

WHO

SYSCOM: NAVAIR

Sponsoring Program: Chief Technology Office, Naval Air Systems Command (NAVAIR)

Transition Target: Initial target application: MH-60 Seahawk platform (PMA299).

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Other Transition Opportunities: Rotorcraft such as the CH-53K King Stallion, tiltrotor aircraft such as the V-22 Osprey, fixed wing aircraft, unmanned aerial vehicles, land vehicles, and undersea platforms.

Notes:
 PRESS is a family of washers that consist of embedded sensors and electronics for direct preload measurement and passive (does not require a battery) wireless data transmission.
 - Drop-in washer replacement/addition and typical washer installation procedure.
 - Each washer has a unique ID for easy tracking.
 - Washer wirelessly communicates joint preload and temperature to a handheld interrogator unit for direct reporting and logging of measurements

>\$600K per year in cost savings
 - A NAVAIR internal assessment showed that implementing something like Lynntech's PRESS for bolt torque spec checks in one bolt location on one helicopter platform (MH-60) could save the US DoD ~\$600K in highly skilled man hours in one year.
 - Implementation of this technology could help address (in part) the shortage of highly skilled labor

Top 3 Aspects for Competitive Advantage:
 - Size and weight: Essentially identical in size and weight to current washers
 - Power: No power required on the washer
 - Cost: Minimal cost per washer; cost savings significantly outweigh any implementation costs

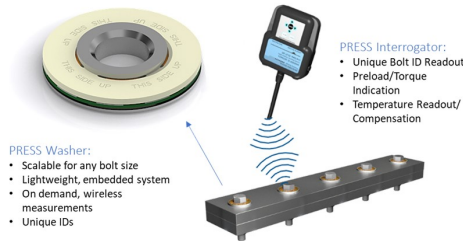


Image courtesy of Lynntech, Inc.

PRESS Washer:
 • Scalable for any bolt size
 • Lightweight, embedded system
 • On demand, wireless measurements
 • Unique IDs

PRESS Interrogator:
 • Unique Bolt ID Readout
 • Preload/Torque Indication
 • Temperature Readout/ Compensation

WHAT

Operational Need and Improvement: Torque checks of Naval Aircraft are tedious and time-consuming processes. Access restrictions require parts to be removed before many bolts can be torque checked, and require removal and replacement of potting compound on every bolted joint at frequent intervals. With Lynntech's PRESS Washer system this process is simplified to where each bolted joint is scanned for torque readings, without needing to remove potting compound or removing parts restricting access. This reduces what has been hours worth of maintenance (per bolted space) to just a few minutes. This also reduces wear and tear on the aircraft and decreases the chances of corrosion due to improper potting of the joints, resulting in significantly reduced cost and overall increased level of fleet readiness.

Specifications Required: A preload indicator that can be easily implemented onto existing Navy/Marine aircraft, without major modifications to any part of the structure or any other components on the aircraft.

The hardware should be able to accommodate bolts as small as 0.375-inches in diameter to as large as 1.6875-inches in diameter.

Additional installed hardware on the aircraft should be no more than a combined weight of two pounds. The hardware must have negligible effect (+/-5%) on the natural frequency of the fasteners as to not interfere with the existing health monitoring sensors.

Technology Developed: 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). The ±5% accuracy of the PRESS Washer preload measurement surpasses that of traditional torque wrenches. PRESS wirelessly communicates the preload measurement when interrogated by a handheld reader which is capable of reading and distinguishing between multiple washers simultaneously. The reusable PRESS Washer 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.

Warfighter Value: Significantly reduced maintenance hours. Reduced wear on aircraft systems. Less likely to damage parts during maintenance. Less likely to develop corrosion due to improper potting of bolted joints. Significantly reduced cost and overall increased level of fleet readiness.

WHEN

Contract Number: N68335-22-C-0185

Ending on: Mar 07, 2024

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Milestone 1: Identify System Requirements.	N/A	Determine exactly what the customers' needs and wants are out of the development effort. Determine specific limitations, conditions, and other considerations that may limit the design.	4	3rd QTR FY22
Milestone 2: Year 1 Demonstration	Low	Demonstrate System and Subsystem designs and developments to date.	4	3rd QTR FY23
Milestone 3: Test of Integrated Prototype	Medium	Test a fully integrated PRESS Washer under laboratory conditions that simulate target use locations.	4	4th QTR FY23
Milestone 4: Final Demonstration	Medium	Demonstrate fully integrated and functional PRESS Washer system in a variety of conditions under a variety of loads.	5	2nd QTR FY24

HOW

Projected Business Model: Primarily, successful commercialization of Lynntech's PRESS technology could be achieved through direct manufacturing and commercialization by Lynntech, or its sister company, On-Demand Systems USA (ODS - www.on-demandusa.com). ODS was created in June 2019 as a spin-off company to manufacture the Flight Breathing Awareness Trainer (FBAT) and potentially, any future technologies matured at Lynntech.

Company Objectives: Lynntech has a proven track record of moving technology to market, primarily through our ability to match technologies with the correspondingly appropriate business models (i.e., strategic alliances, licensing agreements, etc.) towards successful commercialization. In recognition of this, Lynntech received the 2016 Tibbetts Award, a prestigious award that recognizes organizations that have made a visible technological impact on the socio-economic front and exemplify the very best in SBIR achievements. Successful commercialization is part of our company's growth strategy.

Potential Commercial Applications: Anywhere bolts are used and torque compliance is key to continued performance is a potential commercial opportunity. This includes civilian aircraft maintenance, the wind power industry, and the automobile industry, among many others. For example, a wind turbine can contain ~25,000 bolts, each of them under precise bolt load. Lynntech's PRESS could be highly useful in reducing maintenance costs and increasing the efficiency of wind turbines.

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