

## **Aeronautical structures (MECA0028-1)**

### **Electric Training Sailplane RFP**

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## **The project**

The structure of the Electric Training Sailplane designed by the master students during the **2023-20244** conceptual design class shall be studied.

The students will be organized in groups of students following APRI0004 and consider the airplane they are designing during their conceptual project.

Each group of students shall deliver a report –and a code—related to the following points.

### **A/ Manoeuver and Gust envelopes**

Both envelopes shall be computed.

Weight and center of gravity position of each component shall be given.

### **B/ Aerodynamic loads**

For the main points of the envelopes, the aerodynamics loads shall be computed on

- The wing;
- The empennage.

For those points

- A pitch acceleration of maximum  $60 \text{ deg/s}^2$  shall be considered, or following the relevant norm, e.g.:
  - FAR 23.423, <https://www.risingup.com/fars/info/23-index.shtml> for normal category aircraft
  - [https://www.faa.gov/aircraft/air\\_cert/airworthiness\\_certification/std\\_awcert/std\\_awcert\\_regs/regs](https://www.faa.gov/aircraft/air_cert/airworthiness_certification/std_awcert/std_awcert_regs/regs),
  - [https://www.faa.gov/documentLibrary/media/Advisory\\_Circular/AC\\_21\\_17-2A.pdf](https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_21_17-2A.pdf)
  - [https://www.faa.gov/regulations\\_policies/handbooks\\_manuals/aviation/glider\\_handbook](https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/glider_handbook)
  - [https://www.faa.gov/aircraft/air\\_cert/airworthiness\\_certification/sp\\_awcert/light\\_sport](https://www.faa.gov/aircraft/air_cert/airworthiness_certification/sp_awcert/light_sport)
  - <https://www.ecfr.gov/current/title-14/chapter-I/subchapter-F/part-103>
- A maximum yaw angle of  $15 \text{ deg}$  shall be considered, or following the relevant norm (e.g. FAR 23.441, <https://www.risingup.com/fars/info/23-index.shtml> for normal category aircraft, see also links above).

### **C/ Structural loads:**

The following structural loads shall be computed for the different envelope points

- At the fuselage directly aft of the wing;
- At the wing root.

### **D/ Structural design:**

Using the material of the analytical analysis presented during the class, the structure shall be designed based on the results of C/.

**E/ FEM**

The results of D/ shall be assessed using a FEM model

**F/ Deadline**

**Printed version of the extended chapter Structure (or equivalent), with all the details to be handed by 24th of May 2023, 6pm. Electronic version with relevant code to be sent by e-mail.**