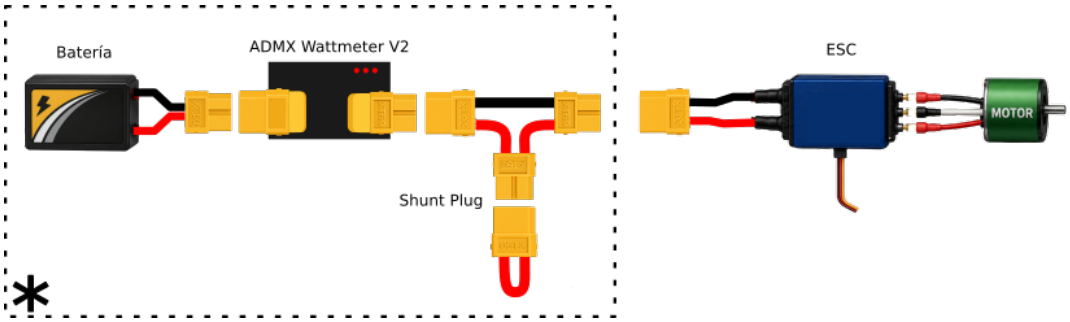

Figure 9.1: Power circuit diagram. Components enclosed within the highlighted box must remain unmodified.

9.4 Payload

The mission payload shall consist of a releasable fragile payload, a protective capsule or system for the fragile payload, and a non-releasable expanded polystyrene secondary payload.

9.4.1 Fragile Payload

The fragile payload shall consist of a raw chicken egg provided by the judges before the flight round.

The egg shall comply with the following conditions:

1. It shall not be cooked, frozen, pierced, varnished, sealed, reinforced, or otherwise modified.
2. It shall remain inside the capsule or protection system declared by the team.
3. It shall be available for inspection after the mission.

9.4.2 Protective Capsule or System

The team shall design a capsule or protection system for the egg. The capsule shall protect the fragile payload during impact and allow the delivery to be as accurate as possible.

The capsule shall be releasable, safe, inspectable, and identifiable with the team number.

The capsule mass, M_{cap}, shall not include the mass of the egg. It shall include all elements that detach from the aircraft together with the egg during release.

The total capsule mass shall not exceed:

$$M_{\text{cap}} \leq 300 \text{ g} \tag{9.2}$$

The following are prohibited:

1. pyrotechnics;
2. high-energy springs;
3. compressed air;
4. CO_2;
5. self-propulsion;
6. sharp metallic components;
7. composite materials;
8. glass, ceramics, or any material capable of dangerous fragmentation.

The capsule shall not contain active movement mechanisms after impact. If a system designed to move forward, roll in a controlled manner, or actively reposition itself after touching the ground is identified, the flight round shall be invalidated.

9.4.3 Expanded Polystyrene Secondary Payload

The secondary payload shall consist of a rectangular block of expanded polystyrene (EPS) provided by the Technical Committee during the competition to ensure identical conditions for all teams.

The density of the secondary payload shall be fixed at:

$$\rho_{\text{sec}} = 10 \text{ kg/m}^3$$

Each team shall design its aircraft to accommodate one of the following payload geometries:

Table 9.2: Secondary payload geometries, units in cm

Option	Length	Width	Height
Option 1	40	40	25
Option 2	80	20	25
Option 3	80	40	12.5

The secondary payload shall remain secured inside the aircraft throughout the mission. It shall be removable for inspection, shall not serve as a structural component of the aircraft, shall not be directly exposed to the external airflow, and shall not include the egg, the egg capsule, or the fixed release mechanism.

9.5 Mission

9.5.1 Generalities

During the mission, the aircraft shall complete the flight circuit, release the capsule containing the egg within the authorized zone, and land in a safe and inspectable condition while keeping the secondary payload secured onboard.

9.5.2 Flight Attempts

Each team shall be allowed one (1) flight per round. Multiple takeoff attempts may be performed, provided that the aircraft has not yet become airborne and remains within the established time limit.

9.5.3 Time Limit T_m

Each team shall have five (5) minutes to complete the mission, counted from the moment the aircraft's main landing gear is positioned on the starting line.

The aircraft shall take off within the first three (3) minutes. If it fails to do so, the round shall be invalidated and no further takeoff attempts shall be permitted.

