Air Cargo Challenge 2026

Participation Handbook

v1.1

25.8.2025

CHANGE-LOG

Revision	Section	Type	Content
2025-08-24	Example	Changed	This is the unchanged text. This was added later. ~~This was removed.~~
2025-08-24	Section 2	Removed	~~**Info** This rulebook should be regarded as preliminary and may be subject to changes until August 31.~~
2025-08-24	Section 4.3	Added	**A/C 9** The pilot must control the aircraft via Line of Sight. FPV is not allowed for the pilot.
2025-08-24	Section 4.3	Added	**Con 2** The measurement box provides only one XT-60 female plug for the ESCs. In case of two ESCs, you shall use a Y-cable.
2025-08-24	Section 4.3	Added	**Info** Exceeding the given current limit of 30A (as measured between battery and ESCs, so both motors summed up) results in penalty points
2025-08-24	Section 4.7.1	Changed	$S_{\text{round, team, raw}} = B_{\text{take-off}} \cdot m_{\text{payload}} \cdot l^2_{\text{distance}} \left(1 - P_{\text{round, current}}\right)$ $S_{\text{~~round, team, raw~~}} = B_{\text{~~take-off~~}} \cdot m_{\text{~~payload~~}} \cdot l^2_{\text{~~distance~~}} - \sum_j P_{\text{~~round, j~~}}$
2025-08-24	Section 4.7.6	Changed	$P_{\text{round, current}} = \min((1), (0.002 \cdot \int \max(0, I - 30\text{A}) \ \text{dt}))$ $P_{\text{~~round, current~~}} = 2 \cdot \int \text{~~max~~}(0, I - 30\text{A}) \ \text{~~dt~~}))$

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Introduction

1.1 Air Cargo Challenge

The competition Air Cargo Challenge was originally initiated in 2003, inspired by the North American Design/Build/Fly (DBF) university aircraft competition. Since then, the competition was held every two years and, from 2007, the challenge gained a European projection. In 2026, the competition is organized by the Akamodell Stuttgart, which won the competition in 2024. It is a competition for university students and postgraduates in the engineering or science area and was created to stimulate interest in the fields of aeronautics. In this competition, each team gets the chance to test and improve their skills by competing with other teams in a design-, build- and fly competition.

1.2 About Akamodell Stuttgart e.V.

The Akamodell Stuttgart is the student aeromodeling club of the University of Stuttgart, founded in 1978. The Akamodell offers its members the opportunity to realize their own projects in the field of model aircraft construction, supported by access to a workshop and a collaborative environment. In addition, members of the Akamodell participate regularly together in multiple student competition, such as the Air Cargo Challenge and the British Model Flying Association Payload Challenge.

1.3 TheNerdLänd

The Air Cargo Challenge 2026 is officially funded by the Ministry of Science, Research and Arts Baden-Württemberg as part of the state's aerospace strategy under the initiative of "TheNerdLänd". Its aim is to promote the aerospace engineering degree programme and Baden-Württemberg as a center of science.

Notification, News and Contact

2.1 Links

All news regarding the competition will be posted on our website. We suggest visiting the website regularly. This is the binding source for news including changes in the regulations and organization.

https://aircargochallenge.de/

For press or sponsoring inquiries please contact via e-mail:

contact@aircargochallenge.de

Some updates will be announced additionally on our Instagram page:

https://www.instagram.com/akamodell_stuttgart/

If you have any questions concerning regulations or organization, please contact via e-mail:

contact@aircargochallenge.de.

2.2 Contact Scheme

Once registered, all teams must use the team number and team name as the first words in the subject line (e.g. “10 Team Rocket - Question about motor”). This contact is for all questions by the teams (organizational, financial, regulations, etc.). If necessary, the answers will be made public to every team.

2.3 WhatsApp Groups

There will be two WhatsApp groups:

1. **“ACC2026 all participants”**: for all participants (unmoderated) to increase the communication between the teams before the competition. You will get the invitation link after your registration. All team members may join. Don’t expect us to read all posts! We won’t answer any questions from here.
2. **“ACC2026 team leaders”**: for team leaders only! You may ask urgent questions regarding organization or regulations. Please keep messages in this group short and informative. Please note that official questions should be asked via e-mail.

2.4 Regulation Modifications

The competition regulations may be changed by the organizing committee to fix errors found in the current version of the regulations. The organizing committee may contact the team leaders by e-mail about more or less urgent subjects. All teams are considered to be notified from the moment the information is available on the official website of the competition.

Organization Handbook

3.1 Nomenclature

Shall	Must
This is a requirement that should be kept. Please consult with us EARLY if you cannot realize any of these rules to find a solution	This is a hard rule. Not keeping it will definitively lead to a penalty up to disqualification!

3.2 Participation

Each team may bring 2 to 7 people to the competition. Additional slots may be requested via the registration form, which are granted depending on capacity after the registration deadline. All team members shall be over 18 years old during the competition. One team member is the designated pilot. If you don't have a pilot, please contact us before applying. The pilot may be a "non-student". (e.g. pilot at your local RC club, ...). Except for the pilot, all other team members shall be students, professors, or research associates of the higher education institution that they are representing. In case the organizing committee finds some of the team members are not from the university or other irregular actions occurred, the team will be disqualified. A professor in charge is required when the team represents a university or other higher education school. He may also be a team member, but does not have to be present at the competition. A written declaration is required in which the professor states that the team is representing the university and confirms that all team members are students or employees of the university.

3.3 Application

The application period will begin on **01.09.2025 at 12:00 UTC**. It ends on **01.11.2025 at 23:59 UTC or once all available spots are taken**. The application form can be downloaded before and during this period at https://aircargochallenge.de/. We intend a maximum number of 30 teams. If the limit is exceeded, the application will be accepted on a first come first serve manner. Outside of the teams, everyone is free to visit the ACC as a visitor. Be aware that visitors cannot perform competition tasks and must stay within the designated visitors area. The application is valid after the organizer receives the following items:

- Application that is fully and correctly filled out
- Professor in charge statement and copies of documents proving that all team members are eligible (ex: Student card, etc.)
- General data protection form

All this information must be sent to contact@aircargochallenge.de with the declaration of the team name in the subject line of the e-mail (e.g. "Team Rocket – Application). Applications made before 01.09.2025 12:00 UTC or after 01.11.2025 23:59 UTC will not be accepted! The teams will be contacted via e-mail after processing to confirm successful registration. A provisional list of the teams will be published one week after the application stop. You will get a bill after the application with important information regarding the bank transfer.

