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Low Power SHM via Frequency-Steerable Acoustic Transducers and Compressive Sensing

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The weight penalty and maintenance concerns associated with wiring a large number of transducers have to be addressed for widespread field deployment of Structural Health Monitoring (SHM) systems. Wireless sensors can simplify such deployment. However, a major limitation of wireless ultrasound sensing technology is the incompatibility between the high frequency of the ultrasound signals and the limited data throughput of existing wireless transponders. In this work, a novel transduction concept based on shaped sensors is combined with an innovative acquisition scheme to fulfill two main objectives: 1) to reduce the number of sensing elements; 2) to lower the data throughput with compressive acquisitions.

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Ключевые слова:

Содержание

Abstract

Introduction

Wavenumber spiral – frequency steerable acoustic transducers

Compressive sensing

Experimental results

Conclusions