Once takeoff has been completed, the team may use the remaining time to complete the flight circuit and release the fragile payload.

The stopwatch shall stop when the fragile payload touches the ground. If this does not occur within the five-minute limit, the round shall be invalidated.

9.5.4 Co-pilot

The co-pilot shall be a registered team member responsible for indicating to the pilot the release moment of the fragile payload through a clear and audible call. The release shall be activated by the pilot.

9.5.5 Flight Circuit and Payload Release

Before entering the release zone for the first time, the aircraft shall complete the required 180° turn of the competition flight circuit.

There is no limit on the number of release approaches. The aircraft may make as many delivery approaches as the remaining mission time allows, provided that it remains within the prescribed flight circuit and stays inside the authorized flight areas.

All approaches to the release zone shall be flown along a trajectory parallel to the runway centerline, also referred to as the longitudinal axis.

The payload release mechanism shall be declared and inspected before the flight round.

Unsafe flight patterns, entering designated no-fly zones, releasing the payload outside the authorized release area, and performing aerobatic maneuvers are strictly prohibited. For additional information, see Appendix H.

9.5.6 FPV (First-Person View) Use

FPV cameras may be used only as an aid for visually identifying the delivery zone, alignment reference, and estimating the appropriate release point.

The pilot in command shall not use FPV goggles, monitors, screens, mobile devices, or any other first-person viewing device to control the aircraft. The pilot shall maintain direct visual line of sight, with the aircraft throughout the entire mission.

If an FPV system is used, it shall be monitored exclusively by the team's registered co-pilot. The use of FPV does not provide any additional bonus points and does not exempt the team from maintaining safe flight operations.

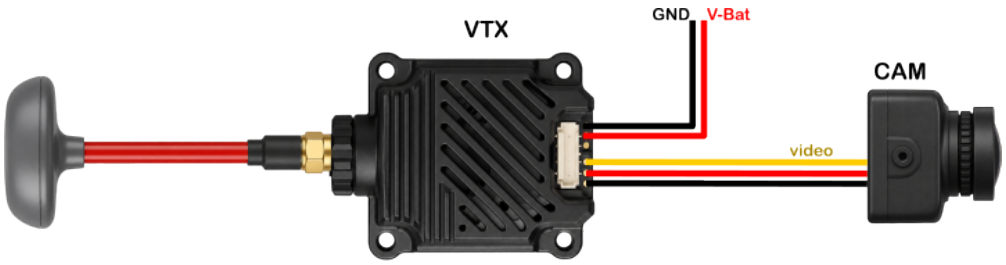

Figure 9.2: FPV system connection diagram suggested by the Technical Committee.

9.5.7 Delivery Zone

The delivery zone shall consist of three concentric circles used as visual reference, all centered on the same point.

Table 9.3: Reference dimensions of the delivery zone

Reference	Diameter
Outer	8 m
Middle	4 m
Inner	2 m

9.5.8 Minimum Altitude and Target Boundaries

To establish a minimum flight altitude during the mission, the target area shall be enclosed by four aluminum poles, each 2 meters tall, positioned at the corners of a 15 m $\times$ 15 m square centered on the target.

The poles shall be connected by yellow boundary tape installed at a height of 2 meters above the ground. During the authorized release pass, the aircraft shall fly above this tape.

The fragile payload may only be released within the area authorized by the judges and under conditions that do not endanger people, aircraft, vehicles, facilities, or non-authorized areas.

9.6 Flight Round Score

The score for each flight round shall be calculated as:

$$P_{\text{round}} = F_s \cdot F_p \cdot M_c + B_{PV} + B_T - \sum D_r \tag{9.3}$$

Where:

Table 9.4: Flight round score variables

Variable	Description
P_{round}	Score obtained for the flight round.
F_{sup}	Egg survival factor.
F_p	Delivery accuracy factor.
M_c	Capsule mass multiplier.
B_{PV}	Empty weight prediction bonus.
B_T	Time bonus.
$\sum D_r$	Sum of all penalties applied during the round.

9.6.1 Capsule Mass Multiplier

The capsule mass without the egg shall be considered in the scoring through the multiplier M_c:

$$M_c = \sqrt{\frac{300}{M_{\text{cap}}}} \tag{9.4}$$

9.6.2 Accuracy Measurement

The delivery distance shall be measured from the center of the delivery zone to the final position of the egg or the capsule containing it, after it has come to a complete stop.