Each University may apply more than one team, but the second team will only be considered if spots are still available at the end of the registration period.

3.4 Financial

The bank transfer must arrive before **01.12.2025 23:59 UTC** with **150€ per team member**. Note that the full bank transfer is a prerequisite for the participation in the competition. Please use your team number and the name of your university as reason of payment. Banking fees have to be covered by the participating team.

We will **not** provide accommodation during the competition. If you need help booking or choosing the accommodation for your team please contact us early.

We will provide a meal during the day and a shuttle to the airfield. More information will follow.

For each team member, including the pilot, the participation fee must be paid. In case of a cancellation, we will refund as much as possible. The teams are responsible for meeting all application fee deadlines.

3.5 Competition program

The competition will take place in Stuttgart on **30.06- 03.07.2026**. This is a preliminary schedule. We will update the schedule regularly and release the final version via our website. Preliminary timetable:

Tue 30.06.2026:	Technical presentation and technical inspection (at University of Stuttgart)
Wed 01.07.2026:	Technical inspection, test flights and competition day 1 (at airfield)
Thu 02.07.2026:	Competition day 2 (at airfield)
Fri 03.07.2026:	Competition day 3 (at airfield)

3.6 Insurance and pilot registration and certificate

The pilot must have insurance for model airplanes by German law. It must cover at least 1.000.000 €. Every pilot is responsible for his aircraft during flight.

All pilots must have a proof of competency certificate. The following three options are possible:

https://kenntnisnachweisonline.dmfv.aero/en/
https://www.schulungsnachweis-modellflug.de/Home?changelanguage=2
https://www.lba.de/DE/Drohnen/Fernpiloten/Kompetenznachweis_A1_A3.html

No other certificates are accepted.

By law you must have a label with the eID of the pilot displayed on the aircraft. You can find links to the registration at:

https://www.easa.europa.eu/en/domains/civil-drones/naa

We advise all participants to travel with health insurance valid in Europe.

3.7 Jury

The jury consists of university professors and members of Akamodell Stuttgart e.V.. They will be announced in the near future. They will score the technical reports submitted by the teams as well as the technical presentations.

3.8 Location and program

The competition will be held at the airfield of the MFV Böblingen.

4.1 General

We consider the ACC regulations as **“open”**, meaning that everything that is not forbidden is allowed. Of course, this is limited by safety concerns. If you are not sure about something you thought of, you can always contact the organizer to clarify if it is allowed.

The powertrain providing thrust to your aircraft is partially **“closed”**, giving only a limited number of options to provide fair and equal conditions for every team.

> 🔥 **Tip**
>
> We will be releasing a guidebook to give a possible solution for the drive-train and some measurements of selected propeller. The information in this guidebook is not necessary to compete, but may help you to design your aircraft.

4.2 Flight goal overview

The task of the ACC 2026 is to transport as many 0.33 l soda cans as possible and as fast as possible. Each flight consists of a take-off including 60 s of climb, followed by a 120 s distance flight segment, and a safe landing. Additional points are given for a shorter runway length and fast loading and unloading. The flight will be automatically measured and does not require a specific flight path. Thus, the results depend less on the skill of the pilot (no sharp turns).

To exclude the influence of the motor selection, a specified motor must be used. As an update for this years competition, it is allowed to use up to two of the specified motors. The choice of propeller and ESC is free but exceeding a given current limit (as measured between battery and ESCs, so both motors summed up) results in penalty points. To simplify travel for the teams, the aircraft must fit in a defined transport box.

First, the aircraft requirements are outlined before the deliverables are described. Following a detailed description of the competition procedure the scoring system is presented.

4.3 Requirements

	Aircraft
A/C 1	The remotely piloted aircraft must be controlled by the pilot on the ground using radio control.
A/C 2	You are tasked to design an aircraft that is powered by an electric propulsion device, and which generates lift by aerodynamic forces acting on surfaces remaining fixed in flight, except control surfaces.
A/C 3	The aircraft must not be rotary wing or lighter-than-air (for example helicopters, autogyros, airships and balloons are excluded)
A/C 4	No form of externally assisted take-off is allowed. All energy for take-off must come from the onboard propulsion battery pack(s). The only means of aircraft propulsion are the prescribed electric motors.
A/C 5	The aircraft in takeoff configuration including payload must not weigh more than 25 kg.

A/C 6	The size of the aircraft is not limited except for the requirement to be transported in the transportation box.
A/C 7	Every aircraft must have unique identification symbols. This identification shall be the team number and the name of the university. Other logos, for example from sponsors, are also allowed. The team number shall be visible on the aircraft: • In figures with at least 10 cm of height (if this is not possible, please contact us) • On both the top and bottom of the wing • On both sides of the fuselage, vertical stabilizer or V-tail The university logo shall be visible on the wings or the fuselage. The university initials can be used instead, if they are unique and recognizable or if the logo is too complex.
A/C 8	By law, you must have a label with the eID of your pilot on the aircraft.
A/C 9	The pilot must control the aircraft via Line of Sight. FPV is not allowed for the pilot.

Transport box

T/B 1	The sum of the inside dimensions (maximum length + width + height) of the transport box must not exceed 1500 mm.
T/B 2	The transport box should be a rectangular cuboid, otherwise the dimensions will be calculated to be the smallest possible rectangular cuboid that can contain the inside geometry of the transport box.
T/B 3	The entire aircraft and all necessary tools for the assembly, disassembly, loading and unloading must fit simultaneously in the transport box. Batteries and Transmitter can be stored outside the transport-box.
T/B 4	The total mass of the box including all items above must not exceed 23 kg.

Motor

Motor 1	You must not use more than two of the specified motors.
Motor 2	The motors must be unmodified T-MOTOR AT2814 900kv Brushless Motors. Please notice that this is not the same motor as in ACC2024. You may solder the motor to the ESC or change connectors.
Motor 3	Motors shall be fixed to the airframe of the aircraft. Every motor must be easily accessible from all sides to allow for inspection. Mounting the motor outside the fuselage is recommended.

