

Wireless power delivery: An enabling technology for maintenance-free wireless devices

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We are part of an exciting multi-disciplinary team dedicated to the development of maintenance free wireless sensors as an enabler for bringing the tremendous benefits of advanced wireless technologies to those with cognitive disabilities. By applying our award winning technologies for efficient and safe harvesting of microwave energy, many wireless devices can be adapted so that they do not require user intervention for battery replacement, battery charging or device configuration. The result is that many of the practical barriers are removed for wide spread use of devices such as health monitoring sensors, medicine dispensers, speech, communications and personal assistants by those with cognitive or physical disabilities.

In this poster we present our latest results co-funded by the UCHSC Rehabilitation Engineering Research Center on Advancing Cognitive Technologies and a CU-Technology Transfer proof-of-concept grant to FreePower Technologies. Our demonstration system is a wireless, maintenance-free health monitoring sensor, as shown in Figure 1. The unit performs temperature, galvanic skin response (related to subject stress level) and 3-axis motion sensing and transmits data to a wireless receiver every once every 5 seconds. The average power consumption for the sensor is less than $5 \mu\text{W}$. The unit is powered via microwave energy from a nearby transmitter. We will demonstrate unit operation using a 1 W commercial power transmitter (about the output power of a typical cellular phone) that is capable of delivering up to tens of milli-watts to the wireless device (over a thousand times more than is required for this sensor example).

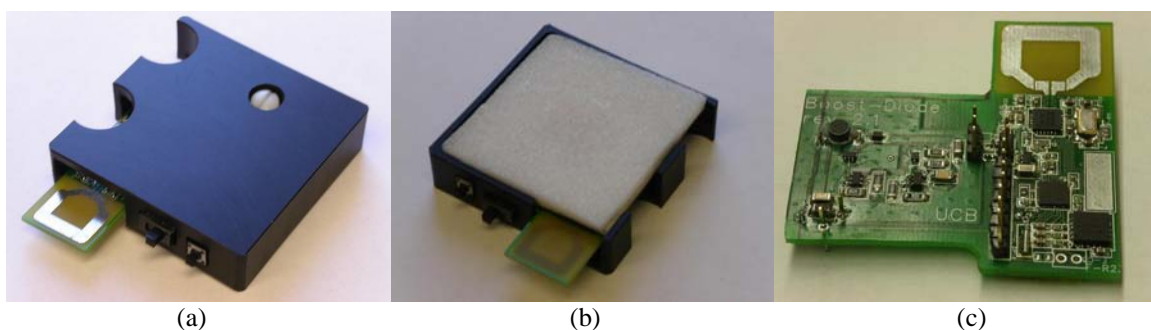


Figure 1: Wireless, maintenance-free health monitoring sensor demonstration unit: (a) Top view showing data transmission antenna and finger positions for galvanic skin response measurement, (b) bottom showing foam cover over energy harvesting rectenna and (c) internal system electronics.