The measured distance, in meters, shall be represented as:

r = distance between the egg or capsule and the center of the delivery zone

If the capsule opens during impact and the egg becomes separated from it, the distance shall be measured from the final position of the egg. If the egg remains inside the capsule, the distance shall be measured from the final position of the capsule.

The accuracy factor, F_p, shall be calculated as:

$$F_p = \begin{cases} 10 - r, & 0 \leq r \leq 4 \text{ m} \\ 0, & r > 4 \text{ m} \end{cases} \tag{9.5}$$

9.6.3 Egg Inspection and Survival Factor

After the flight, the capsule shall be recovered and brought to the judge for inspection. The judge shall verify the condition of the egg and determine whether it remains completely intact.

The egg condition shall be evaluated according to the following table:

Table 9.5: Egg survival factor

Observed condition	**Factor** F_{sup}
Egg completely intact, with no cracks, fractures, splits, or visible leakage	10
Egg broken, cracked, fractured, split, or leaking	3

9.7 Bonuses

9.7.1 Empty Weight Prediction Bonus, per Round

Teams receive a bonus for accurately predicting the aircraft empty weight. The bonus shall be calculated as:

$$B_{PV} = 30 \cdot \max\left(0,\ 1 - \frac{|PV_{\text{reported}} - PV_{\text{measured}}|}{0.1 \cdot PV_{\text{measured}}}\right) \tag{9.6}$$

Where:

Table 9.6: Empty weight prediction bonus variables

Variable	**Description**
B_{PV}	Empty weight prediction bonus.
PV_{reported}	Empty weight reported by the team in the design documentation.
PV_{measured}	Empty weight measured by the Technical Committee before the flight round.

The measured empty weight corresponds to the aircraft in its *Ready-to-Fly* configuration without the secondary payload, the egg, or the releasable capsule. Fixed elements required for the mission, such as the release mechanism, permanent mounting hardware, propulsion system, and declared auxiliary batteries, are included in the empty weight.

9.7.2 Time Bonus, per Round

Teams may earn additional points by completing the mission before the five-minute time limit.

The bonus is calculated using the time at which the fragile payload first touches the ground:

$$B_T = \frac{300 - T_m}{6} \tag{9.7}$$

Where:

Table 9.7: Time bonus variables

Variable	Description
B_T	Time bonus.
T_m	Mission time, in seconds, measured from the start of the mission until the fragile payload first touches the ground.

This bonus is applicable only to valid flight rounds. If the fragile payload has not touched the ground before the five-minute time limit expires, there is no flight round score.

9.7.3 Video Bonus

To earn the Video Bonus, BV, the team shall satisfy all of the following requirements:

1. Record a continuous flight video, without interruptions or scene cuts, using the actual competition aircraft. The video shall show a complete 360° flight circuit within runway limits and comply with all mission rules and takeoff limits. The video shall also demonstrate that the capsule release mechanism functions correctly.

2. The video shall clearly show aircraft startup, takeoff, flight circuit, landing, aircraft integrity after landing, installed and operating Watt Meter, capsule release, and capsule recovery.

3. The video shall be uploaded to YouTube and remain public, with no privacy restrictions. The video link shall be emailed before February 22, 2027, 23:59 hours Mexico City time to `comisiontecnica@aerodesign.mx` with the subject `Video_DropChallenge_Equipo_ADMX27`.

Successful submissions receive 20 bonus points.

9.7.4 Watt Meter Log Bonus

To earn the Watt Meter Log Bonus, BLW, teams shall complete the following requirements:

1. During the flight used for the Video Bonus, teams shall use the official ADMX Watt Meter, V1 or V2, with a properly installed and configured microSD card for data logging.
2. Submit the original `.txt` data log generated during the video flight. The log shall correspond to the Video Bonus flight described in Subsection 9.7.3 and contain valid data throughout the mission.
3. The submission shall include:
   a. original flight data log in `.txt` format;
   b. Voltage (V) vs. Timestamp (ms) graph;
   c. Current (A) vs. Timestamp (ms) graph;
   d. Power (W) vs. Timestamp (ms) graph.
4. Teams may process and generate the graphs using the official Python or MATLAB scripts available in the official Watt Meter ADMX repository:

   `github.com/axelavv/wattmeteraeromx`

   Teams may also use their own software or scripts, provided that the graphs are readable, correct units are used, and the graphs accurately represent the original log file.
5. The `.txt` file and the graphs shall be compressed into a single `.zip` archive named:

   `Logs_Wattmeter_Equipo_ADMX27.zip`

6. The `.zip` archive shall be emailed to `comisiontecnica@aerodesign.mx` with the subject `Logs_Wattmeter_Equipo_ADMX27` before February 22, 2027, 23:59 hours Mexico City time.