Transmission

T/M 1	The rotational speed of a propeller must always be the same as the rotational speed of the corresponding motor.
T/M 2	You must not physically link the two motor shafts.
T/M 3	Each motor must be physically linked to exactly one propeller.

Propeller

Prop 1	Each propeller must be of fixed pitch.
Prop 2	You may use folding propellers.
Prop 3	The propellers must be commercially available off the shelf.
Prop 4	The propellers must be fastened to the motor in a secure way.

> **Tip**
>
> Some propellers may damage the motor due to overheating. Please keep in mind that it is your responsibility to avoid this.

ESC	
ESC 1	You may use your choice of ESC
ESC 2	The ESC may be developed and built by the team.
ESC 3	The ESC must not increase the voltage of the battery in any way.
ESC 4	The usage of an ESC with a programmable current limit (battery side) is recommended to avoid penalty points.

> **Info**
>
> Exceeding the given current limit of 30A (as measured between battery and ESCs, so both motors summed up) results in penalty points

Battery	
Bat 1	You may use LiPo-, LiIon- or LiFePo-based batteries. You may use up to 3 cells in series. The maximum voltage for the pack is 12.6 V (LiIo and LiFePo have a lower maximum voltage, according to their datasheet). The maximum voltage per cell as specified in the datasheet must not be exceeded.
Bat 2	The maximum continuous discharge rate must be at least 40 A.
Bat 3	Multiple battery packs in parallel are allowed. Serial connection is allowed as long as the entire pack does not exceed 3S. The energy capacity per battery pack must not exceed 100 Wh.
Bat 4	Voltage, capacity, and maximum discharge rate shall be clearly printed on the battery. The cells/packs must keep their factory look and condition and may not be altered except for the plugs. If the required data is not printed on the pack/cells you must provide the datasheet from the manufacturer.
Bat 5	To allow for inspection of the voltage, the battery must have a (female) balancer connector of the single cell voltages with a spacing of 2.45 mm pitch of the pins. (e.g. Standard EH or XH connectors)
Bat 6	All batteries must be stored and transported in a LiPo safety bag or container and not mounted in the aircraft. Usually, you can buy these safety bags at your LiPo battery dealer. If you notice a damaged LiPo battery, notify the organizational committee immediately!

Connectors	
Con 1	The battery connector must be an XT-60 female plug to enable connection to the data recording box. The connector on the ESC must be an XT-60 male plug.
Con 2	The measurement box provides only one XT-60 female plug for the ESCs. In case of two ESCs, you shall use a Y-cable.

Radio Requirements

Rad 1	The servos must be capable of withstanding aerodynamic loads the aircraft is going to be subjected to during the flight.
Rad 2	The radio equipment shall be protected for flights in sunny, rainy and windy weather conditions.
Rad 3	All radios must comply with the legal frequencies for model aircraft in Germany.
Rad 4	An independent (second) battery pack is mandatory for the avionics/servos. The minimum capacity is 600 mAh. Power supply of servos and radio from the main propulsion battery is prohibited. If your ESC has a BEC, you must disconnect the positive wire of the RC system or use an optocoupler module.
Rad 5	The aircraft must have an externally accessible switch or jumper plug to turn on the radio control system. It must not be internal or under a panel or hatch.
Rad 6	Only 2.4 GHz Systems are allowed since it reduces the risk of multiple teams having the same frequency channel. The system may have an 868 MHz backup channel. Please be aware that with some manufacturers your radio must have an EU firmware installed to comply with German radio regulations (e.g. Taranis EU Firmware).
Rad 7	The fail-safe function in the receiver must be activated in the following way: • Motor off • Full up elevator • Full right rudder • Full right aileron • Full flaps (if existing) down

Autopilots

Auto 1	Fully automated flight is not allowed.
Auto 2	Gyroscopes, either integrated inside RC receivers or as an external gyroscopes are allowed as long as no navigation/position/route control is done. Flight stabilization/“Fly-by-wire” is allowed.
Auto 3	GPS systems are only allowed as part of a telemetry system. If a GPS is used, it must be directly connected to the receiver and not to the flight controller.

Automated Measuring Equipment

Measure 1	To make the scoring relevant measurements of your flights, we developed a small box with all the measurement equipment, which will measure barometric altitude and GPS Data, as well as battery voltage and current.
Measure 2	For safety, the box contains an arming plug that is used to arm the aircraft when it stands on the runway and disarm directly after the flight.
Measure 3	The Measuring Equipment Box will be provided by the organizer and must be mounted in the aircraft by the team. The loss of the Box will result in zero points for the flight.
Measure 4	It is your responsibility to fly in a way that the GPS receiver will point to the sky. Avoid steep bank angles (>40 deg) and high G-loads (>3-4 gr). Loss of GPS signal will not be a reason to get an additional new flight.
Measure 5	The measurement box must be placed in the model with an unobstructed vertical view of the sky (=nothing allowed in this area). We added two lines in the drawings to indicate an angle of 20 deg from the horizontal. Additionally to the vertical requirement we recommend not to place any component in this area to ensure good visibility of the sky.

Measure 6	The box will be handed to you before take-off and must be given back after landing. In case of a malfunction of the logging equipment, the flight manager will give you a reflight.
Measure 7	You can find the size of the box in the Appendix. The box will be screwed into your aircraft with two M3 screws. Every aircraft must have two M3 nuts directly under the box to safely and reliably mount the box. We suggest using M3 drive-in nuts in the aircraft. The box has one XT-60 Male connector to plug in the battery and one XT-60 Female connector for your ESC. The box shall be oriented with the XT-60 input and output connectors facing forward as shown in the appendix. It is your responsibility that the cables are long enough that they can be connected to the measurement box. If required you can extend the cables either by soldering additional cable between your components and the connector or using extension cables.
Measure 8	If you use two ESCs, you shall use a Y-cable or similar to connect both to the XT-60 Female connector of the box.
Measure 9	The box will have a mass of 150 gr.
Measure 10	We will give you one opportunity per team to compare the measurements of current and voltage of the box with your own equipment (e.g. telemetry).

