

Abstract

Wireless and Passive SAW Devices, for Structural Health Monitoring Applications [†]

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Surface acoustic wave (SAW) passive and wireless sensors are a promising solution for condition and structural health monitoring (SHM) applications. They are robust devices, which can withstand extreme operating conditions (very high temperatures, high pressure, etc.). They do not require any embedded electronics and can be implanted in various kinds of (dielectric) structures. Moreover, SAW sensors of the reflective delay line (R-DL) type have built-in RFID capabilities, which can prove extremely useful for various industrial applications. Some selected applications are described in this poster. They are based on existing CTR 2.45GHz R-DL devices.

As surface acoustic wave (SAW) sensors often fail in operation, particularly, because of housing failure at high temperature, promising ‘package-less’ solutions are also presented. Here, guided modes that propagate in protective multilayer structures are used, instead of surface waves. In recent years, several multilayer configurations have been suggested, simulated and/or tested. However, thermo-mechanical effects are expected to impact the behavior of these devices. Besides, a solution to embed the antenna in the layer stack is yet to be developed. The realization of innovative ‘package-less’ (implantable) SAW devices for structural health monitoring (SHM) applications will first require that these two issues are solved.



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