

Conceptual Design of an Energy Harvesting System for Air Vehicles Landing Gear

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Abstract

Current aircrafts are generating a substantial amount of wasted energy. There is a potential to harness and use some of this energy. These energy harvesting systems will reduce the electrical power required on an aircraft, and more broadly will help in creating sustainable forms of power.

This paper explores different methods of harvesting energy and considers how to implement them into harvesting energy from aircraft landing gear. This research includes considering existing systems that are used in an alternative way. The paper develops a number of conceptual ideas based upon this research into a conceptual design of an energy harvesting system. The ideas consider the use of regenerative shock absorbers and regenerative brakes in various schemes. The regenerative shock absorber can convert the kinetic energy generated by the vibration of the landing gear system during landing to electrical energy. The regenerative brake can convert either the kinetic energy of the aircraft during landing or the heat generated in the brakes to electrical energy. The finalized conceptual design includes details of the entire system, including energy conversion, energy capture and storage, and energy usage.

Energy harvesting can be achieved in a variety of methods. As such, there are a lot of opportunities to maximize the efficiency of an energy harvesting system. For energy harvesting in aircraft landing gear, the power generation to weight ratio of a given system is the driver for ensuring installation of the system on a large scale.