Payload

Payload 1	You are transporting standard 0.33 l cans.
Payload 2	The payload must be fully enclosed within the aircraft's structure.
Payload 3	Each can must be securely held in position without touching each other.
Payload 4	The cans must not exert any force on one another.
Payload 5	The cargo bay must have a capacity of at least two cans
Payload 6	The dimensions of a can are specified in the Appendix.
Payload 7	The mass of one can is 350 gr.
Payload 8	Be aware that the payload might affect the center of gravity (CG) of the aircraft. The static margin has to be calculated for all extreme CG positions (including zero and max payload).

Longitudinal Stability of the Aircraft

Stab 1	Calculation of the correct CG has to be executed by using corresponding formulas. The chosen calculation method must be described in the preliminary report for review by the organizing committee. You shall use an established method or tool to calculate the required derivatives for the CG calculation.
Stab 2	The aircraft shall have a static margin between 5% and 50% for all numbers of cans between zero and max payload. This must be proven by adequate means in the technical report.

Aircraft Production

Prod 1	The aim of the *Air Cargo Challenge* is to learn and understand the challenges of the aircraft design process. Therefore, you must not only design the aircraft but you shall manufacture as many components of the airframe as possible by yourself. You will experience problems arising from your design decisions and learn from them. Especially the production of the wings shall be done by the team. Evidence that the

	manufacturing had been carried out by members of the participating team has to be provided (e.g. time-lapse video recording, photos,...)
Prod 2	Some components are specifically excluded from rule Prod 1. You shall use reliable commercially available off-the-shelf parts for: • RC components (transmitter, receiver, servos) • Screws, fittings and connectors • Powertrain (propellers, batteries)

Proof of Flight

Proof 1	An aircraft that has never flown before the competition and/or has no proof of flight will not be allowed during the competition. A proof of flight video must be presented one week prior to the competition. Delay will result in penalty points.

Technical Inspection

Inspec 1	During the technical inspection, all aircraft will be checked to meet all regulations and the minimum quality for a safe flight.
Inspec 2	You will get a maximum of one hour time to set up your aircraft for the technical inspection. It has to be complete and ready for take-off, except for the batteries that are not connected until instructed and the payload that is provided on the flight days.
Inspec 3	Inspection will comprise at least the following items: • Aircraft dimensions in comparison to drawings • Verification that all components are adequately secured to the vehicle • Visual inspection of all electronic wiring to ensure adequate wires and connectors are used • Verification that the propeller is attached safely • Motor Test • RC-Check, range test with motor off and motor on (read the manual of your equipment before the competition to make sure you know how to activate the range check) • Servo test • Linkages (correct mechanics, backlash, strength) • Payload installation (fixation) • Check of Center of Gravity (must be marked at the aircraft) • Build quality • Secure attachment of components • Check of measurement box compatibility This list is not complete and we reserve the right to ground an aircraft we deem not airworthy. Note: Significant delays resulting from insufficient preparation, airworthiness deficiencies, or incompatibility with regulated equipment may result in penalties of up to 50 points.

Static Load Test

Load 1	In addition to the technical inspection, there will be a static load test of the aircraft with payload before take-off.

Load 2	A maximum of 2 team members are allowed to lift the aircraft on its wingtips by hand. The thumb of the hand has to touch the outermost point of the wingtip. The aircraft has to withstand this load to be allowed for take-off. The aircraft must be held at the wing with the biggest wingspan for the load test.
Load 3	Especially for swept wings, multiple wings, or wingtips, which do not allow easy support with the hands, a support structure may be used. For this support structure, the following rules apply: 1. The thumb of the hand must touch the outermost point of the support structure, which must not reduce the effective wingspan. 2. It must not reach further inside the wing than 20 cm from the wing tip. 3. The support structure may protrude forward or backward to compensate for any pitch tendencies due to wing sweep. 4. When connecting multiple wings, the structure must not carry any moments in between them. 5. The support structure must be easily attachable and must be removed before take-off. 6. The support structure and its functionality must be presented during the tech inspection.
Load 3	Alternatively to using a support structure, a third team member is allowed to stabilize the aircraft by pushing either the nose or tail **downwards**.

Spare Parts and Reserve Aircraft

Spare 1	You are allowed to have as many spare parts and additional aircraft as you want. All parts and aircraft must be identical to the primary competition aircraft. All parts must be presented during tech inspection. One primary competition aircraft must be declared and will be marked.

4.4 Deliverables

4.4.1 Preliminary Report (PR)

The preliminary report is an update for the organizer. It consists of a written document that does not exceed one A4 page and eight additional pictures. It shall give a summary of the progress of the aircraft design and how you organized your team. It shall also show what is not developed yet and what difficulties you encountered. Please don't forget to include your stability analysis formula as well as your aimed stability margin in the Preliminary Report. There will be no scoring on the Preliminary Report, but there are penalties if you miss delivering it within the deadline. Delivery is via e-mail in PDF format. The maximum allowed file size is 20 MB

4.4.2 Technical Report (TR)

The technical report sums up all your thoughts during the design of the aircraft and shows the final aircraft with its details. The TR may have up to 30 pages in total (font size 11 or 12), including title page and table of contents, without attachments. It must be in A4 format. Delivery is via e-mail in PDF format. The maximum allowed file size is 20 MB. To have better comparability between the different reports, the report shall contain at least the following chapters:

- Introduction
- Project management (including financial budget and time schedule)
- Aerodynamic design

- Structural design
- Payload prediction (see Section 4.7.3)
- Outlook
- Drawings

More content is requested and necessary to get the full score for the report. The drawings must be included in the technical report.

Additionally, you must include a payload prediction for your aircraft. This must be a fixed. We recommend assuming reasonable values of air density and wind speed for the airfield based on statistical weather.

4.4.3 Drawings

The technical report must include a set of four detailed drawings of the aircraft in A3 size. The drawings do not count toward the page limit. One of the drawings must be a 3-view drawing of the aircraft using European projection, that is:

- front view at the top left corner
- top view below
- starboard view on the right of the front view

The views must contain the main aircraft dimensions:

- wingspan
- wing root chord
- wing tip chord (if the planform has sharp tips, use the chord at 80% half wing span)
- aircraft overall length
- aircraft overall height
- distance between the wing and stabilizer leading edge at the center line
- span of the horizontal stabilizer
- root chord of the horizontal stabilizer
- tip chord of the horizontal stabilizer
- height of the vertical stabilizer
- root chord of the vertical stabilizer
- tip chord of the vertical stabilizer
- position of center of gravity

If you use a V-Tail configuration, please specify root chord, tip chord and dihedral angle.

