

NASA Space Grant Opportunity:

Fellowship Project

Anti-vibration using Linear Propulsion

Available for: 1 student (US Citizen Not Required)

Organization: Sikorsky Aircraft
Engineering Science, Dynamics and Internal Acoustics

Technical Lead: William Welsh

Sikorsky Space Grant Project Coordinator: Steven Weiner 203-386-3776, Robert Frawley 203-386-3033

Description

Helicopters produce high vibration levels that disturb passengers and limit public acceptance as a transportation method. Automatic anti-vibration systems can help but they are too heavy.

New linear motor technology may enable a low weight anti-vibration device. This device involves propelling a metal wheel or "puck" around a circular track. The puck rolls very quickly but is not otherwise touched. The puck is propelled around the track at a pre-determined speed designed to counteract the helicopter vibration by providing a centrifugal force that cancels the unwanted vibration-producing force.

The puck is propelled by inducing eddy currents in the puck by energizing a surrounding magnetic field is caused to move in the direction we want the puck to travel. The moving magnetic field induces currents in the puck which cause it to be propelled in the same direction.

Can enough propulsive force be produced to force the puck around a two foot track at 1400 inches per second? This should take about 4 lbs of continuous propulsive force. The student will need to design the magnets using advanced tools like the finite element method to optimize the magnetic strength and efficiency. It is suggested that this project include an analytical study using verified tools and a simple bench test if time permits.

Skills Required

- The ideal candidate will have an interest in electricity and magnetism.
- Access to 3-D finite element analysis tools that can simulate magnetics

Helpful Skills

- Knowledge of finite element methods
- Willingness to learn and innovate