

SFI CONNECT Energy Harvesting Testbed

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ABSTRACT: The Energy Harvesting Testbed will be comprised of modular time-controllable energy sources, allowing the creation of realistic, repeatable and interesting time versus energy profiles. As well as this it will have a fully developed modular system solution, from Energy Harvesting (EH) to Handheld device application. By having the system configured in a modular way means that developers from every part of the chain from EH to application can plug into the system and gain useful knowledge.

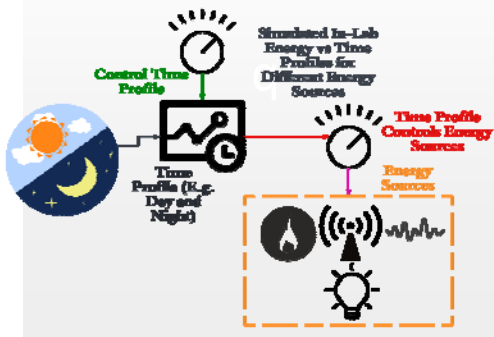
Introduction

The Testbed is for developers of Materials, Devices (energy transducers, storage devices, PMICs, sensors), Firmware (e.g. energy efficiency, condition monitoring algorithms), WSN protocols and communications infrastructure to have access to a fully functional EH solution that they can plug directly into with their own technology. A one stop shop for all developers in the chain to test and improve their own part.

Real-Time Profile Simulation

Key Features

- Real Time Controllable Energy Sources (Light, Heat, Vibration and RF)
- Experimental Simulation of Real-Life Time VS Energy Profiles



Challenges in Implementation

Some Challenges:

- Accurate and Safe Control of Energy Sources
- Calibration and Characterization of Energy Sources
- Collecting and Successfully Repeating Recorded Energy Profiles e.g., making the energy sources repeat the recorded ambient energy of an industrial setting

What is the EH Testbed?

Key Features

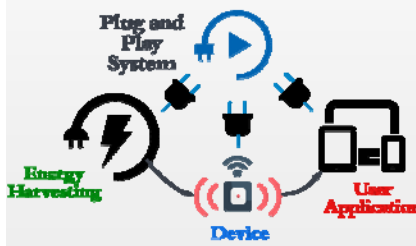
- Full System from EH to Network to User Application
- Modularly built for Easy Substitution of parts
- Standardized Configurations for Communications (Wireless and Wired) for Ease of Use



Challenges In Implementation

Some Challenges

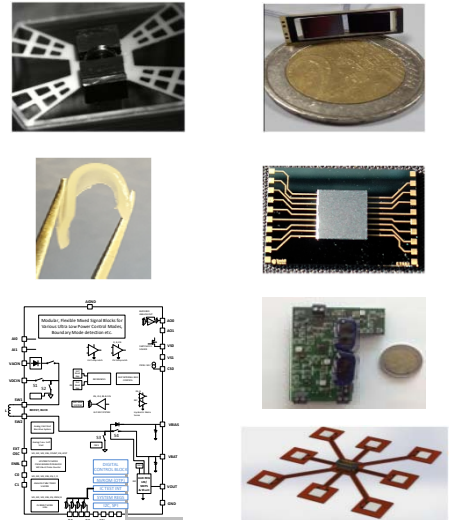
- Developing a clear methodology to allow all users to easily slot in their part
- Combining a Multitude of Disciplines into 1 Project Is Unpredictable
- Physically Designing a System that



Tyndall's Platform

- Tyndall Have Developed Many Devices Within These Fields
- (Below) EM Vibrational EH, MEMS Vibrational EH, Flexible Battery, SI Thermal Generator, Multisource PMIC, Discrete Multisource Harvester, TEG Flex Array.

Examples – Tyndall platforms:



Benefits

The EH WSN testbed will establish networking, power consumption and energy harvesting capability of eSIP type devices in into WSN modules in real life scenarios. It will

- foster collaborations
- attract technology developers interested in embedding/integrating their technology
- attract potential integrators and users of the technology.

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