

Signal Transmission between Electrical Components in Microlight Aircraft

Task for a *Bachelor Thesis*

Background

New microlight aircraft are becoming more complex with more technology and electronics onboard to make flying safer and easier while improving the user experience. One reason for this is the increase of the allowed maximum take-off weight in several countries since 2019. This enabled microlight aircraft manufacturers around the world to build more complex aircraft with larger weight margins. Uniplanes GmbH was therefore able to apply for a new certification for the amphibious Flywhale aircraft with a maximum take-off weight of 650 kg, which offers more comfort and range. Customers of personal aircraft are beginning to expect user interfaces they know from consumer electronics and cars. The electrical equipment exceeds the legal requirements. For example, the instruments of modern microlight aircraft would enable IFR, which is not permitted for this class. For all electrical components on board an aircraft to work together, they must be able to communicate. This communication requires a transmission channel between the devices and the ability to interpret their signals.

Task

The task of this thesis is to show the steps of signal transmission between electrical components in microlight aircraft. The distinction to larger aircraft classes shall be shown. Furthermore, the avionics of the Flywhale aircraft must be presented as an example for microlight aircraft. The structure of this work is carried out in the following steps:

- Explain the fundamentals of communication between electrical components.
- Discuss different transmission channels and their ability to transmit data.
- Examine the suitability of different protocols for microlight aircraft.
- Introduce the Flywhale aircraft from Uniplanes GmbH, focussing on its avionics.
- Develop a fuel level indicator system that incorporates signal processing and transmission. The component should be suitable for usage in a microlight aircraft.

The report has to be written in English based on German or international standards on report writing.