

Q&A

This Q&A summarizes the already asked questions to avoid unnecessary work answering them multiple times. The Q&A will be updated occasionally.

Organizational

1.

Question: Can we later change team members (including the pilot)?

Answer: Yes, you can change team members until the 01.02.2024.

We will provide you begin of January with an updated registration excel template. In this we will ask for additional information like T-Shirt Size, Food Preference,... Please do not send us updated name lists prior. Remember to provide the prove of eligibility for changed team members.

2.

Question: Is it possible to pay participation fee significantly before the deadline (for us it would be best to pay for everything before the end of this year). It is possible to directly pay both payments?

Answer: We plan to send the invoices for both payments the end of November. Yes, you can also directly pay the full amount.

3.

Question: is it necessary for the responsible professor of the team to be physically with us during the days of the competition?

Answer: no

Regarding Aircraft Design

General

1.

Question: In the rules it is stated that:

“ damage the aircraft (status after landing not equal to the status before take-off)” and
“If you damage the aircraft during landing in a way that it is not capable or safe to fly directly again”.
In our association among other possible solutions we considered retractable landing gear, that can only close i.e. airplane starts on wheels but land on it's belly. Does such a solution counts as a damaged aircraft after landing or not?

Answer: If it is intentional and you do not need special tools, glue or replacement parts to return to aircraft to the take-off state it is ok. Dropping the gear after take-off or similar is not allowed.

2.

Question: would like to ask you a question regarding paragraph 3.3.11 “Longitudinal Stability of the Aircraft”, more specifically, the part about calculating the CG stability margin for the most extreme CG positions, due to changes in the payload. Are you implying that, in a situation where there are 10 slots for balls but not all 10 slots will be used in every loading configuration, do you still need to ensure a safety margin or extra protection for all 10 slots, even if some of them won't be used in certain configurations?

To clarify, if we plan to have 5 balls in the 5 most forwardly placed slots only, with 5 empty slots behind them, and this is the only situation that we plan to use, do we still have to calculate the stability margin for these 5 balls placed in the rearmost slots, even though we won't use that configuration?

Answer: you do not need to ensure the stability for every possible placement of the balls. But for every number of balls from 0 to max. payload. Max. Payload is what you define. Does not need to be equal to number of slots.
So for your example no.

3.

Question: Concerning propeller selection, are multiple propellers allowed for the airplane design?

Answer: No, only one

Components

1.

Question: Are we allowed to create our own Li-Ion battery pack (using commercially available cells, 18650 for example), assuming that it fulfills the requirements mentioned in the rules and that we provide the cell's datasheet?

Answer: No

2.

Question: Are we allowed to use a telemetry board we designed (that also incorporates a GNSS receiver) that transmits data to a custom receiver on the ground and operates on 433 MHz? Using 866 MHz would also be an option in case the former is not allowed. Lastly, it features SD card logging too and telemetry could be disabled altogether.

Answer: only commercially off the shelf 2.4 GHz and 866 MHz only as an off-the-shelf build-in backup system (see for example JETI) are allowed to comply with all laws and avoid interference with other teams.

3.

Question: In the regulations you mention that the production of the wings shall be done from the team. Is it allowed to buy for example tubes from carbon fiber, in order to be used as spars? We can construct as a team the skins of the wings, but you want also all the internal components like the spars and the ribs to also be constructed by us?

Answer: you can use tubes, rods, etc... You are not allowed to use pre-manufactured construction kits, complete parts from existing aircrafts etc..

4.

Question: We would like to develop our custom ESC, it would present a commercial ESC control board plus our custom board which controls and limits the Amps whatever throttle position and engine request is.

Is it allowed by the regulations to do what I describe above?

Answer: yes, that is allowed.

Scoring

1.

Question: In the rules one gets points as $1000 * \text{Your_performance} / \text{Best_performance}$. But is maximal efficiency, payload etc. the best efficiency, payload etc. during given round, or entire competition?

Answer: per round

2.

Question: In the section 3.7.7 Current Penalties, the current penalty equation shown in the Handbook is equivalent to $0.5 * \int (\text{current} - 30) dt$? For example, if the current in a certain moment is 40A for 2 seconds, does it mean the penalty will be $(40 - 30) * 0.5 = 5$ points for each second?

Answer: yes

3.

Question: Paragraph 3.7.11 states that a penalty should be applied per second and ampere, for current over 30A. Is this a penalty for the take-off part of the flight or is it universally applicable to the entire flight?

Answer: it is applicable for the entire flight

4.

Question: If a propeller is damaged during landing, but only propeller, does that mean the score gets cut in half?

