Vibration Based Solar Panel Cleaning Device

Status: Filled

Group Members: Adrian Wikarna, Bobby Jelveh, Kush Chhatbar, Yousef Saheb Javaher, Kirill Salita

Sponsor(s):

Supervisor(s):   Siamak Arzanpour, PhD, PEng, Associate Professor, Mechatronic Systems Engineering

Project Description

Solar panels are widely used to produce clean renewable energy. Application of solar panels in desert environments as well as space exploration require operation in dusty surroundings. In such environments accumulation of dust and sand on the surface of a solar panel leads to decrease in efficiency and can even render the panel inoperable. Dust removal in such situations becomes a serious concern. Existing solutions for solar panel cleaning are often expensive, labour intensive, complicated and inefficient.

Our team wants to build a compact inexpensive self-sufficient device that can be attached to a solar panel and protect it from sand and dust by applying vibration to the surface. This device would consist of an actuator (piezoelectric or electromagnetic), a battery, a driver module and a microcontroller. In addition to vibration, we will also consider adding electrostatic field generation functionality to protect surface from finer dust particles. Potentially this device can also be used to protect other surfaces from dust such as mirrors, windows, LCD screens.

By optimizing size, weight, efficiency and power consumption of the system we are hoping to build a compact device that can be attached to any surface and work for an extended period of time from a single cell battery. We think that such a device can be made affordable and have a wide variety of applications. Working on this project would allow us to learn about miniaturization, power management, actuators and prototyping. In addition, we will have the opportunity to develop a test system to validate our designs.

Timeline

Spring Term	
Week #	**Deliverables**
1-3	Goals outline Project scope & division of tasks

	Project Proposal (*due in week 2-3*)

4-7