These 13 parameters will be used to verify that the aircraft has the same dimensions as the drawing. There will be penalties for incorrect or missing dimensions. Below the starboard view, there must be a table containing other dimensional information such as relevant areas and/or volumes, used airfoil, etc. The second drawing must be an isometric perspective view of the aircraft. The third drawing shows the cargo bay, its location, and dimensions, as well as the location of the RC receiver and the measuring equipment. The content of the fourth drawing is up to each team. Summary:

1. 3-view drawing
2. Isometric drawing
3. Cargo bay, RC receiver position, position of measuring equipment
4. Free choice

A standard scale for each drawing must be properly chosen. The 3-view and isometric perspective drawings may not display hidden lines. All dimensions must be in SI units except for linear lengths which shall be in millimeters and plain angles which shall be in degrees. All the drawings must have a label in the right bottom corner containing the team logo or university logo, the team's name and number, a short description, and other pertinent information. If the aircraft is changed after the technical report is sent in, a new copy (called corrected drawing package) with remarks identifying the changes must be e-mailed to the organization committee or presented during the technical inspection.

4.4.4 Poster

Every team will bring a poster (size A0, 841 mm × 1189 mm, portrait) with details of their design. These posters shall be easily understandable to give spectators of the event a glimpse of the work you put into this project. The poster shall at least contain the following:

1. Header: ACC2026 logo (left side), team number, team name, 3-letter country code (right side; https://en.wikipedia.org/wiki/ISO_3166-1_alpha-3)
2. Team/University logo
3. Basic aircraft parameters
   - Wingspan
   - Total length
   - Wing area
   - Empty mass without payload, with battery and measurement box
   - Maximum payload mass for design take-off length
   - Main wing airfoil. If it is not publicly available, provide: Thickness to chord and camber. If multiple airfoils are used, select one representative airfoil.
   - Image, isometric view, or rendering of the entire plane to identify it during the competition
   - More details are encouraged
4. Special features of the aircraft

A missing poster will be penalized with 50 points.

4.4.5 Presentation

Each team must hold a 10 minute presentation (plus Q&A) about their aircraft at the University of Stuttgart. Each presentation must not be longer than 10 minutes. The presentation shall include additional information about the design and what makes it special. You may show your aircraft or parts of your aircraft during the presentation. The complete team shall be present during the presentation. You shall prepare slides for the presentation (PowerPoint or PDF).

A maximum of 100 points will be awarded for the presentation. Evaluation criteria include but are not limited to:
- Technical depth and accuracy
- Clarity and structure of the presentation
- Design justification and innovation

4.4.6 Deadlines

End of application period	**01.11.2025, 23:59 CET**
Bank transfer	**01.12.2025, 23:59 CET**
Preliminary report	**01.03.2026, 23:59 CET**
Technical report and drawings	**01.05.2026, 23:59 CET**

Proof of flight	**23.06.2026, 23:59 CET**
Flight competition	**30.06.2026-03.07.2026**

(may be subject to changes)

4.5 Flight competition

4.5.1 Airfield

The competition will take place at the MFV Böblingen. Some may remember the field from ACC2019. The aircraft must takeoff from the paved runway (see Figure 4). The aircraft must stay within the paved area while rolling. For landing, the grass runway next to it is allowed to be used as well. The lawn will be mowed before the competition.

4.5.2 Flight Area

Details about the allowed Flight zones will follow. The minimum allowed altitude during the distance flight segment is 10 m above ground (measured towards the GPS initialization height). Maximum altitude is 200 m above the ground.

4.5.3 Bad weather

The contest will be interrupted if the wind, measured at approx. 2 m above the ground at the starting line, is stronger than 9 m/s for at least 20 seconds. (8 m/s if the wind is more than 45 deg from the starting direction)

You have to be prepared for high humidity conditions or even light rain. The competition will not be interrupted in light rain conditions if the number of rounds is critically low.

The flight manager has the right to interrupt the competition if there are safety concerns.

4.5.4 Protest

The teams have the right to protest against the decisions made by the organizing committee. The applicable rules and the decisions of the jury cannot be the subject of protests. The protests must be presented in writing in English to the judges by the team leader. We remind you that unjustified (not accepted by the jury) protests will result in a penalty.

4.5.5 Pilot, Helper and Flight Manager

The pilot is allowed to have one helper with him on the runway. All other team members must be in the safety area during the flight. The pilot is required to follow the current German laws. This includes that he must not be under the influence of alcohol, drugs, or other illegal substances.

There will be a flight manager directly next to the pilot. He is the authority on the field and helps you to stay within the flight area. There will be no take-off attempt without his specific call. The flight manager has the authority to demand an abort of flight and immediate landing.

4.6 Mission Procedure

4.6.1 Time Slots

A queue for the flight will be posted before each flight round. Before the start of each new round, you must inform the responsible judge about your selected payload mass and runway length for the coming round. For this purpose we will provide forms to fill in payload mass and runway length.

After your team name is called, you have maximum 5 minutes to arrive at the staging area. You must have the aircraft prepared and all materials and tools you need on hand. At the staging area you will receive the payload and measurement box.

4.6.2 Loading and Pre-flight check

Only two people are allowed in the staging area. You have maximum of 5 minutes to install the measurement box and prepare your aircraft (and tools if needed) for loading the payload. The payload is not allowed to touch any part of the aircraft or loading equipment. The positioning of all parts is up to the team. During the loading, the aircraft is positioned on the ground and only one team member is allowed to touch the aircraft, the payload, and any tools. The loading and the time measurement starts with the callout of the jury. After the loading, no changes to the aircraft are allowed except for arming the aircraft.

After loading, the aircraft is lifted by the same two team members at the wingtips as a structural test. If a third person is required as described in Section 4.3 this person may then enter the staging area.

4.6.3 Take-off

The entire aircraft must be on the runway with the frontmost wheel at the starting line and no team member is allowed to touch the aircraft after line-up. If the aircraft touches anything outside this runway during take-off, there will be a red flag indicating that you violated the take-off distance. In this case, you are allowed to return your aircraft to the starting line with a maximum of three team members and try again as soon as the helpers are in the safety area. You have a total of three minutes to complete the take-off including multiple attempts.

