

A Versatile Wireless Sensor Network Platform for Structural Health Monitoring

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Due to its low cost, high scalability and easy of deployment, wireless sensor network (WSN) has been considered to be the next generation paradigm of structural health monitoring (SHM) systems. In the past several years, researchers have devoted considerable efforts and some preliminary prototypes of WSN-based SHM systems have been developed. However, constrained by the intrinsically low wireless bandwidth, limited node resources and lack of efficient coordination mechanism, the existing systems often fail to satisfy stringent SHM requirements such as high sampling rate (over KHz), strictly synchronized sensing among multiple sensors, high throughput of processing and transmission, low packet loss rate and some real-time constraints. Moreover, most of the existing systems are application-specific and can hardly be applied to structures with different characteristics and/or in different environmental conditions. To address these problems, we aim to develop a versatile high-performance WSN platform for SHM applications. This platform can satisfy most of the stringent SHM requirements. Moreover, it is flexible and supports on-line configuration of parameters or mechanisms to address requirements of various SHM applications. The high performance and wide-range applicability, along with the intrinsic advantages of WSNs, will make it a perfect platform for SHM areas.