Incomplete, unreadable, corrupted, or mismatched files will not qualify for the bonus. Successful submissions receive 20 bonus points.

9.7.5 Marketing Video Bonus

Teams may earn up to 15 points by publishing a short promotional video on TikTok or Instagram, with a duration of 60 seconds or less. The video should creatively promote the aircraft by highlighting technical innovation, competitive advantages, team spirit, and the design process.

Requirements

Duration: 60 seconds or less.

Content: Flight demonstration, whether live, simulated, or using previously recorded footage; mention of at least two technical specifications, such as wingspan or maximum payload capacity; and at least one (1) team member appearing in the video.

Required hashtag: `#ADMX2027`.

Deadline: February 28, 2027, 23:59 hours Mexico City time.

Format: Public TikTok or Instagram Reels link sent to `comisiontecnica@aerodesign.mx`.

Effects that distort the aircraft actual capabilities, such as filters that simulate stable flight, are not permitted.

Content Criteria

Table 9.8: Marketing video criteria

Criteria	Points
Creativity / originality	5
Technical clarity	4
Audiovisual quality	3
Engagement	3

A minimum of 600 likes and 60 engagements is required to validate the engagement criterion.

9.8 Total Score

The Total Score used to determine the overall competition ranking shall be calculated as:

$$PT = RD + PO + \sum P_{\text{round}} + BV + BLW + BV_{\text{MKT}} - \sum D \tag{9.8}$$

Where:

Table 9.9: Total score variables

Variable	Description
PT	Total Score.
RD	Design Report Score.
PO	Technical Presentation Score.
P_{round}	Flight Round Score.
BV	Video Bonus.
BLW	Watt Meter Log Bonus.
BV_{MKT}	Marketing Video Bonus.
$\sum D$	Sum of all penalties applied to the team.

Appendix A.

Statement of Compliance

Team	_____
Educational Inst.	_____
Faculty Advisor	_____
Faculty Advisor - Email	_____
Address	_____

As faculty advisor:

_____ (Initials) I certify that the registered members are currently pursuing their studies.

_____ (Initials) I certify that the team has designed and built a radio-controlled aircraft exclusively with the intent of complying with the requirements of the ADMX rulebook, without the assistance of experts, ringers, or model aircraft builders.

_____ (Initials) I certify that the address provided in this appendix corresponds to a private residential address, which will be used for the shipment of the Watt Meter provided by the competition.

_____ (Initials) I certify that the Design Report submitted by the team contains original content written by the active members of this team.

_____ (Initials) I certify that any reused content is properly referenced and complies with the reuse policies.

_____ _____

Faculty Advisor Signature Date

_____ _____

Captain Signature Date

Appendix B.

Appeal Form

Team # _____
Team Name _____
Team Captain _____

Point Collateral

This appeal will require the team to place twenty (20) points as collateral. If the appeal is upheld and the action is reversed, the team will retain its collateral points. If the appeal is rejected, the team will lose the collateral points.

Collateral Points: 20

_____
Acknowledgment Signature

Reason for Appeal

Justify your appeal in detail, using competition terminology.

Rule Number

List the ADMX rulebook section(s) that are in conflict with the action(s) taken by the competition judge.

Desired Decision

Briefly summarize the expected resolution.

Folio # _____
Field completed by the Technical Committee

Appendix C.

Engineering Change Request

Team # _____
Team Name _____
Team Captain _____

Affected System

- ☐ Structural
- ☐ Aerodynamics
- ☐ Stability
- ☐ Electronics
- ☐ Propulsion
- ☐ Performance

Where was the change required?

- ☐ Design Analysis
- ☐ Flight Testing
- ☐ Technical Inspection
- ☐ Flight Rounds
- ☐ Other: _____

Description

Describe in detail the change made.

Reason for Change

Describe the reason for the change made.