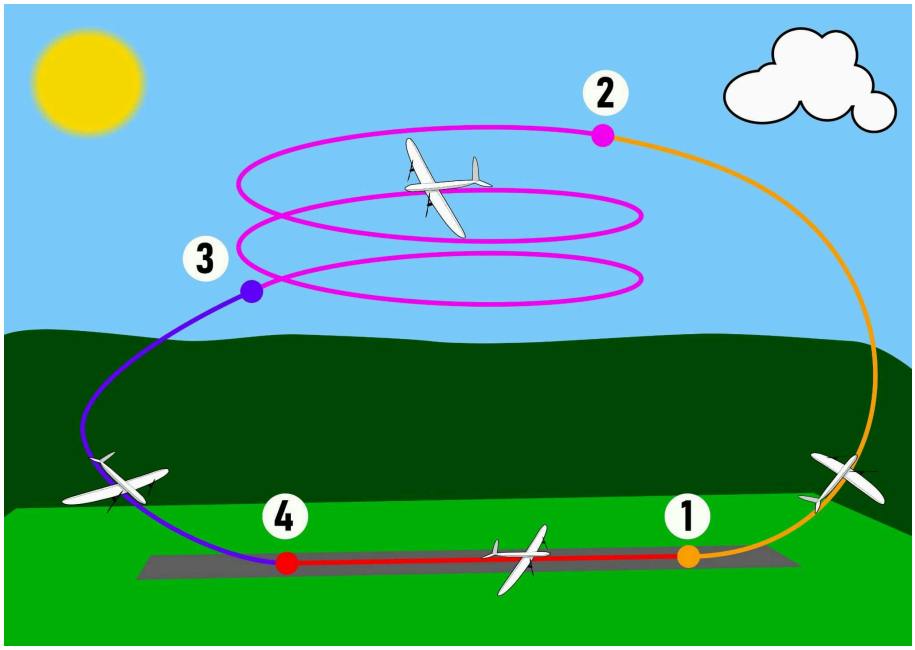


Figure 1: Competition flight mission.
1: Take-off
1-2: Climb
2-3: Distance
3-4: Landing

4.6.4 Definition Flight Time

The flight time starts when:

- the current exceeds 5 A for more than 3 seconds in the logged data and the take-off is valid
- the aircraft reaches 5 km/h GPS-speed in the logged data and the take-off is valid

Whichever of these 2 conditions occurs first.

4.6.5 Climb

The first 60 s flight time may be used to climb. The achieved climb altitude is not considered in the round score, but may help for the following distance segment.

4.6.6 Distance

After 60 s of flight time (defined according to Section 4.6.4) the Distance task begins. The duration of this segment is 120 seconds. You must cover as much (ground projected) distance as possible within this time. For that, the measuring equipment will automatically log the GPS distance covered. You are allowed to trade altitude gained during the previous climb phase for speed as long as you stay within the altitude limits as described in Section 4.6.8.

4.6.7 Landing

The landing must take place within the landing area defined in Figure 4. Landing within means that the first contact with the ground or any object must be within the landing area. After touchdown, the aircraft may roll or slide off the runway. It must not bounce off the runway. If you lose any parts during landing the flight score will be scored to zero points.

