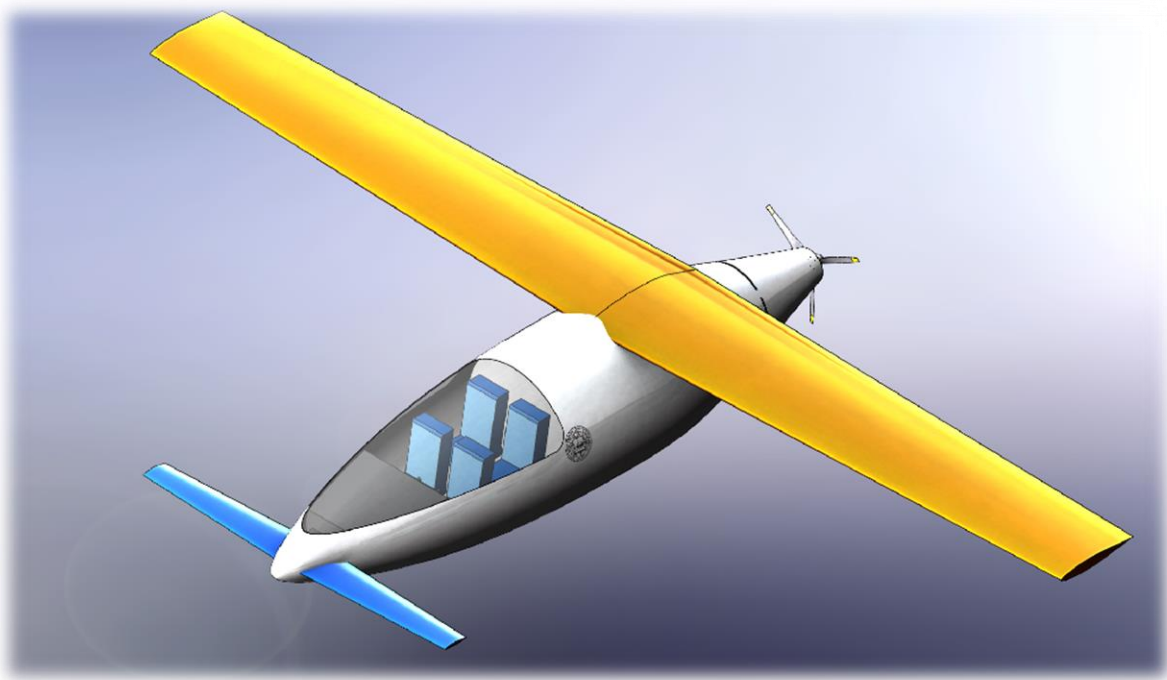


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Areion

2020 ELECTRIC GENERAL AVIATION AIRCRAFT

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ABSTRACT

As energy demand grows across the globe, it is increasingly important to diversify energy sources. Heavy investment in technologies like solar, wind, and nuclear promises a cleaner grid in the future. Traditionally oil dependent industries, most notably transportation, are experiencing an electric renaissance, led by auto manufacturers. Until recently, electrification has eluded the aviation industry due to limitations in specific energy. Recent advances in battery and fuel cell technology has lowered this barrier, making the all-electric aircraft a more feasible proposition. This is the challenge proposed by the NASA Langley Aeronautics Mission Directorate (ARMD) in the 2015 University Design Challenge. Areion is an all-electric general aviation (GA) aircraft designed to compete with contemporary combustion-powered aircraft. It is targeted at the high-end GA market and relies on innovative technologies to achieve its requirements. The hydrogen fuel cell system at its core delivers higher specific energy than any current battery technology and requires no further research or assumptions of technological growth. The unique Prandtl Bell Shaped Lift Distribution provides for minimum induced drag and wing weight as well as tailless coordinated flight. The canard configuration reduces the planform area and drag of the main wing while a blended airfoil design and hyperelastic flaperons enable the usage of Natural Laminar Flow (NLF) technology and reduce energy requirements over a broad flight envelope. These enabling technologies combine to form an all-electric GA aircraft concept grounded in contemporary technology and feasible for deployment by 2020.