Conformal Body Capacitors Suitable for Vehicles

The University of North Dakota is actively seeking companies to commercialize an unmanned aircraft system with an enhanced charge storage capacity.

Applications

- Can enhance remotely piloted vehicles as well as any vehicle, machine or device that has an airframe, body or structurally-framed compartment

Advantages

- Enhances, enables and/or replaces existing on-board power sources for remotely piloted vehicles beyond what current power sources provide (such as engines, motors, or traditional batteries)

The Technology

This invention is a method of enhancing the charge storage capacity of an Unmanned Aircraft System (UAS) by utilizing the body of the aircraft as a capacitor to store electric charge, and a system for charging the capacitor and utilizing it as an auxiliary source of energy to augment the primary on-board power source. The system requires at least three capacitors. A first capacitor implements the large auxiliary on-board energy storage. A second capacitor implements an energy buffer between the charging circuit and the battery. A third capacitor implements a charge buffer between the primary power source and the electric load. To facilitate ease of construction and cost reduction, each capacitor is an aggregate of parallel capacitor arrays where the individual capacitors of the array are shaped as conformal bands within the inner surface of an aircraft's body, or otherwise appropriate segment of the fuselage.

Super-capacitors provide other significant advantages over large batteries. They are capable of delivering higher peak currents to facilitate large dynamic electric load swings, are essentially maintenance free, and operate across a wider range of temperature and charging life cycle. They are also more environmentally friendly. However, unlike batteries, super-capacitors provide a less stable voltage output over time as the stored charge depletes. Hence, combining them with a battery provides both a large charge capacity and a stable voltage output under high dynamic loading conditions. Utilizing the aircraft body as capacitors reduce the overall power source bulk and increases the capacity for payloads.

contact

Tara Kopplin
(701) 777-3267

Reference UND #14-01 - Patent pending