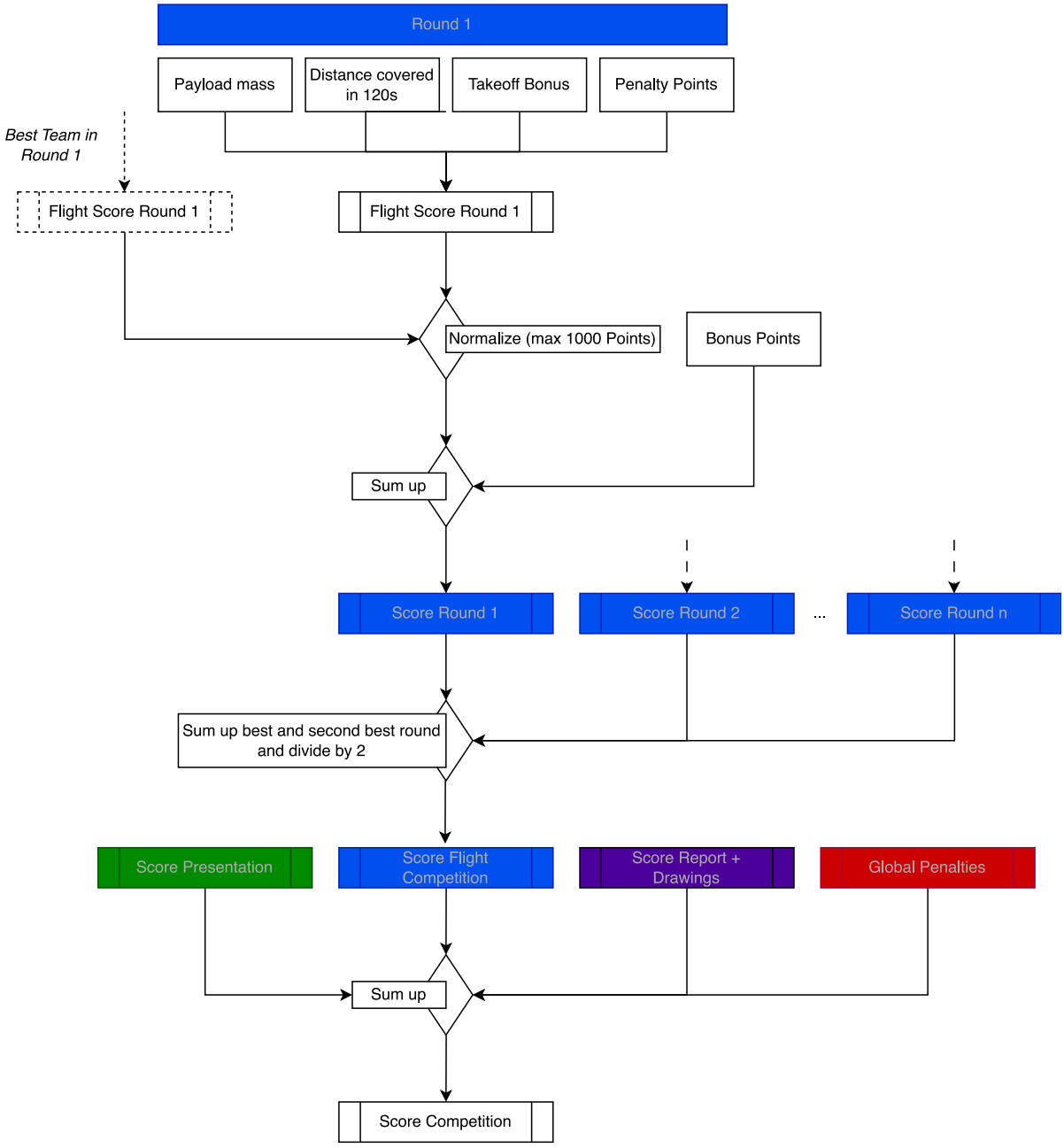
4.6.8 Restricted Areas

If you fly outside the flight area, the flight will be scored to zero points and you will receive additional penalties. The minimum flight altitude during the distance segment is 10 m. The maximum altitude during all phases of flight is 200 m.

As safety for participants and visitors is our highest priority there will be a penalty up to disqualification if any person is endangered by the aircraft. Please inform your pilots that the highest priority is the well-being of people, not the aircraft.

4.7 Scoring

The scoring schema is visualized in the following Figure:



4.7.1 Round scoring

We will fly as much (n) rounds as possible. For each flight, the raw scoring of each time is evaluated in dependence of the carried payload mass m_{payload} [kg] and the covered projected distance within the distance flight segment l_{distance} as well as the bonus factor for take-off. The bonus factor is defined by:

$$B_{\text{take-off}} := \begin{cases} 1.15 \text{ if } l_{\text{take-off, announced}} = 40\text{m} \\ 1 \text{ if } l_{\text{take-off, announced}} = 60\text{m} \\ 0 \text{ if } l_{\text{take-off}} > l_{\text{take-off, announced}} \end{cases} \quad (1)$$

Which means, you get a 15% bonus for announcement of 40 m take-off length instead of 60 m, but your flight score will be scored to zero if you can not make a successful take-off attempt within the announced limit. The raw score for a competition flight is then calculated by:

$$S_{\text{round, team, raw}} = B_{\text{take-off}} \cdot m_{\text{payload}} \cdot l_{\text{distance}}^2 \left(1 - P_{\text{round, current}}\right) \tag{2}$$

The raw flight score is normalized by the best scoring of all teams in this round. Bonus points $B_{\text{round, loading}}$ and penalty points $P_{\text{round, j}}$ are summed up to the normalized scoring:

$$S_{\text{round, team}} = \frac{S_{\text{round, team, raw}}}{S_{\text{round, best team of this round, raw}}} \cdot 1000 + \sum_i B_{\text{round, i}} \tag{3}$$

The maximum possible score for one flight is thereby 1120 points.

4.7.2 Loading and Unloading Bonus

For each flight, the team must put payload into the aircraft. The shorter the amount of time a team needs for loading the payload, the more points can be gained. Loading bonus points are only given if a payload gets loaded onto the aircraft. The aircraft shall be prepared for take-off completely before the loading. After the payload is mounted, no more changes to the aircraft are allowed except for the safety plug.

After the flight, the safety plug is disconnected and the aircraft is transported to a safe location on the ground by the team for the unloading of the payload.

The bonus points for loading are dependent on the measured time for loading (t_{loading} [s]) and unloading ($t_{\text{unloading}}$ [s]) according to the following relationship:

$$B_{\text{round, loading}} := \begin{cases} 60 \cdot \left(1 - \frac{t_{\text{loading}} + t_{\text{unloading}}}{120\text{s}}\right) \text{ if } \left(t_{\text{loading}} + t_{\text{unloading}}\right) < 120s \\ 0 \text{ else} \end{cases} \tag{4}$$

4.7.3 Payload Prediction Bonus

In the technical report, you have to announce a number of payload cans that you will carry in a competition round ($N_{\text{cans, announced}}$). You will get a bonus defined by:

$$B_{\text{payload prediction}} := \begin{cases} 3 \cdot N_{\text{cans, announced}} \text{ if } N_{\text{cans, carried}} \geq N_{\text{cans, announced}} \\ 2 \cdot N_{\text{cans, announced}} \text{ if } N_{\text{cans, carried}} = N_{\text{cans, announced}} - 1 \\ 1 \cdot N_{\text{cans, announced}} \text{ if } N_{\text{cans, carried}} = N_{\text{cans, announced}} - 2 \\ 0 \text{ else} \end{cases} \tag{5}$$

The Bonus is limited to a maximum of 60 Bonus Points. Please notice that the decline in bonus points is significant if less payload is carried than announced. Select a payload mass for your prediction that you are sure to be able to carry.

4.7.4 Flight Penalty points

1. You will get penalty points for exceeding the current limit of 30 A. The current is recorded with 10 Hz and mean value calculated every 0.5 s. The current penalty is active for the total flight round, including the 3 s of motor time until the timer starts. The penalty calculates to (per second and ampere you exceed 30 A you receive 2 penalty for the current flight round):

$$P_{\text{round, current}} = \min\left((1), \left(0.002 \cdot \int \max(0, I - 30\text{A}) \ \text{dt}\right)\right) \tag{6}$$

2. If the recorded battery voltage exceeds 12.75 V at any time, the flight will receive zero points.

3. If the current measured exceeds 70 A at any time, the flight will receive zero points.

4. If any part of the aircraft gets lost during the flight attempt, the flight will be scored with zero points due to safety concerns. “Lost” means that a part has no more physical connection to the aircraft.

4. If the landing is hard, the flight manager may request an additional Static Load Test. The aircraft must then withstand the bending loads without any repairs. If it cannot, or if the team refuses the test, the flight will receive zero points.

5. If you violate the Flight Zone rules defined in Section 4.6.8, the flight will receive zero points

4.7.5 Flight Competition Scoring

The calculation of the team’s scoring for the total flight competition is based on the two best rounds out of 3 or more competition rounds, or the single best if the number of rounds is lower than three:

$$S_{\text{flight competition, team}} = \begin{cases} \frac{S_{\text{best round, team}} + S_{\text{second best round, team}}}{2} & \text{if num rounds} \geq 3 \\ S_{\text{best round, team}} & \text{else} \end{cases} \tag{7}$$

4.7.6 Global penalties

The following penalties will be deducted from your final competition score.