Answer: yes, it does not matter which part of the aircraft is damaged

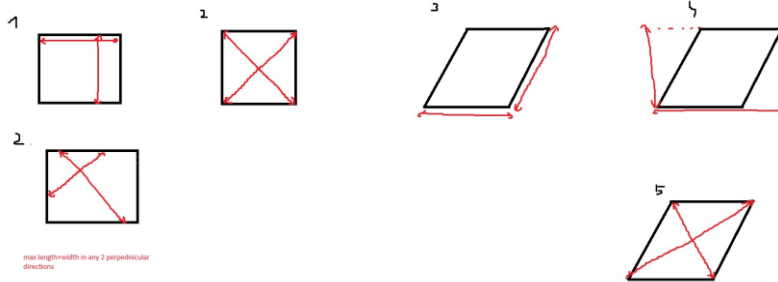
Transport Box

1.

Question: in the rules about the transportation box it is stated that:

“The box is limited in size and must not exceed a maximum length + width + height of 1400 mm (inside dimensions)”

Does that mean that the box should be a cuboid? And which of the following interpretation of maximal length, and width hold?



Answer: No, the box does not necessarily have to be a cuboid. We will measure in three cartesian dimensions. In a way that is most advantageous for you. (so we would measure the edges of a cuboid, not the diagonals). Or expressed in another way: the smallest (imaginary) cuboid your box would fit inside will be considered. If your geometry is too complex it is your responsibility to prove/show the dimensions in a quickly comprehensible way.

Regarding your drawings:

- 1 correct
- 2 (both) no, because we measure the shortest maximums = edges
- 3 no, not perpendicular
- 4 correct
- 5 no, number 4 is more advantageous for you.

Payload / Loading / Unloading

1.

Question: If spheres must not touch, is it then legal to use for example plastic bags to store each individual ball in a bag?

Answer: no, the balls must not touch each other and must not apply any force to other balls. So every ball needs its own restraint system.

2.

Question: As the regulation states "the positioning of all parts is up to the team" and "Neither any tools nor any payload is allowed to touch the aircraft", can the payload be positioned into any external tools (not part of the aircraft) before the loading time starts?

Would then a trapdoor-like contraption positioned above the airplane, where the balls directly drop over the cargo bay when a lid is removed over the aircraft be legal?

Answer: yes, the payload can be placed in the tools and the trapdoor-like mechanism would be allowed.

3.

Question: Also as it is stated in the regulation "all additional tools and devices must not be part of the aircraft", can the balls be loaded into a magazine-like cylinder and slid into the fuselage (cylinder and balls)? If the balls are loaded into a removable part of the aircraft which serves a structural function, would it be considered an external tool?

Answer: no, the balls are not allowed to be in any objects that are later part of the flying aircraft.

4.

Question: During the loading of the payload, if our mechanism of loading is through the belly of the aircraft and we have to place the aircraft upside down (meaning the belly of the fuselage is pointing up), the loading time ends when we finish the loading or when we load and then flip the plane up right?

Answer: must be ready to take-off -> in the upright position

5.

Question: We would like to ask you a question regarding the procedure of loading the aircraft. Are we allowed to turn it over and keep it upside down using a loading mechanism, to load from the bottom, turning it over again in its takeoff stance once the static load test is finished, as prescribed in par. 3.6.2 of the regulations?

Answer: you are allowed to turn the aircraft over for loading. For the static load test, it must be in the normal flight orientation with wings and fuselage parallel to the ground.

6.

Question: can the cargo bay be pulled out of the drone to insert the billiard balls or is it needed for it to be steadily installed into the drone?

Answer: it can be pulled out. However, as stated in the rules the balls must not be placed in the cargo bay prior to the loading mission

Report

1.

Question: We were wondering what do you mean for outlook (e.g.: efficiency outlook?, kind of project drone outlook?, ecc.)

Answer: as in a scientific paper, what do you plan to do or accomplish in the remaining time to the competition

2.

Question: In relation to the technical report and drawings, it states that they must describe the final plane. Can modifications be made to the design or construction after submitting the report and drawings?

Answer: yes, but note the penalties

3.

Question: In section 3.3.11 for the calculation of the longitudinal stability of the aircraft, the methods described refer to the calculation of the airfoil derivatives for the CG calculation. Does this disallow the use of other tools such as CFD for any other aerodynamic analysis e.g. for the calculation of the overall aircraft aerodynamic coefficients?

Additionally, one shall use the aerodynamic coefficients of the wing and tail instead of the airfoils in order to find the suitable CG position, so why is it referred to the calculation of the airfoil derivatives for the CG calculation? Does this mean we can use CFD to calculate the derivatives but not for the CG calculation?

Answer: You are free to choose any software you wish to calculate all coefficients of the aircraft. However, the stability calculation must be also confirmed with one of the listed tools. The coefficients of wing and tail largely depend on the airfoil characteristics. So you have to use the tools to calculate these.