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Abstract	Novel wireless remote inspection methods for identifying structural damages or system conditions have evolved over the last years motivated by new lightweight parts made of composite materials and with increasing system complexity. One smart way of enabling remote inspections can be performed through the use of Wireless Sensor Networks. This energy-efficient wireless technology has reached a maturity level that brings the industry in the position to advertise COTS products based on standardized communication protocols. The IEEE 802.15.4 is such a well-established communication standard already used in many control and monitoring applications beyond aerospace. This paper aims to provide the reader with a case study about wireless remote inspection of aircraft systems in order to understand the wireless communication and operational performance limits of the CSMA/CA protocol as part of IEEE 802.15.4. This paper provides also a brief overview about some aerospace applications, expected benefits as well as future challenges for designing wireless remote inspection applications using Wireless Sensor Networks.