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REPLACEMENT OF AN AIRCRAFT'S 'OLEO-PNEUMATIC HYDRAULIC SYSTEM' WITH AN
'ELECTROMAGNETIC SHOCK ABSORBING SYSTEM', AN ALTERNATIVE SOLUTION.**Abstract**

Mankind will soon become a space faring race with frequent travels from Earth to other planetary systems and back. An alternate landing and impact dynamics solution will be necessary to withstand different planetary environmental systems. Current landing and impact dynamics of aircraft oleo strut shock absorber systems have not undergone a major change for a decade or so. This abstract proposes to use Electro Magnets as a replacement of the landing gear's current oleo-pneumatic system, that can be used with landing systems in earth based or extraterrestrial locations. The proposal will be modeled through simulation and data-sets from available, measurable and estimated data. It will overcome disadvantages of hydraulic fluids, such as, hydraulic leakages, fluid replacement and reduction or possible elimination of fatigue due to repetitive hoop stress.

The scope of the study is limited to the use of electromagnets in the oleo-strut shock absorber. Associated systems such as power generation, sensor/sensory inputs, such as data ranges related to load, weight, magnetic and acting forces will be part of the study. The basic principle relies on the use of 'Electromagnetic Halbach' system to act as a shock absorbing mechanism. Oleo struts will be modified to accommodate the magnetic system. 'Controlled' repulsion force between the electromagnets will be used to act as a shock absorbing mechanism during landing, taxiing and take-off. The strength of the repulsion force between the electromagnets will be controlled based on real-time feedback from various sensors. This design, like existing and previous systems cushions the impacts and damps out vertical oscillations.

Similar technology exists in Maglev trains where electromagnetic forces are used to levitate a maglev train. Unlike the maglev system, this proposal focuses on the landing force impact control, dissipation, and management with the use of electromagnets. Various technologies such as Electromagnetic suspension (EMS), Electrodynamic suspension (EDS) and Magnetodynamic suspension (MDS) are currently available. Such technologies will form the foundation of the proposal. Use of electromagnetic system will be environment friendly and will not need the use of hydraulic fluid. Not all extraterrestrial atmospheres will be earth-like. Some planets will be without atmosphere, while others may be comparable to earth-like. The recommended electro magnetic systems can be used in any situations similar to earth-based scenario's or where thrusters are required.