ADMX Fields

ECR Folio #	**-**	**-**
Penalty		

Appendix D.

Excess Power Penalty (850 W)

The following provisions shall apply, as applicable:

a) For each watt (1 W) above the established limit, a penalty of $0.\overline{6}\%$ shall be applied to the flight round score.

$$PENPOT = \left[0.\overline{6}\,(POTEXC - 850)\right]\,\% \tag{D.1}$$

Where:

Symbol	Description
$PENPOT$	Excess power penalty
$POTEXC$	Recorded excess power. Values greater than 850 and less than 1000

b) Any power value recorded by the Watt Meter that is equal to or greater than 1000 watts shall result in zero points for the flight round score.

Figure D.1: Excess power penalty graph

Appendix E.

Payload Bay Volume

The payload bay is defined as a rectangular prism capable of containing the predicted payload.

The required payload bay volume is determined by the design density and the predicted payload mass.

$$V_{\min} = \frac{PP}{\rho} \tag{E.1}$$

Where:

Symbol	Description
$V_{\min}$	Minimum required volume (m^3)
PP	Predicted Payload (kg)
ρ	Required design density: 7,600 $\frac{kg}{m^3}$, as defined in Section 8.4.2

Example

An aircraft has a Predicted Payload of 12 kilograms, and the required design density is 7,600 $\frac{kg}{m^3}$:

$$V_{\min} = \frac{12\,kg}{7{,}600\,\frac{kg}{m^3}} \tag{E.2}$$

$$V_{\min} = 0.00157\,m^3 \tag{E.3}$$

Dimensional Options (Meters)

1. Length: 0.2 Width: 0.1 Height: 0.1 $V : 0.002\,m^3$
2. Length: 0.4 Width: 0.04 Height: 0.1 $V : 0.0016\,m^3$

Note: Any dimensional configuration with a volume equal to or greater than the calculated minimum volume will comply with the Technical Rules.

Appendix F.

Use of the ADMX Watt Meter V1

Generalities

To ensure fairness and transparency in power measurement across all categories, the ADMX Technical Committee will provide each registered team with one (1) official Watt Meter as part of its registration. This device will be the only one authorized to validate compliance with the power limits established in Sections 8.3.2 (Cargo) and 9.3.2 (Drop).

Watt Meter Specifications

Model: ADMX Watt Meter V1
Capacity: 75A
Features:

I. Peak power recording (Hold Function).

II. Digital interface with LCD display.

III. Tamper-evident sealing system (official holographic label).

Connection: It must be installed in series between the battery and the ESC, according to the diagram in Section 8.3.2 (Cargo) and 9.3.2 (Drop).

Delivery and Verification Procedure

Delivery

Each team will receive its official Watt Meter after successfully completing the registration process.

Verification

The device will be inspected during technical inspection by the Technical Committee to prevent any modifications to it. Any attempt to alter the seal will result in immediate disqualification.

Acquisition of Additional Units

Teams may request additional Watt Meters by email for an amount of $800 MXN.

Equipment Failures

If the ADMX Watt Meter fails during the team's testing, please notify the Technical Committee by email at `comisiontecnica@aerodesign.mx`; technical support will be provided there to address the failure.

Appendix G.

Numerical Example of P_C

In the following scenarios, the aircraft is weighed before each flight round. Therefore, the structural efficiency of each payload-carrying flight is calculated using the empty weight recorded specifically for that round:

$$EE_n = \frac{CU_n}{W_{\text{EMPTY},n}}$$

The empty weight may change during the competition due to repairs, component replacements, adjustments, or authorized modifications. The value used to calculate EE_n shall always be the empty weight recorded before the corresponding round. For the empty flight, the P_{VV} score is calculated exclusively using the empty weight recorded during the first successful empty flight.

Scenario 1: Progressive Increase in Structural Efficiency

The team completes a successful empty flight with an empty weight of 3.50 kg and subsequently completes six payload-carrying flights. The aircraft experiences minor weight variations between rounds.

$$P_{VV} = \frac{200}{3.50} \approx 57.14$$

n	$W_{\text{EMPTY},n}$ [kg]	CU_n [kg]	EE_n	Calculation of P_{C_n}	P_{C_n}
1	3.50	3.50	1.00	$100(1.00) - 80(0.00)$	100
2	3.40	5.10	1.50	$100(1.50) - 80(1.00)$	70
3	3.40	6.80	2.00	$100(2.00) - 80(1.50)$	80
4	3.30	8.25	2.50	$100(2.50) - 80(2.00)$	90
5	3.30	9.90	3.00	$100(3.00) - 80(2.50)$	100
6	3.20	9.60	3.00	$100(3.00) - 80(3.00)$	60
				Total payload-flight score:	**500**

Table G.1: Scenario 1: Round-by-round calculation using the empty weight recorded for each flight.

