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Technology Transfer Office

Licensing Opportunity

# Multivibe Vibrational Energy Harvester

## Overview

A novel, patented, 'fit and forget' energy harvesting solution that converts ambient vibrations into electrical power. The new technology eliminates the need for batteries and is tailored to power low-energy sensors for Internet of Things (IoT) applications.

Vibrational energy harvesters are typically based on linear oscillators, which can have a narrow frequency bandwidth. This impacts their ability to harvest energy as their resonant frequency must be close to the main frequency of ambient vibrations. Different methods have been suggested to overcome the problem of narrow bandwidth harvesters, however, the main challenges consist of increasing the output power and broadening the bandwidth at the same time.

## Technology

The technology is a prototype wideband (~6.5 Hz), tuneable (11-30 Hz) harvester product (74 mm tall x 40 mm diameter), with power conditioning circuitry (3.3 VDC), that has been demonstrated to TRL6 in an end-user's environment. Under excitation from an industrial compressor, the product has been successfully shown to power two industry-standard IoT wireless sensors: a LoRaWAN node and a Bluetooth SensorTag. The resonant frequency of the device can be tuned, via an adjustable cap, to match the input vibration source. This allows it to effectively capture energy across a wide range of vibration input frequencies. It is easily tuneable so that it can be optimised on-site when being fitted.

## Benefits

- Tuneable device: the same prototype can work in a range of different ambient vibrations and applications by adjusting the internal height of the prototype
- Larger output powers thanks to velocity amplification
- Wider bandwidth compared to common energy harvesters: if the main frequency of the ambient vibration varies in time, the harvester would still work, thanks to its broader frequency range
- Robust electrical contacts by using low stiffness extension springs
- Small size, lightweight, and low resonant frequency
- Suitable for a wide range of IoT sensors and communications protocols – 3.3V standard output.

## Applications

The Energy Harvester is an environmentally friendly alternative to batteries for remote or difficult-to-access applications such as:

- Industrial monitoring
- Automotive, railway, aeronautical
- Human motion
- Structural monitoring
- Agricultural machinery monitoring

## Commercial Opportunity

The technology is available for license, as the basis of a new Spin Out company and/or as the basis of further development projects. This technology has patent applications in the EU and US and has been developed by a world-class team of industry-engaged researchers.

☐Development partner

☒Commercial partner

☒Licensing

☒University spin-out

☐Seeking investment

**Patent Filings:**

WO2020260698A1

US8350394 (B2)

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## Figures


Figure 1. Energy Harvester vs standard “D” battery

Figure 2. Energy Harvester mounted on an industrial air compressor