Delay in delivering preliminary report	30 points per day, max. 100 points, disqualification after 30 days
Poster missing	50 points
Delay in delivering technical report/drawings	30 points + 30 points per day, no acceptance after 15 days delay
Delay in delivering proof of flight	10 points per day
Delay or not being present at the technical inspection (e.g. over 60 min set-up)	50 points
Aircraft dimensions changed compared to the technical report drawing package. A tolerance of $\pm$ 2 cm is allowed	Every additional cm of difference is 5 points
Corrected drawings incomplete	30 points
Disregard of aircraft requirements	Disqualification
Flying outside the flight area	flight with 0 Points; 2nd offender: disqualification
Flying over the spectator area	Disqualification
Disregard of official instructions	200 points up to disqualification
Unjustified protest (the jury does not agree with your protest)	First time: 5 points, Next times: 50 points

4.7.7 Competition Scoring

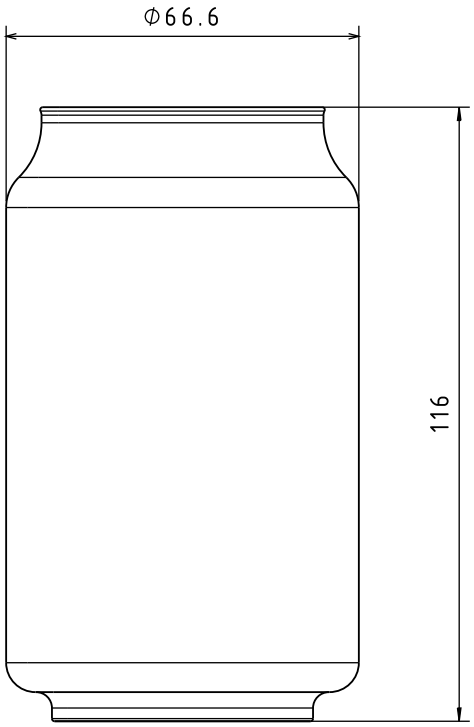
The total competition scoring, relevant for the competition ranking, results from summing up the scores for flight competition ($S_{\text{flight competition}}$, maximum 1120 points possible), technical report (S_{report} maximum 200 points), drawings (S_{drawings} maximum 50 points) and presentation ($S_{\text{presentation}}$ maximum 100 points). The global penalties $P_{\text{global,i}}$ as listed in Section 4.7.6 are subtracted. Therefore, maximum 1470 points are achievable.

$$S_{\text{competition, team}} = S_{\text{flight competition}} + S_{\text{report}} + S_{\text{drawings}} + S_{\text{presentation}} - \sum_i P_{\text{global,i}} \tag{8}$$

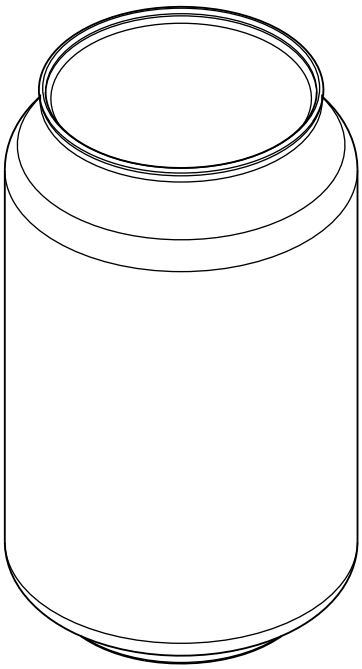
Appendix

5.1 Payload:

The payload can be approximated by a cylinder with the following dimensions.



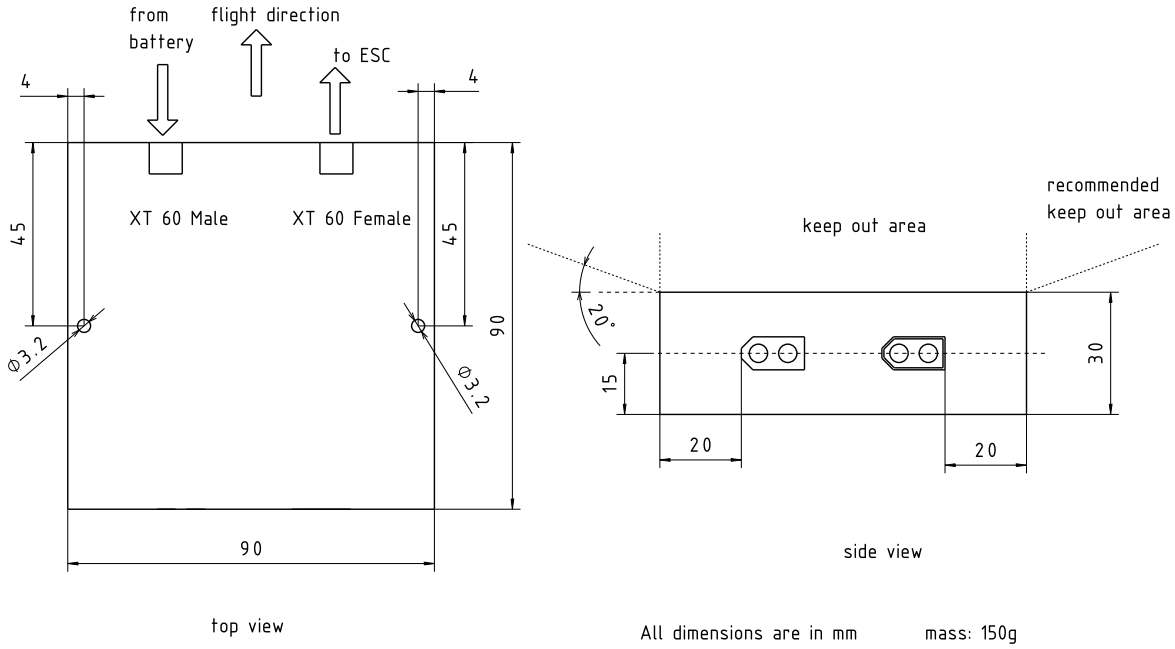
front view



isometric view

All dimensions are in mm

5.2 Automated Measuring Equipment



5.3 Airfield