

WHO

SYSCOM: NAVAIR

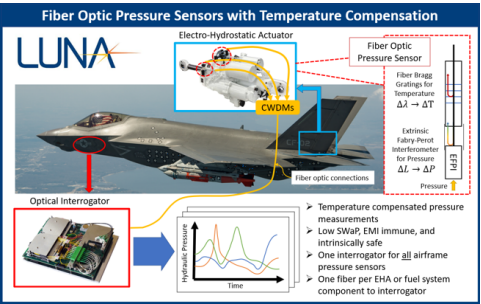
Sponsoring Program: PEO-JSF

Transition Target: F-35, F-18, V-22

TPOC: (240) 309-5720

Other Transition Opportunities: Hydraulic pressure sensing, pneumatic pressure sensing, nuclear , oil & gas, industrial

Notes: The accompanying image depicts Luna’s new fiber optic pressure sensors integrated in the electro-hydrostatic actuator (EHA) used in the F-35 to position the flight control surfaces. The Hyperion interrogator will be integrated in the airframe and interfaced to the flight control system.



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WHAT

Operational Need and Improvement: Pressure sensors are required to enable detection of failures prior to launch and during flight. Hydraulic systems are critical for military aircraft such as the F-35. Traditional pressure sensors for these systems are complex, expensive, and prone to reliability issues. Luna is developing a fiber optic pressure sensor with built-in temperature compensation that solves these problems and increases mission-readiness.

Specifications Required: Robust to pressure spikes (6,000 psi)
Low SWaP-C (size/weight/power/cost)
Reliable (30-year operation, 8,000 flight hours)
Immune to EMI

Technology Developed: The hydraulic pressure sensor will be a drop-in replacement for legacy sensors used in Electro-Hydrostatic Actuators (EHAs). Many fiber optic sensors can be multiplexed together for signal processing by a single interrogator, thereby saving weight for the aircraft. Luna will demonstrate sensor performance in laboratory and relevant environments to meet TRL 6 in Phase II.

Warfighter Value: Increase safety, aircraft uptime, mission readiness, and reduce maintenance costs. U.S. Navy fixed wing and rotary wing aircraft subsystems will directly benefit from this innovation.

WHEN

Contract Number: N68335-21-C-0727

Ending on: Aug 02, 2023

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Project Kickoff	N/A	Requirements established	4	4th QTR FY21
System architecture for integration in aircraft	Low	Installation location and interfaces defined	4	3rd QTR FY22
Sensor design complete and calibration procedure established	Medium	Accuracy, temperature, and pressure requirements met	5	1st QTR FY23
System demonstration in relevant environment	High	Navy and OEM witness of system performance	6	3rd QTR FY23
	Medium	Environmental tests (810G) and flight test	7	3rd QTR FY24

HOW

Projected Business Model: Luna will partner with OEM manufacturers and prime contractors to integrate robust fiber optic pressure sensors in aircraft hydraulic systems and actuators. The patent-pending technology can be licensed or manufactured in-house for new product lines that would be disruptive in the market.

Company Objectives: To enhance the safety, security and connectivity of people by leveraging our expertise in fiber optic-based technology and the information it provides.

Potential Commercial Applications: The hydraulic sensor will have significant potential applications beyond advanced aircraft. The hydraulic sensor with thermal compensation, along with a high-speed interrogator, can provide extremely useful information in extreme environments. Rocket testing facilities, oil & gas operations, industrial systems control, and nuclear power plant monitoring applications will all benefit from this advancement.