SELF-POWERED WIRELESS SENSING FOR SMART INFRASTRUCTURE

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Effective sensing of environmental parameters or conditions rely on wireless connectivity of spatially distributed autonomous sensors to acquire and transmit data to a main location. To date, the majority of sensing and wireless transmission devices rely on wired connections or batteries that require periodic replacement, which is not entirely true to the concept of an autonomous embedded sensing network. Advances made towards the development of low-power microcontrollers, sensing devices and ultra low-power wireless technologies open the opportunity for substituting depletable batteries with low levels of locally-harvested kinetic, light, or thermal energy to power the sensing and transmission functions of a network.

The predominant approach to using locally-harvested power has been to use an auxiliary harvester, solar or mechanical power, to operate vibration or ow sensing and transmission devices. In contrast, it would be more advantageous, in terms of size or volume of sensing element or in terms of availability of power, to use the same device to sense a physical quantity over a specific time period and to harvest energy that can be used to operate itself as a sensor and to power the transmission of the acquired signal over other periods. In this work, we will present examples of self-powered wireless sensors of air speed, water flow and vibrations.