Safety recommendation no. 511

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Safety deficit	On 13th December 2015, a pilot took off from Locarno Airport for a tow flight with an MCR-ULC aircraft. A few seconds after taking off, he noticed that the aircraft engine began to run erratically and some of the circuit breakers tripped at the same time. A few seconds later, the aircraft's engine failed at an altitude of around 20 m above ground. The pilot was able to perform an emergency landing in the towplane, which was damaged in the process. The glider being towed was able to release and land safely. In the MCR-ULC aircraft with a Rotax 914 engine, fuel supply is ensured by two electrical fuel pumps. A failure of both fuel pumps, which can, among other things, occur due to a complete outage in the power supply, leads to engine failure. The rectifier regulator, which rectifies and regulates the alternating current from the generator, requires a constant input voltage from the battery in order to operate. In the event of battery failure, the rectifier regulator automatically switches itself off in order to prevent internal damage and strong fluctuations in the output voltage of the regulator, which would subsequently damage further electrical systems. As a result, the power supplies in the electrical system of the MCR-ULC, consisting of a generator with a rectifier regulator and a battery, are not designed to be redundant. Disconnection of the battery from the on-board power supply due to a short circuit, an interruption in the ground cable, a failure of the master relay or simply due to the master switch being switched off, for example, leads to the failure of both fuel pumps and subsequently to engine failure because of a lack of fuel. A comparison with other aircraft types registered in Switzerland that are fitted with a Rotax 914 engine shows that the power supply is the same as that of the MCR-ULC. Accordingly, the risk of an engine failure due to a lack of redundancy in the power supply is also present in these aircraft types.
Safety recommendation	The European Aviation Safety Agency (EASA) and the Federal Office of Civil Aviation (FOCA) should take appropriate measures to ensure that the electrical system of aircraft types operated with Rotax 914 engines is equipped with a redundant power supply for the two electrical fuel pumps.
Addressees	EASA Europäische Agentur für Flugsicherheit; BAZL Bundesamt für Zivilluftfahrt; EASA Europäische Agentur für Flugsicherheit
Stage of the implementation	Not implemented. The Federal Office of Civil Aviation sees no need for action and the European Aviation Safety Agency is working together with the engine manufacturer to assess the situation. Final response of the EASA received on 14.12.2018

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	EASA has rewieved the service history of the EASA certified aircraft types equipped with the Rotax 914 engines in order to check for possible continuing airworthiness issues. The data did not indicate any in-service engine shutdowns caused by dual fuel pump failures. Although the Certification Specification LSA does not contain such requirement, for aeroplanes that may be in the future certified according to Certification Specification (CS) LSA a special condition will be raised by the Agency to require such redundancy.
Investigation report concerning the safety recommendation	Rapporto finale Zwischenbericht Schlussbericht Final report

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