

**Cranfield Defence and Security
Department of Engineering Systems and Management**

Internship Project Summer 2010

Title: Linear generator for energy harvesting from human movements

Introduction:

The linear generator is a lightweight electromagnetic system for generating, converting and storing electrical energy derived from human body movements. The kinetic energy generated from repeated everyday movements such as walking, running & cycling can be usefully converted into electrical energy by the linear generator, and stored in a removable battery / capacitor, which can be used to power electronic devices and gadgets worn by the person, or to power electric appliances in order to reduce carbon footprint. It is envisaged that there are many civilian and military applications.

In order to achieve efficient power conversion and system compactness, optimal electromagnetic design of the machine and control electronics are the key areas of research. The internship will involve close team work with other experienced researchers in the Power and Drive Systems Group, as well as the opportunities to work with some potential industry partners.

Aim:

Development of a linear generator demonstrator

Objectives:

- To develop simulation models to determine the dimensions and predict electromagnetic performance of the linear machine
- To develop simple embedded control algorithms
- To work with a local start-up company to help develop a commercially viable product (optional)

Pre-requisites:

- Electrical/electronic engineering and physics disciplines
- Strong analytical or simulation skills using MATLAB or similar software tools
- Experience in linear electric machines as well as embedded control will be a distinct advantage