



Vibration energy harvesting to power sensors

The technology

CSIC's innovative vibration energy harvesting (VEH) and low-power sensing technologies enable a new approach to distributed autonomous structural health monitoring.

The VEH technologies complement or replace existing battery solutions, providing enabling technology for long-term condition monitoring of assets in a range of remote and/or inaccessible locations.

Vibration energy harvesting can potentially provide a convenient, self-sustaining on-board power solution to complement emerging wireless sensor technologies – the smarter power backbone to the ever-growing wireless infrastructure.

Applications

These devices address a number of applications for powering wireless sensors in structural health monitoring, industrial process control and environmental monitoring. The team is currently engaged in integrating the harvesters with a variety of wireless sensor modules for monitoring transport-related infrastructure such as bridges and rail track.

The benefits

- fully packaged macro-scale vibration energy harvesters have undergone successful laboratory tests demonstrating peak power output of greater than 100mW. Ongoing work is addressing integration with wireless sensors and preliminary field trials with Industry Partners
- micro electro mechanical systems (MEMS)-scale harvesters have been developed with peak power output of up to 20 μ W with a design pathway outlined towards achieving peak output power of greater than 100 μ W
- MEMS-scale harvesters have been utilised to successfully power interface circuits for a MEMS strain gauge enabling the possibility of self-powered sensors and 'event-triggered' operation for wireless motes
- a spin-out company, 8Power, is being formed to commercialise the technology
- the team has been awarded a new Innovate UK project to develop the MEMS-scale vibration energy harvesting technology

"Energy harvesting has been attracting serious research and development attention over recent years. Increases in the level of harvested power are becoming interesting for real industrial remote sensing applications."

Steve Riches, Business Development at GE Aviation Systems

"The new vibration energy harvesting technology developed by CSIC is a world-class innovation with several large potential markets. A key benefit of the CSIC environment is the level of contacts and insight that the team has developed. This will be of great value as we build the business case for the spin-out company 8Power."

Robert Trezona, IP Group plc