Passive RFID Embedded Stress Sensor (PRESS) System

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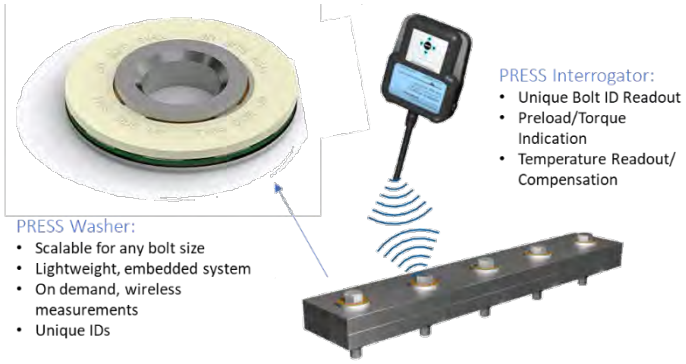

THE CHALLENGE

Lynntech's challenge was to develop a method of determining preload on aircraft bolted joints through a visual indication, or alternate means, that does not require physical measurement of torque via a torque wrench and does not require disassembly of any adjacent parts.

THE INNOVATION

Lynntech's smart, embedded, passive preload-measuring washer (PRESS) addresses the costly maintenance burdens of torque checks by rapidly and precisely quantifying the preload of multiple bolted joints without needing physical access, line-of-sight, or onboard power storage (no batteries). PRESS wirelessly communicates the preload measurement when interrogated by a handheld reader that is capable of reading and distinguishing between multiple washers simultaneously. The reusable PRESS is designed to be a direct replacement for the current washers with no loss in mechanical performance. It can be used on either the bolt head side or nut side.

The initial target application is the UH-60 Seahawk platform as a part of a SBIR Phase II effort funded by NAVAIR. Other possible applications include rotorcraft such as the CH-53K King Stallion, tiltrotor aircraft such as the V-22 Osprey, fixed wing aircraft, land vehicles, and Naval vessels.

THE NAVY BENEFIT

Frequent torque checks, while necessary for risk mitigation associated with loose fasteners, increase maintenance time and cost significantly for both DoD and commercial applications. Torque checking procedures for DoD rotorcraft require maintainers to disassemble aircraft components to gain adequate access to bolts, increasing the required labor. Beyond labor costs, these maintenance activities affect overall mission readiness. Lynntech's technology is projected to reduce associated maintenance labor by an estimated 97% and the logistical and monetary burden of replacing adjacent parts damaged during disassembly.

THE FUTURE

Lynntech has demonstrated function of a breadboard system in a laboratory environment and is currently developing an integrated prototype that will be tested in simulated relevant environments (e.g., temperature, salt-fog, vibration, chemical contamination). Lynntech is seeking additional PMAs that could benefit from the technology, contacts with primes for additional applications and integration with their systems, maintenance end users with applications where torque checks are labor intensive, and potentially other Radio Frequency antenna designers.

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