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Solution of Reduced Mass in Solar Glider with Electric Engine

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Abstract : The project of a glider with an electric motor charged by solar power is an step toward the future of Polish gliding. Due to the popularity of the SZD-50-3 glider and its type of usage, the project was developed based on this model. By placing an auxiliary engine in the glider, the pilot is guaranteed a safe return to the airport. Since it is a training glider, and routes are mainly flown by student pilots and instructors, the guarantee of returning to the airport allows flights in more challenging thermal conditions, which contributes to better pilot training. In case of worsening weather, the pilot has a reliable return option, which prevents time loss due to field landings and saves money by avoiding delays in training. The glider uses the NOVA 15 LW engine, a solar installation, and technical modifications to reduce the glider's weight. This includes the Misztal spar solution, previously used in the PZL 19 aircraft. Additionally, the use of lighter coverings and materials that handle loads from pulling, straining, and sharing improves the aerodynamic performance of the glider, enhancing its overall efficiency. Every component added to the glider's construction (battery, engine, etc.) has been placed to avoid shifting loads along the axis, thus preventing unintended spins and flat spins. Safety concerns were also addressed. In the event of a battery or engine fire, the pilot's cabin is designed as a detachable part of the structure and is made of composites covered with non-flammable resin. The batteries are also enclosed in separate boxes located in the former "luggage" compartment. Access to the installation connecting the engine, panel, and battery is convenient due to the detachable cabin from the structure and the fact that the entire installation runs under the structure. The batteries also have easy access due to the current closed hatch. Cooling for the battery is provided this way.

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