

Department of the Navy SBIR/STTR Transition Program

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Topic # N08-025

Innovative Method for Strain Sensor Calibration on Fleet Aircraft
ATA Engineering, Inc

WHO

SYSCOM: NAVAIR

Sponsoring Program: Joint Strike Fighter Office (JSF)

Transition Target: F/A-18 and EA-18G Program Office (PMA 265)

TPOC:
(301)342-9325

Other transition opportunities:
Joint Strike Fighter (F-35)



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WHAT

Operational Need and Improvement: To obtain a load history for individual fleet aircraft, strain sensors are installed during production and are monitored and recorded through every flight. This data is downloaded and used in structural fatigue life tracking methods to determine how much structural life has been expended. The readings on these strain sensors can vary by 10% or more from aircraft to aircraft due to manufacturing and installation issues. This variation must be accounted for before using the output of those sensors in the fatigue life tracking method. The Navy requires a solution for sensor calibration that avoids the expense of full-scale load rig testing and is more accurate than in-flight calibration.

Specifications Required: The technology must be applicable to legacy and future aircraft and existing strain sensor technology, and it must reduce error in strain readings to less than 1% (objective) or 2% (threshold). It must be operable by Navy artisans at the fleet depot level and rugged enough to survive the flightline environment.

Technology Developed: ATA is developing a ground-based strain sensor calibration system (SSCS) to obtain individual sensor correction factors for Navy fleet aircraft. The first system variant to be delivered to the Navy is configured to the F/A-18E, F and EA-18G and is capable of automatically calibrating the strain sensors at the outer wing fold, horizontal stabilator root, and vertical tail root.

Warfighter Value: Accurate in-flight structural health measurement (resulting from sensor calibration accomplished by the SSCS) leads to exponentially more accurate fatigue life predictions to avoid both catastrophic failure and unnecessary maintenance.

WHEN

Contract Number: N68335-15-C-0066 **Ending on:** June 1, 2016

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Calibration of long-term storage aircraft	Low	Successful calibration	6	January 2016
Calibration of fleet aircraft	Low	Successful calibration	7	February 2016
Calibration of loads-calibrated aircraft	Med	Consistency observed between SSCS and flight measurement system	7	May 2016
Delivery of first production unit	Low	Calibration performed by Navy artisans	8	June 2016

HOW

Projected Business Model: ATA will build and deliver several SSCS units for deployment to the Navy's Fleet Readiness Centers. We will provide training and technical support services during system roll-out. ATA may also perform aircraft sensor calibration services at the request of the Navy.

Company Objectives: ATA intends to leverage this technology in expanding our design, analysis, and test engineering services business. In particular, we view successful transition of this technology to the Navy as an important enabler for continued growth in the design and fabrication of ground support equipment and in the provision of specialized aircraft testing services, such as ground vibration testing (GVT). We also believe that the benefits observed in fielding the system on the F/A-18 platform will compel the stakeholders responsible for structural health of other aircraft to engage ATA in adapting the system for those aircraft. At the FST, we have particular interest in meeting with program office and prime contractor officials with involvement in structural health assessment and/or aircraft life extension.

Potential Commercial Applications: The SSCS has potential applications to commercial aircraft, spacecraft, unmanned aerial vehicles (UAVs), and other structures with embedded health monitoring sensors.

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