Although the payload and empty weight change between rounds, each EE_n value is calculated using the empty weight recorded for that same round.

Scenario 2: Moderate Increase in Structural Efficiency

The team completes a successful empty flight with an empty weight of 8.00 kg and completes four payload-carrying flights. In this case, the aircraft's empty weight increases and decreases slightly during the competition.

$$P_{VV} = \frac{200}{8.00} = 25.00$$

n	$W_{\text{EMPTY},n}$ [kg]	CU_n [kg]	EE_n	Calculation of P_{C_n}	P_{C_n}
1	8.00	4.00	0.50	$100(0.50) - 80(0.00)$	50
2	7.90	6.32	0.80	$100(0.80) - 80(0.50)$	40
3	8.10	8.10	1.00	$100(1.00) - 80(0.80)$	36
4	8.00	9.60	1.20	$100(1.20) - 80(1.00)$	40
				Total payload-flight score:	**166**

Table G.2: Scenario 2: Empty weight variations between rounds with moderate growth in EE_n.

The empty weight used to calculate each structural efficiency value is not a fixed value for the entire competition. It is the value measured before the corresponding round.

Scenario 3: Decrease in Structural Efficiency

The team completes a successful empty flight with an empty weight of 5.00 kg and completes four payload-carrying flights. During these rounds, the aircraft's empty weight gradually increases, while the ratio between payload and empty weight decreases.

$$P_{VV} = \frac{200}{5.00} = 40.00$$

n	$W_{\text{EMPTY},n}$ [kg]	CU_n [kg]	EE_n	Calculation of P_{C_n}	P_{C_n}
1	5.00	10.00	2.00	$100(2.00) - 80(0.00)$	200
2	5.10	9.18	1.80	$100(1.80) - 80(2.00)$	20
3	5.20	7.80	1.50	$100(1.50) - 80(1.80)$	6
4	5.30	6.36	1.20	$100(1.20) - 80(1.50)$	0
				Total payload-flight score:	**226**

Table G.3: Scenario 3: Decrease in EE_n and the effect of the term associated with the previous round.

This scenario shows that a decrease in structural efficiency relative to the previous round can significantly reduce the round score, even when the flight is successful.

General Observation

In all scenarios, weighing the aircraft before each flight allows the calculation to reflect the aircraft's actual configuration during that round. Therefore, any weight change occurring during the competition is directly incorporated into the value of EE_n. Teams must consider that both the payload carried and the empty weight recorded during each round affect their score.

Appendix H.

Reference Cases for Drop Capsule Release

This appendix presents three representative release scenarios during the mission. The flight paths are illustrative and are intended to support the understanding of the competition flight pattern, the approaches to the release zone, and the required orientation for landing.

Case 1: Release During the First Approach

The aircraft takes off, enters the competition flight pattern, performs an authorized approach to the release zone, releases the drop capsule, and proceeds to land.

