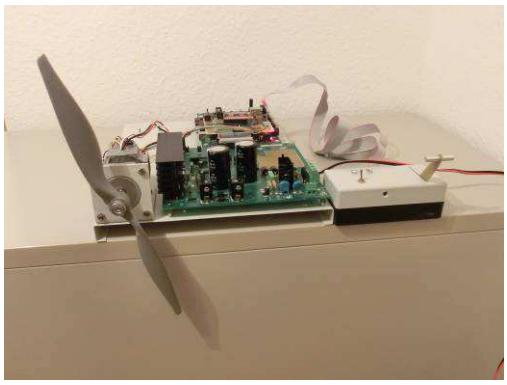
ePropeller Safety Device *[eSD]*

E-mobility also enters aviation. The usage of electric motors for aircraft propulsion opens possibilities for completely new aircraft concepts due to the low weight of these machines. Concepts like distributed propulsion become feasible. This leads to configurations where the propeller is not necessarily in the field of view of the pilot at the nose of the aircraft (see e.g. University of Stuttgart electric aircraft e-Genius, http://www.ifb.uni-stuttgart.de/e-genius).

Due to that and also because of the fact that electric drive systems can indeed be activated, i.e. “switched on”, but at the same time not necessarily need to move, rotate or even make a sound, there is a considerable risk that there are people, animals or objects in the propeller disk area and that they can be injured or damaged accidentally during the run-up of the propeller. This risk is especially high for recreational aircraft which are not always operated from strictly guarded airfields.



The *ePropeller Safety Device* is a concept to avoid such accidents without adding extra weight or extra components to the aircraft. Using the motors own sensors and microcontrollers, the propeller disk area is checked for obstacles during the run-up phase. For a short period, *eSD* operates the drive system in a protected mode, switching automatically to the normal operation mode after the disk area is detected clear.

In order to demonstrate the feasibility of the concept a demonstration prototype has been built on a STMicroelectronics STM3210B-MCKIT motor control starter kit and successfully operated. The principle of the protected moderation mode is to detect the divergence of commanded value and actual value for either rotational speed, torque moment or rotor position and cut off the power supply as soon a defined threshold is exceeded or underrun. For more details contact Kasaero GmbH.

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