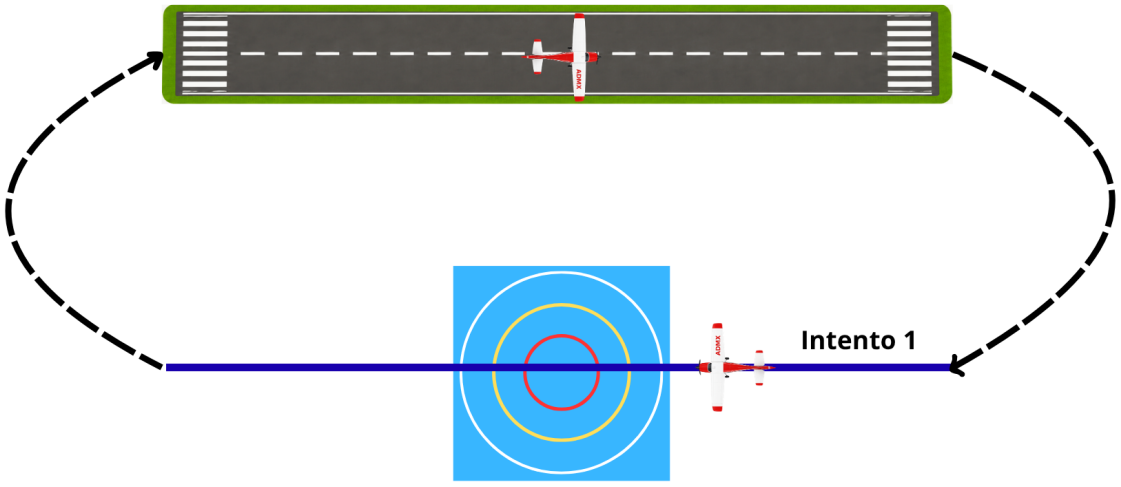

Figure H.1: Drop capsule release during the first approach, followed by landing.

Case 2: Release During the Second Approach

The aircraft performs a first authorized approach without releasing the drop capsule. It subsequently performs a second approach during which the drop capsule is successfully released.

After the release, the aircraft must follow the necessary flight path to orient itself in the required direction and proceed to land in accordance with the mission rules.

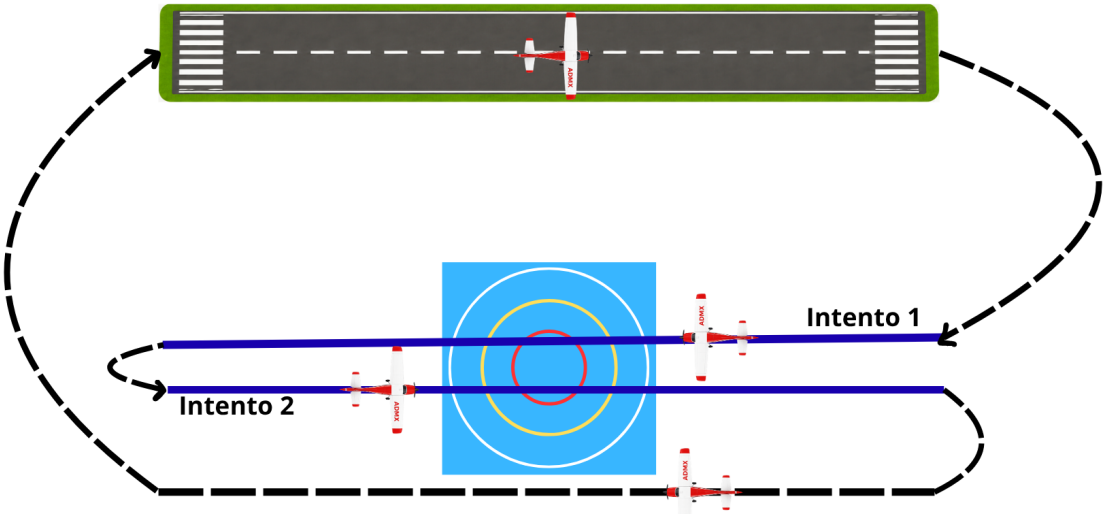

Figure H.2: Drop capsule release during the second approach and subsequent reorientation for landing.

Case 3: Release During a Subsequent Approach

The aircraft performs two authorized approaches without releasing the drop capsule. During a third approach, the drop capsule is successfully released, and the aircraft proceeds to land.

The aircraft may perform additional approaches provided that sufficient time remains and all flight rules are followed.

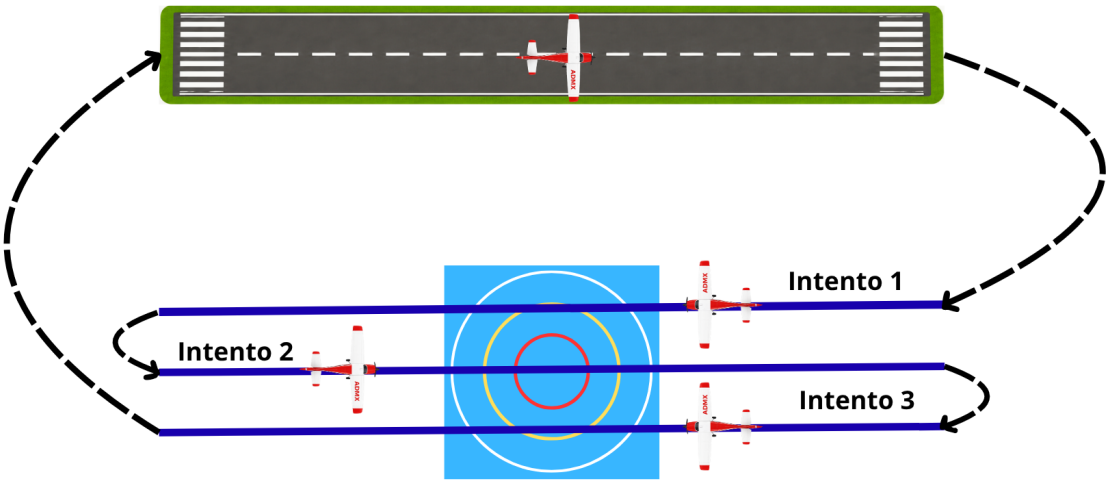

Figure H.3: Example of a drop capsule release during a subsequent approach.

Appendix I.

Numerical Example of P_{ronda}

The round score is calculated as follows:

$$P_{\text{ronda}} = F_{sup} \cdot F_p \cdot M_c$$

The accuracy factor is calculated as follows:

$$F_p = \begin{cases} 10 - r, & 0 \leq r \leq 4 \text{ m} \\ 0, & r > 4 \text{ m} \end{cases}$$

The capsule mass multiplier is calculated as follows:

$$M_c = \sqrt{\frac{300 \text{ g}}{M_{\text{cap}}}}$$

In this manner, the capsule mass continues to affect the score, but its effect is reduced to prevent the score from depending excessively on this factor.

Scenario 1

Egg condition	Broken
F_{sup}	3
r	2.0 m
M_{cap}	300 g

$$F_p = 10 - 2.0 = 8.0$$

$$M_c = \sqrt{\frac{300}{300}} = 1.0$$

$$P_{\text{ronda}} = 3 \cdot 8.0 \cdot 1.0 = 24$$

Variable	Value
F_{sup}	3
F_p	8.0
M_c	1.0
P_{ronda}	24

Scenario 2

Egg condition	Intact
F_{sup}	10
r	3.0 m
M_{cap}	300 g

$$F_p = 10 - 3.0 = 7.0$$

$$M_c = \sqrt{\frac{300}{300}} = 1.0$$

$$P_{\text{ronda}} = 10 \cdot 7.0 \cdot 1.0 = 70$$

Variable	Value
F_{sup}	10
F_p	7.0
M_c	1.0
P_{ronda}	70

Scenario 3

Egg condition	Intact
F_{sup}	10
r	1.0 m
M_{cap}	250 g

$$F_p = 10 - 1.0 = 9.0$$

$$M_c = \sqrt{\frac{300}{250}} = \sqrt{1.2} \approx 1.095$$

$$P_{\text{ronda}} = 10 \cdot 9.0 \cdot 1.095 \approx 98.59$$

Variable	Value
F_{sup}	10
F_p	9.0
M_c	1.095
P_{ronda}	98.59

Scenario 4

Egg condition	Intact
F_{sup}	10
r	1.0 m
M_{cap}	100 g

$$F_p = 10 - 1.0 = 9.0$$

$$M_c = \sqrt{\frac{300}{100}} = \sqrt{3} \approx 1.732$$

$$P_{\text{ronda}} = 10 \cdot 9.0 \cdot 1.732 \approx 155.88$$

Variable	Value
F_{sup}	10
F_p	9.0
M_c	1.732
P_{ronda}	155.88

Appendix J.

Excess Power Penalty: Drop Challenge

The following provisions shall apply, as applicable:

a) For each watt (1 W) above the established limit, a penalty of $0.\overline{6}\%$ shall be applied to the flight round score.

$$PENPOT = [0.6 \times (POTEXC - 500)]\,\% \tag{J.1}$$

Where:

Symbol	Description
$PENPOT$	Excess power penalty.
$POTEXC$	Recorded excess power. Values greater than 500 and less than 600.

b) Any power value recorded by the Watt Meter that is equal to or greater than 600 watts shall result in zero points for the flight round score.

Figure J.1: Excess power penalty graph